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Dear Readers,

With this issue, we offer you a new journal that originated from the *Journal of Research in Innovative Teaching* we started ten years ago. It served educators and researchers well, but we decided it was time to raise it to a higher level and provide top materials in a variety of educational areas that would help educators innovate and thus make education – both secondary and higher – more effective and efficient.

This issue presents five papers on the following topics:

1. innovation in education;
2. organizational practices;
3. online education;
4. history of educational innovations; and
5. globalization of education

The first paper, “Innovation in education: what works, what doesn’t, and what to do about it” by Peter Serdyukov, presents a systemic overview of the field of educational innovation, addressing various issues in the education system and beyond that create barriers for effective teaching and learning, and discusses prospective paths for enhancing educational innovations. The author argues that innovations are not solely technological in nature, as the human element remains the most crucial and sensitive aspect of any educational advances. He suggests that the principal focus of educators’ innovative work should be on learners and teachers, and on increasing the effectiveness and efficiency of all pedagogic efforts. The key to a prosperous, innovative society, in his opinion, is an educational system that breeds critical thinking, autonomy, self-efficacy, creativity, responsibility, and a culture that supports innovative education. The most effective way to spread innovations, according to the author, is to make it a major societal issue.

The next paper, “The role of the university in accelerated learning and innovation as a regional ecosystem integrator” by Kevin Celuch, Bryan Bourdeau, Mohammed Khayum, and Leslie Townsend, presents a social entrepreneurship program emphasizing innovative solutions to regional problems/needs. The model is examined through the lens of several defining aspects of ecosystems that exist on strong platforms, engage diverse actors, drive new collaborations, accelerate engaged learning and innovation, and create unique value. The model points to implications for the future of higher education.

The third paper, “A case study on narrative structures in instructional MOOC designs” by Elke Höfler, Claudia Zimmerman, and Martin Ebner, share the lessons learned in implementing certain MOOC instructional design patterns, such as shorter course duration, narrative structures with suspense peaks, and a course schedule that is diversified and stimulating within the “Dr Internet” MOOC.

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The paper “Problems and solutions for using computer (networks) for education” by Hermann Maurer, one of the pioneers of computer-based education, provides a unique insight into the 50-year history of the use of computers for teaching and learning. The author writes that in some niches, applications tend to be successful; in others, attempts to fully eliminate humans from the educational process are bound to fail. He reports on what he has learned over the last 50 years, and shares his rich experiences in the hope they will help other researchers avoid falling into the same traps.

Finally, R.D. Nordgren’s paper, “Cultural competence and relational closeness: examining refugee education,” uses a two-site case study to examine refugee education in Sweden together with relevant literature to explore effective ways in which refugees can be educated in Sweden, the USA, and elsewhere. This case study points toward the dual use of cultural competence and relational closeness as ways in which refugees can be integrated (rather than assimilated) into the cultures of their host nations.

Educators and researchers are invited to submit their innovative research for publication in JRIT&L.

Peter Serdyukov
Innovation in education: what works, what doesn’t, and what to do about it?

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Abstract

Purpose – The purpose of this paper is to present an analytical review of the educational innovation field in the USA. It outlines classification of innovations, discusses the hurdles to innovation, and offers ways to increase the scale and rate of innovation-based transformations in the education system.

Design/methodology/approach – The paper is based on a literature survey and author research.

Findings – US education badly needs effective innovations of scale that can help produce the needed high-quality learning outcomes across the system. The primary focus of educational innovations should be on teaching and learning theory and practice, as well as on the learner, parents, community, society, and its culture. Technology applications need a solid theoretical foundation based on purposeful, systemic research, and a sound pedagogy. One of the critical areas of research and innovation can be cost and time efficiency of the learning.

Practical implications – Several practical recommendations stem out of this paper: how to create a base for large-scale innovations and their implementation; how to increase effectiveness of technology innovations in education, particularly online learning; how to raise time and cost efficiency of education.

Social implications – Innovations in education are regarded, along with the education system, within the context of a societal supersystem demonstrating their interrelations and interdependencies at all levels. Raising the quality and scale of innovations in education will positively affect education itself and benefit the whole society.

Originality/value – Originality is in the systemic approach to education and educational innovations, in offering a comprehensive classification of innovations; in exposing the hurdles to innovations, in new arguments about effectiveness of technology applications, and in time efficiency of education.

Keywords Implementation, Innovation, Educational technology, Time efficiency

Paper type Conceptual paper

Necessity is the mother of invention (Plato).

Introduction

Education, being a social institution serving the needs of society, is indispensable for society to survive and thrive. It should be not only comprehensive, sustainable, and superb, but must continuously evolve to meet the challenges of the fast-changing and unpredictable globalized world. This evolution must be systemic, consistent, and scalable; therefore, school teachers, college professors, administrators, researchers, and policy makers are expected to innovate the theory and practice of teaching and learning, as well as all other aspects of this complex organization to ensure quality preparation of all students to life and work.

Here we present a systemic discussion of educational innovations, identify the barriers to innovation, and outline potential directions for effective innovations. We discuss the current
status of innovations in US education, what educational innovation is, how innovations are being integrated in schools and colleges, why innovations do not always produce the desired effect, and what should be done to increase the scale and rate of innovation-based transformations in our education system. We then offer recommendations for the growth of educational innovations. As examples of innovations in education, we will highlight online learning and time efficiency of learning using accelerated and intensive approaches.

Innovations in US education

For an individual, a nation, and humankind to survive and progress, innovation and evolution are essential. Innovations in education are of particular importance because education plays a crucial role in creating a sustainable future. “Innovation resembles mutation, the biological process that keeps species evolving so they can better compete for survival” (Hoffman and Holzhuter, 2012, p. 3). Innovation, therefore, is to be regarded as an instrument of necessary and positive change. Any human activity (e.g., industrial, business, or educational) needs constant innovation to remain sustainable.

The need for educational innovations has become acute. “It is widely believed that countries’ social and economic well-being will depend to an ever greater extent on the quality of their citizens’ education: the emergence of the so-called ‘knowledge society’, the transformation of information and the media, and increasing specialization on the part of organizations all call for high skill profiles and levels of knowledge. Today’s education systems are required to be both effective and efficient, or in other words, to reach the goals set for them while making the best use of available resources” (Cornali, 2012, p. 255). According to an Organization for Economic Cooperation and Development (OECD) report, “the pressure to increase equity and improve educational outcomes for students is growing around the world” (Vieluf et al., 2012, p. 3). In the USA, underlying pressure to innovate comes from political, economic, demographic, and technological forces from both inside and outside the nation.

Many in the USA seem to recognize that education at all levels critically needs renewal: “Higher education has to change. It needs more innovation” (Wildavsky et al., 2012, p. 1). This message, however, is not new – in the foreword to the 1964 book entitled Innovation in Education, Arthur Foshay, Executive Officer of The Horace Mann-Lincoln Institute of School Experimentation, wrote, “It has become platitudinous to speak of the winds of change in education, to remind those interested in the educational enterprise that a revolution is in progress. Trite or not, however, it is true to say that changes appear wherever one turns in education” (Matthew, 1964, p. v).

Yet, more than 50 years later, we realize that the actual pace of educational innovations and their implementation is too slow as shown by the learning outcomes of both school and college graduates, which are far from what is needed in today’s world. Jim Shelton, Assistant Deputy Secretary of the Office of Innovation and Improvement in the US Department of Education, writes, “Whether for reasons of economic growth, competitiveness, social justice or return on tax-payer investment, there is little rational argument over the need for significant improvement in US educational outcomes. Further, it is irrefutable that the country has made limited improvement on most educational outcomes over the last several decades, especially when considered in the context of the increased investment over the same period. In fact, the total cost of producing each successful high school and college graduate has increased substantially over time instead of decreasing – creating what some argue is an inverted learning curve […]”

“Education not only needs new ideas and inventions that shatter the performance expectations of today’s status quo to make a meaningful impact, these new solutions must also ‘scale,’ that is grow large enough, to serve millions of students and teachers or large portions of specific underserved populations” (Shelton, 2011). Yet, something does not work here.
Lack of innovation can have profound economic and social repercussions. America’s last competitive advantage, warns Harvard Innovation Education Fellow Tony Wagner, its ability to innovate, is at risk as a result of the country’s lackluster education system (Creating innovators, 2012). Derek Bok, a former Harvard University President, writes, “[…] neither American students nor our universities, nor the nation itself, can afford to take for granted the quality of higher education and the teaching and learning it provides” (Bok, 2007, p. 6). Hence it is central for us to make US education consistently innovative and focus educational innovations on raising the quality of learning at all levels. Yet, though there is a good deal of ongoing educational research and innovation, we have not actually seen discernable improvements in either school students’ or college graduates’ achievements to this day. Suffice it to mention a few facts. Program for International Student Assessment (PISA) evaluations keep revealing disappointing results for our middle school (Pew Research Center, 2015); a large number of high school graduates are not ready for college (College preparedness, 2012); and employers, in turn, are often dissatisfied with college graduates (Thomson, 2015; Jaschik, 2015). No one, be they students, parents, academia, business, or society as a whole, are pleased with these outcomes. Could it be that our education system is not sufficiently innovative?

Danny Crichton, an entrepreneur, in his blog The Next Wave of Education Innovation writes expressly, “Few areas have been as hopeful and as disappointing as innovation in education. Education is probably the single most important function in our society today, yet it remains one of the least understood, despite incredible levels of investment from venture capitalists and governments. Why do students continue to show up in a classroom or start an online course? How do we guide students to the right knowledge just as they need to learn it? We may have an empirical inkling and some hunches, but we still lack any fundamental insights. That is truly disappointing. With the rise of the internet, it seemed like education was on the cusp of a complete revolution. Today, though, you would be excused for not seeing much of a difference between the way we learn and how we did so twenty years ago” (Crichton, 2015).

Editors of the book Reinventing Higher Education: The Promise of Innovation, Ben Wildavsky, Andrew Kelly, and Kevin Carey write, “The higher education system also betrays an innovation deficit in another way: a steady decline in productivity driven by a combination of static or declining output paired with skyrocketing prices (Wildavsky et al., 2012, p. 3). This despairing mood is echoed by Groom and Lamb’s statement in EDUCAUSE Review, “Today, innovation is increasingly conflated with hype, disruption for disruption’s sake, and outsourcing laced with a dose of austerity-driven downsizing” (Groom and Lamb, 2014).

USA success has always been driven by innovation and has a unique capacity for growth (Zeihan, 2014). Nevertheless, it is indeed a paradox: while the USA produces more research, including in education, than any other country (Science Watch, 2009), we do not see much improvement in the way our students are prepared for life and work. The USA can be proud of great scholars, such as John Dewey, B.F. Skinner, Abraham Maslow, Albert Bandura, Howard Gardner, Jerome Bruner, and many others who have contributed a great deal to the theory of education. Yet, has this theory yielded any innovative approaches for the teaching and learning practice that have increased learning productivity and improved the quality of the output?

The USA is the home of the computer and the internet, but has the information revolution helped to improve the quality of learning outcomes? Where and how, then, are all these educational innovations applied? It seems, write Spangehl and Hoffman, that “American education has taken little advantage of important innovations that would increase instructional capacity, effectiveness, and productivity” (2012, p. 21). “The new ‘job factory’ role American universities have awkwardly stuffed themselves into may be killing the modern college student’s spirit and search for meaning” (Mercurio, 2016).
What is interesting here is that while we are still undecided as to what to do with our struggling schools and universities and how to integrate into them our advanced inventions, other nations are already benefiting from our innovations and have in a short time successfully built world-class education systems. It is ironic that an admirable Finnish success was derived heavily from US educational research. Pasi Sahlberg, a Finnish educator and author of a bestselling book, *The Finnish Lessons: What Can the World Learn from Educational Change In Finland*, said in an interview to the Huffington Post, “American scholars and their writings, like Howard Gardner’s Theory of Multiple Intelligences, have been influential in building the much-admired school system in Finland” (Rubin, 2015); so wrote other authors (Strauss, 2014). Singapore, South Korea, China, and other forward-looking countries also learned from great US educational ideas.

We cannot say that US educators and society are oblivious to the problems in education: on the contrary, a number of educational movements have taken place in recent US history (e.g. numerous educational reforms since 1957 to this day, including recent NCLB, Race to the Top, and the Common Core). Universities and research organizations opened centers and laboratories of innovation (Harvard Innovation Lab, Presidential Innovation Laboratory convened by American Council on Education, Center for Innovation in Education at the University of Kentucky, NASA STEM Innovation Lab, and recently created National University Center for Innovation in Learning). Some institutions introduced programs focusing on innovation (Master’s Program in Technology, Innovation, and Education at Harvard Graduate School of Education; Master of Arts in Education and Innovation at the Webster University). New organizations have been set up (The International Centre for Innovation in Education, Innovative Schools Network, Center for Education Reform). Regular conferences on the topic are convened (AERA, ASU-GSV Summit, National Conference on Educational Innovation, The Nueva School for the Innovative Learning Conference). Excellent books have been written by outstanding innovators such as Andy Hargreaves (2003), Hargreaves and Shirley (2009), Hargreaves *et al.* (2010), Michael Fullan (2007, 2010), Yong Zhao (2012), Pasi Sahlberg (2011), Tony Wagner (2012), Mihaly Csikszentmihalyi (2013), and Ken Robinson (2015). There is even an Office of Innovation and Improvement in the US Department of Education, which is intended to “[…] drive education innovation by both seeding new strategies, and bringing proven approaches to scale” (Office of Innovation and Improvement, 2016). And still, innovations do not take hold in American classrooms on a wide scale, which may leave the nation behind in global competition.

Society’s failure to anticipate the problems and their outcomes may have unpredictable consequences, as Pulitzer Prize winner and Professor Jared Diamond, University of California, Los Angeles, writes in his book, *Collapse: How Societies Choose to Fail or Succeed* (Diamond, 2005). Yong Zhao interpreted Diamond’s findings as “[…] society’s inability to perceive or unwillingness to accept large and distant changes – and thus work to come up with the right response – is among one of the chief reasons that societies fail. This inability also leads human beings to look for short-term outcomes and seek immediate gratification” (Zhao, 2012, p. 162). It looks like the issue of educational innovation goes beyond the field itself and requires a strong societal response.

Three big questions arise from this discussion: why, having so many innovators and organizations concerned with innovations, does our education system not benefit from them? What interferes with creating and, especially, implementing transformative, life-changing, and much-needed innovations across schools and colleges in this country? How can we grow, support, and disseminate worthy innovations effectively so that our students succeed in both school and university and achieve the best learning outcomes that will adequately prepare them for life and work? Let us first take a look at what is an educational innovation.
What is educational innovation?

Creativity is thinking up new things. Innovation is doing new things (Theodore Levitt).

To innovate is to look beyond what we are currently doing and develop a novel idea that helps us to do our job in a new way. The purpose of any invention, therefore, is to create something different from what we have been doing, be it in quality or quantity or both. To produce a considerable, transformative effect, the innovation must be put to work, which requires prompt diffusion and large-scale implementation.

Innovation is generally understood as “[…] the successful introduction of a new thing or method” (Brewer and Tierney, 2012, p. 15). In essence, “[…] innovation seems to have two subcomponents. First, there is the idea or item which is novel to a particular individual or group and, second, there is the change which results from the adoption of the object or idea” (Evans, 1970, p. 16). Thus, innovation requires three major steps: an idea, its implementation, and the outcome that results from the execution of the idea and produces a change. In education, innovation can appear as a new pedagogic theory, methodological approach, teaching technique, instructional tool, learning process, or institutional structure that, when implemented, produces a significant change in teaching and learning, which leads to better student learning. So, innovations in education are intended to raise productivity and efficiency of learning and/or improve learning quality. For example, Khan’s Academy and MOOCs have opened new, practically unlimited opportunities for massive, more efficient learning.

Efficiency is generally determined by the amount of time, money, and resources that are necessary to obtain certain results. In education, efficiency of learning is determined mainly by the invested time and cost. Learning is more efficient if we achieve the same results in less time and with less expense. Productivity is determined by estimating the outcomes obtained vs the invested effort in order to achieve the result. Thus, if we can achieve more with less effort, productivity increases. Hence, innovations in education should increase both productivity of learning and learning efficiency.

Educational innovations emerge in various areas and in many forms. According to the US Office of Education, “There are innovations in the way education systems are organized and managed, exemplified by charter schools or school accountability systems. There are innovations in instructional techniques or delivery systems, such as the use of new technologies in the classroom. There are innovations in the way teachers are recruited, and prepared, and compensated. The list goes on and on” (US Department of Education, 2004).

Innovation can be directed toward progress in one, several, or all aspects of the educational system: theory and practice, curriculum, teaching and learning, policy, technology, institutions and administration, institutional culture, and teacher education. It can be applied in any aspect of education that can make a positive impact on learning and learners.

In a similar way, educational innovation concerns all stakeholders: the learner, parents, teacher, educational administrators, researchers, and policy makers and requires their active involvement and support. When considering the learners, we think of studying cognitive processes taking place in the the brain during learning – identifying and developing abilities, skills, and competencies. These include improving attitudes, dispositions, behaviors, motivation, self-assessment, self-efficacy, autonomy, as well as communication, collaboration, engagement, and learning productivity.

To raise the quality of teaching, we want to enhance teacher education, professional development, and life-long learning to include attitudes, dispositions, teaching style, motivation, skills, competencies, self-assessment, self-efficacy, creativity, responsibility, autonomy to teach, capacity to innovate, freedom from administrative pressure, best conditions of work, and public sustenance. As such, we expect educational institutions to provide an optimal academic
environment, as well as materials and conditions for achieving excellence of the learning outcomes for every student (program content, course format, institutional culture, research, funding, resources, infrastructure, administration, and support).

Education is nourished by society and, in turn, nourishes society. The national educational system relies on the dedication and responsibility of all society for its effective functioning, thus parental involvement, together with strong community and society backing, are crucial for success.

A national education system is commonly the product of a distinctive set of historical, political, social, cultural, and economic effects. As it is a complete system, its different areas are not only interrelated and interdependent but act together. Subsequently, any change in one of them may generate a change in others. A few examples of innovations in some areas that made a drastic impact on the whole educational system are:

- political (NCLB (No Child Left Behind Act), Race to the Top);
- social (Equal Opportunities Act, affirmative action policy, Individual with Disabilities Education Act);
- philosophical (constructivism, objectivism);
- cultural (moral education, multiculturalism, bilingual education);
- pedagogical (competence-based education, STEM (curriculum choices in school: Science, Technology, English, and Mathematics);
- psychological (cognitive science, multiple intelligences theory, Maslow’s hierarchy of needs, learning style theory); and
- technological (computer-based learning, networked learning, e-learning).

Though these innovations left a significant mark on education, which of them helped improve productivity and quality of learning? Under NCLB, we placed too much focus on accountability and assessment and lost sight of many other critical aspects of education. In drawing too much attention to technology innovations, we may neglect teachers and learners in the process. Stressing the importance of STEM at the expense of music, arts and physical culture ignores young people’s personal, social, emotional, and moral development. Reforming higher education without reforming secondary education is futile. Trying to change education while leaving disfunctional societal and cultural mechanisms intact is doomed. It is crucial, therefore, when innovating to ask, “What is this innovation for?” “How will it work?” and “What effect will it produce?”

Many of us educators naively believe grand reforms or powerful technologies will transform our education system. Did we not expect NCLB to change our schools for the better? Did we not hope that new information technologies would make education more effective and relieve teachers from tedious labor? However, again and again we realize that neither loud reforms nor wondrous technology will do the hard work demanded of teachers and learners.

Innovations can be categorized as evolutionary or revolutionary (Osolind, 2012), sustaining or disruptive (Christensen and Overdorff, 2000; Yu and Hang, 2010). Evolutionary innovations lead to incremental improvement but require continuity; revolutionary innovations bring about a complete change, totally overhauling and/or replacing the old with the new, often in a short time period. Sustaining innovation perpetuates the current dimensions of performance (e.g. continuous improvement of the curriculum), while disrupting innovation, such as a national reform, radically changes the whole field. Innovations can also be tangible (e.g. technology tools) and intangible (e.g. methods, strategies, and techniques). Evolutionary and revolutionary innovations seem to have the same connotation as sustaining and disruptive innovations, respectively.
When various innovations are being introduced in the conventional course of study, for instance Universal Design of Learning (Meyer et al., 2014); or more expressive presentation of new material using multimedia; or more effective teaching methods; or new mnemonic techniques, students’ learning productivity may rise to some extent. This is an evolutionary change. It partially improves the existing instructional approach to result in better learning. Such learning methods as inquiry based, problem based, case study, and collaborative and small group are evolutionary innovations because they change the way students learn. Applying educational technology (ET) in a conventional classroom using an overhead projector, video, or iPad, are evolutionary, sustaining innovations because they change only certain aspects of learning. National educational reforms, however, are always intended to be revolutionary innovations as they are aimed at complete system renovation. This is also true for online learning because it produces a systemic change that drastically transforms the structure, format, and methods of teaching and learning. Some innovative approaches, like “extreme learning” (Extreme Learning, 2012), which use technology for learning purposes in novel, unusual, or nontraditional ways, may potentially produce a disruptive, revolutionary effect.

Along with types of innovation, the degree of impact can be identified on the following three levels:

1. Adjustment or upgrading of the process: innovation can occur in daily performance and be seen as a way to make our job easier, more effective, more appealing, or less stressful. This kind of innovation, however, should be considered an improvement rather than innovation because it does not produce a new method or tool. The term innovative, in keeping with the dictionary definition, applies only to something new and different, not just better, and it must be useful (Okpara, 2007). Educators, incidentally, commonly apply the term “innovative” to almost any improvement in classroom practices; yet, to be consistent, not any improvement can be termed in this way. The distinction between innovation and improvement is in novelty and originality, as well as in the significance of impact and scale of change.

2. Modification of the process: innovation that significantly alters the process, performance, or quality of an existing product (e.g. accelerated learning (AL), charter school, home schooling, blended learning).

3. Transformation of the system: dramatic conversion (e.g. Bologna process; Common Core; fully automated educational systems; autonomous or self-directed learning; online, networked, and mobile learning).

First-level innovations (with a small i) make reasonable improvements and are important ingredients of everyday life and work. They should be unequivocally enhanced, supported, and used. Second-level innovations either lead to a system’s evolutionary change or are a part of that change and, thus, can make a considerable contribution to educational quality. But we are more concerned with innovations of the third level (with a capital I), which are both breakthrough and disruptive and can potentially make a revolutionary, systemic change.

All innovations are ultimately directed at changing qualitative and/or quantitative factors of learning outcomes:

- qualitative: better knowledge, more effective skills, important competencies, character development, values, dispositions, effective job placement, and job performance; and
- quantitative: improved learning parameters such as test results, volume of information learned, amount of skills or competencies developed, college enrollment numbers, measured student performance, retention, attrition, graduation rate, number of students in class, cost, and time efficiency.
Innovation can be assessed by its novelty, originality, and potential effect. As inventing is typically a time-consuming and cost-demanding experience, it is critical to calculate short-term and long-term expenses and consequences of an invention. They must demonstrate significant qualitative and/or quantitative benefits. As a psychologist Mihalyi Csikszentmihalyi writes, “human well-being hinges on two factors: the ability to increase creativity and the ability to develop ways to evaluate the impact of new creative ideas” (Csikszentmihalyi, 2013, p. 322).

In education, we can estimate the effect of innovation via learning outcomes or exam results, teacher formative and summative, formal and informal assessments, and student self-assessment. Innovation can also be computed using such factors as productivity (more learning outcomes in a given time), time efficiency (shorter time on studying the same material), or cost efficiency (less expense per student) data. Other evaluations can include the school academic data, college admissions and employment rate of school graduates, their work productivity and career growth.

Assessing the effects of innovation can also be based on the scale of implementation:

- singular/local/limited;
- multiple/spread/significant; and
- system-wide/total.

This gradation correlates with the three levels of innovation described above: adjustment, modification, and transformation. To make a marked difference, educational innovation must be scalable and spread across the system or wide territory. Prominent examples include Khan Academy in the USA, GEEKI Labs in Brazil (GEEKI), and BRIDGE International Academies in Kenya (BRIDGE). Along with scale, the speed of adoption or diffusion, and cost are critical for maximizing the effect of innovation.

Innovations are nowadays measured and compared internationally. According to the 2011 OECD report (OECD, 2014), the USA was in 24th place in educational innovativeness in the world. This report singled out the use of student assessments for monitoring progress over time as the top organizational innovation, and the requirement that students were to explain and elaborate on their answers during science lessons as the top pedagogic innovation in the USA. Overall, the list of innovations selected by OECD was disappointingly unimpressive.

Innovations usually originate either from the bottom of the society (individual inventors or small teams) – bottom-up or grass root approach, or from the top (business or government) – top-down or administrative approach. Sometimes, innovations coming from the top get stalled on their way to the bottom if they do not accomplish their goal and are not appreciated or supported by the public. Should they rise from the bottom, they may get stuck on the road to the top if they are misunderstood or found impractical or unpopular. They can also stop in the middle if there is no public, political, or administrative or financial backing. Thus, innovations that start at the bottom, however good they are, may suffer too many roadblocks to be able to spread and be adopted on a large scale. Consequently, it is up to politicians, administrators, and society to drive or stifle the change. Education reforms have always been top-down and, as they near the bottom, typically become diverted, diluted, lose strength, or get rejected as ineffective or erroneous. As Michael Fullan writes in the Foreword to an exciting book, *Good to Great to Innovate: Recalculating the Route to Career Readiness, K012+*, “[…] there is a good deal of reform going on in the education world, but much of it misses the point, or approaches it superficially” (Sharratt and Harild, 2015, p. xiii).

Innovations enriching education can be homegrown (come from within the system) or be imported (originate from outside education). Examples of imported innovations that result from revolution, trend, or new idea include the information technology revolution, social media, medical developments (MRD), and cognitive psychology. Innovations can also be borrowed from
superior international theories and practices (see Globalization of Education chapter). National reform may also be a route to innovation, for instance when a government decides to completely revamp the system via a national reform, or when an entire society embarks on a new road, as has happened recently in Singapore, South Korea, and Finland.

Innovations may come as a result of inspiration, continuous creative mental activity, or “supply pushed” through the availability of new technological possibilities in production, or “demand led” based on market or societal needs (Brewer and Tierney, 2012, p. 15). In the first case, we can have a wide variety of ideas flowing around; in the second, we observe a ubiquitous spread of educational technologies across educational system at all levels; in the third, we witness a growth of non-public institutions, such as private and charter schools and private universities.

Innovation in any area or aspect can make a change in education in a variety of ways. Ultimately, however, innovations are about quality and productivity of learning (this does not mean we can forget about moral development, which prepares young people for life, work, and citizenship) (Camins, 2015). Every innovation must be tested for its potential efficiency. The roots of learning efficiency lie, however, not only in innovative technologies or teaching alone but even more in uncovering potential capacities for learning in our students, their intellectual, emotional, and psychological spheres. Yet, while innovations in economics, business, technology, and engineering are always connected to the output of the process, innovation in education does not necessarily lead to improving the output (i.e. students’ readiness for future life and employment). Test results, degrees, and diplomas do not signify that a student is fully prepared for his or her career. Educational research is often disconnected from learning productivity and efficiency, school effectiveness, and quality output. Innovations in educational theories, textbooks, instructional tools, and teaching techniques do not always produce a desired change in the quality of teaching and learning. What, then, is the problem with our innovations? Why do not we get more concerned with learning productivity and efficiency? As an example, let us look at technology applications in teaching and learning.

Effects of technology innovations in education

A tool is just an opportunity with a handle (Kevin Kelly).

When analyzing innovations of our time, we cannot fail to see that an overwhelming majority of them are tangible, being either technology tools (laptops, iPads, smart phones) or technology-based learning systems and materials, e.g., learning management system (LMS), educational software, and web-based resources. Technology has always served as both a driving force and instrument of innovation in any area of human activity. It is then natural for us to expect that innovations based on ET applications can improve teaching and learning. Though technology is a great asset, nonetheless, is it the single or main source of today’s innovations, and is it wise to rely solely on technology?

The rich history of ET innovations is filled with optimism. Just remember when tape recorders, video recorders, TV, educational films, linguaphone classes, overhead projectors, and multimedia first appeared in school. They brought so much excitement and hope into our classrooms! New presentation formats catered to various learning styles. Visuals brought reality and liveliness into the classrooms. Information and computer technology (ICT) offered more ways to retrieve information and develop skills. With captivating communication tools (iPhones, iPads, Skype, FaceTime), we can communicate with anybody around the world in real time, visually, and on the go. Today we are excited about online learning, mobile learning, social networking learning, MOOCs, virtual reality, virtual and remote laboratories, 3D and 4D printing, and gamification. But can we say all this is helping to produce better learning? Are we actually using ET’s potential to make a difference in education and increase learning output?
Larry Cuban, an ET researcher and writer, penned the following: “Since 2010, laptops, tablets, interactive whiteboards, smart phones, and a cornucopia of software have become ubiquitous. We spent billions of dollars on computers. Yet has academic achievement improved as a consequence? Has teaching and learning changed? Has use of devices in schools led to better jobs? These are the basic questions that school boards, policy makers, and administrators ask. The answers to these questions are ‘no,’ ‘no,’ and ‘probably not.’” (Cuban, 2015). This cautionary statement should make us all think hard about whether more technology means better learning.

Technology is used in manufacturing, business, and research primarily to increase labor productivity. Because integrating technology into education is in many ways like integrating technology into any business, it makes sense to evaluate technological applications by changes in learning productivity and quality. William Massy and Robert Zemsky wrote in their paper, “Using Information Technology to Enhance Academic Productivity,” that “[…] technology should be used to boost academic productivity” (Massy and Zemsky, 1995). National Educational Technology Standards also addressed this issue by introducing a special rubric: “Apply technology to increase productivity” (National Educational Technology Standards, 2004). Why then has technology not contributed much to the productivity of learning? It may be due to a so-called “productivity paradox” (Brynjolfsson, 1993), which refers to the apparent contradiction between the remarkable advances in computer power and the relatively slow growth of productivity at the level of the whole economy, individual firms, and many specific applications. Evidently, this paradox relates to technology applications in education.

A conflict between public expectations of ET effectiveness and actual applications in teaching and learning can be rooted in educators’ attitudes toward technology. What some educational researchers write about technology in education helps to reveal the inherent issue. The pillars and building blocks of twenty-first century learning, according to Linda Baer and James McCormick (2012, p. 168), are tools, programs, services, and policies such as web-enabled information storage and retrieval systems, digital resources, games, and simulations, eAdvising and eTutoring, online revenue sharing, which are all exclusively technological innovations. They are intended to integrate customized learning experiences, assessment-based learning outcomes, wikis, blogs, social networking, and mobile learning. The foundation of all this work, as these authors write, is built on the resources, infrastructure, quality standards, best practices, and innovation.

These are all useful, tangible things, but where are the intangible innovations, such as theoretical foundation, particularly pedagogy, psychology, and instructional methodology that are a true underpinning of teaching and learning? The emphasis on tools seems to be an effect of materialistic culture, which covets tangible, material assets or results. Similarly, today’s students worry more about grades, certificates, degrees, and diplomas (tangible assets) than about gaining knowledge, an intangible asset (Business Dictionary, 2016). We may come to recognize that modern learning is driven more by technological tools than by sound theory, which is misleading.

According to the UNESCO Innovative Teaching and Learning (ITL) Research project conducted in several countries, “ICT has great potential for supporting innovative pedagogies, but it is not a magic ingredient.” The findings suggest that “[…] when considering ICT it is important to focus not on flash but on the student learning and 21st century skills that ICT can enable” (UNESCO, 2013). As Zhao and Frank (2003) argue in their ecological model of technology integration in school, we should be interested in not only how much computers are used but also how computers are used. Evidently, before starting to use technology we have to ask first, “What technology tools will help our students to learn math, sciences, literature and languages better, and how to use them efficiently to improve the learning outcomes?”
Thus, the problem of ET innovations is twofold: any integration of technology in teaching and learning has to demonstrate an increased productivity of teaching and learning, but it can be achieved only when ET applications are based on an effective pedagogic theory. Technology innovation will eventually drive pedagogic innovations, without a doubt, however, this path is slower, more complicated, and leads to an enormous waste of financial, technical and human resources.

Technocentric syndrome

More disquieting than even the lack of pedagogical foundation for technology-enhanced education is the sincere belief of many educators that technology will fix all the problems they encounter in the classroom, be they live or virtual. Consequently, fewer university professors nowadays perceive the need for pedagogic mastery in online teaching in addition to content-area expertise as they reason technology will solve all instructional difficulties anyway. This belief is called “technocentrism” (Pappert, 1990), which, according to Nickols (2011), is common in higher education and e-learning discussions. It is probably common in secondary school as well. Unfortunately, educators often forget that the computer is only an extension of human abilities, not a replacement or substitute. We, as educators, must realize that for technology innovation to produce a positive effect in learning it must be preceded by pedagogic leadership, research, and sound theory; however, the reality is typically the reverse. We are excited to grab the new gadget and try to fit it into the classroom without preliminary assessment of its implementation challenges and potential effects, solid research, or laying out a theoretical foundation based on advanced pedagogic theory which will ensure its effective use. Former Kodak Chairman George Fisher described it this way, “Even good people get locked into processes that may be totally inappropriate to deal with a new technology attacking from underneath (Christensen and Eyring, 2011, p. 16).

Technology (as an entity) contains an inherent pedagogical value (Accuosti, 2014, p. 5). It pushes the limits of what educators can do but is not a magic wand; it is only a means, an instrument, a tool for an innovative teacher and learner. That we overestimate technology’s power in education has its roots in human anticipation of a miracle, or a hope of finding a quick fix. But “[…] we can’t just buy iPads (or any device), add water, and hope that strategy will usher schools to the leading edge of 21st century education. Technology, by itself, isn’t curative. Human agency shapes the path” (Levasseur, 2012). We are all excited by the technology and information revolution and believe in its potential but “[…] perhaps the next important revolution isn’t technological, even as technology marches forward unabated. Perhaps the revolution that we need, the one we should aspire to, is societal. Indeed, the next revolution should be one of education, empathy, and a broader understanding of the world, and of its people and culture” (Jiang, 2015).

One of my students wrote in a recent online class, “Students learn from their teachers, not from electronic gadgets.” Do we understand how students learn in a technology-based environment, one-on-one with the laptop or mobile phone? Can we estimate possible changes in the students’ cognition, learning style, behavior, attitudes, values, and social relationships under the influence of electronic devices? It is certainly true that live interaction between students and their teachers offers worthy examples and enlightening experiences for students and gratifying moments for teachers. Overestimating the power of technology, regrettably, leads to the deterioration of the “human element” (Serdiukov, 2001) in technology-based and, particularly, online teaching and learning. It further underestimates the need for sound pedagogy and quality teacher preparation. It may also have a devastating impact on our ability to socialize, collaborate, and survive. George Friedman argues that computers have had “profoundly disruptive consequences on cultural live throughout the world” (Friedman, 2012, p. 25), which could not have left education unperturbed.
Neil Postman addressed another concern of overemphasizing the role of technology in education, cautioning against “[...] surrendering education to technology” (Postman, 1993), which may have far-reaching social and cultural consequences (Serdyukov, 2013b). According to Sousa (2014), the widespread use of technology is having both positive and negative effects on students’ attention and memory systems. A strong warning about the negative effects of the Web comes from Maurer et al. (2013), who caution that modern media, particularly networked computers, are endangering our capacity to think, to remember clearly, and to read and write with concentration; they also imperil creativity. “New technologies, whether or not they succeed in solving the problem that they were designed to solve, regularly create unanticipated new problems” (Diamond, 2005, p. 505). There are numerous social, cultural and psychological side effects of technology-enhanced or technology-based education, among them placing unrealistic hopes on technology, which leads to weakening a student’s and teacher’s effort and eventually takes the teachers out of the equation. This in turn makes the outcomes of online learning overly dependent on the LMS platform, washing away human interaction and communication by industrializing and formalizing learning.

Christensen and Eyring (2011), who wrote about disruptive innovations that force universities to change, predict that teaching in the future will be disruptable as technology improves and shifts the competitive focus from a teacher’s credentials or an institution’s prestige to what students actually learn. Their observations support the findings of other studies that indicate learning occurs best when it involves a blend of online and face-to-face learning, with the latter providing essential intangibles best obtained on a traditional college campus. From this statement, one can extrapolate that technology alone cannot ensure productive and enriched learning and, especially, personal and social development as students still need a human element in a technology-enhanced environment. Additionally, when planning to apply a new technology to education, we have to consider its potential pedagogic and psychological effects. Finally, we need a solid, innovative, theoretical foundation for online learning. This foundation would help teachers do a better job in both classroom and online environments than simply integrating computers and other gadgets into learning. It would help enrich students’ otherwise almost entirely independent online experiences using only LMS navigation as a GPS in the world of knowledge with inspiring interaction with a live instructor, peers, and real life.

As technology-based education is unquestionably going to grow, we need to make it pedagogically, psychologically, and socially meaningful and effective. At the same time, we want to minimize its negative short- and long-term consequences, which reaffirms the need for a comprehensive theory of technology-based education and serious research.

**Online learning concerns**

Demand for online learning is largely driven by working adult students (WALs) willing to have broad access to education and, at the same time, to accommodate learning to their busy lives, rather than by its effectiveness as a cognitive tool, which is determined by its most attractive feature – convenience (Christensen and Eyring, 2011; Song et al., 2004). In studies of student satisfaction, students commonly rate their online experiences as satisfactory, with convenience being the most cited reason (Cole et al., 2014). We observe students’ preference for convenience as a consumer strategy, and regrettably, not only in online higher education but across the whole educational system (Kerby et al., 2014). Convenience, along with comfort, helps reduce workload and complexity of learning, as well as the strain of face-to-face interaction with the class and instructor. It produces a sense of privacy and self-satisfaction. It also generates a false perception that online learning is easier than learning in the classroom (Aaron, 2007; Westra, 2016), and often leads to online cheating (Spalding, 2012). The convenience, like the happiness factor, however, means a less
demanding and less rigorous school experience (Zhao, 2012, p. 137). Convenience can be a blessing for creative people, liberating them from the need to waste time and energy on trifles; however, it may also develop self-gratification and laziness instead of struggling with obstacles and doing the hard job of digging in the knowledge mine.

So, accessibility and, especially, convenience, enhanced by flexibility of the study schedule and comfortable learning environment of one's office or bedroom are evidently the key factors of its popularity among students. The motto of online education, "Any time, any place, any pace" is extremely seductive. Yet, despite a number of studies showing that online learning is on a par with traditional, campus-based learning (Ni, 2013; Wrenn, 2016), it is going to take more time and effort to really make online learning deliver outcomes comparable to the traditional classroom-based, face-to-face education. Mattan Griffel, Founder of "One Month," an online education startup, rethinks online education in the aftermath of the MOOC explosion writing, "[Online education] has kind of overstepped its current effectiveness, and everyone is saying what is possible by painting this picture, but the tools haven’t reached that point yet" (Crichton, 2015). We know very well online education suffers from restricted interaction among students and with the instructor, is deficient of live collaboration, and lacks opportunities for relationships that take form in a study group. These collective relationships are crucial for individual success. Productive online learning also depends on well-developed learning, technology, critical thinking, research, and even reading and writing skills, as well as strong intrinsic motivation, perseverance, and self-efficacy, which many students do not possess. Finally, substituting real-life objects and processes with virtual reality is not helpful in developing practical skills, which makes real-world laboratory and experimental work less effective in virtual online environments.

Still, the question remains whether online education has helped improve teaching and learning. With the popularity of online education and enormous investment, do online college programs now prepare better specialists? Have we achieved the result we had expected, besides widening access to education for working adult learners, formerly marginalized groups, such as disabled students and minorities, and people geographically separated from the learning centers, thus reaching multi-million enrollment in online programs by 2016 and making sure that students enjoy convenience in their studies?

Innovative technology may bring performance enhancement in some ways but does not necessarily produce a direct benefit to education expressed by increased learning productivity. Are the secondary benefits, like convenience or fun with technology, worthy of heavy investment? What, then, is needed to raise the quality of education? The real question here is, as always, do we control technology, or do we let ourselves be controlled by it and those who have created it? "Choose the former," writes an innovative author Douglas Rushkoff, “and you gain access to the control panel of civilization. Choose the latter, and it could be the last real choice you get to make” (Rushkoff, 2010). The raw powers of technology should be harnessed by sound pedagogy.

Pedagogy of online education is just being developed, after two decades of titanic effort (Serdyukov, 2015a). Online learning is a big business (Stokes, 2012), which should be turned into a serious academic endeavor. When improving online learning, we should not narrow our innovative focus down to only technical solutions in all educational issues. We need to develop a broader look at all aspects of teaching and learning rather than trying to resolve problems and overcome barriers with technology alone.

**Barriers to innovation**

There are reasons for the discrepancy between the drive for educational innovation that we observe in some areas, great educational innovations of recent times, and the daily reality of the education system.
First of all, if we look at the education holistically, as a complete system in charge of sustaining the nation’s need for educating society members and building their knowledge and expertise throughout their active lifetime, we have to acknowledge that all educational levels are interrelated and interdependent. Moreover, education being a system itself is a component of a larger social supersystem, to which it links in many intricate and complicated ways. As a social institution, education reflects all the values, laws, principles, and traditions of the society to which it belongs. Therefore, we need to regard education as a vital, complete, social entity and address its problems, taking into account these relations and dependencies both within the educational system and society.

In turn, if the society supports innovations in education, then its educational system will continuously and effectively evolve and progress. If it does not, education will stagnate and produce mediocre outcomes. An example of negative socio-cultural impact on education is mercantilism, which is destroying the ultimate purpose of education, and consumerism which is degrading institutions of higher education (Feeman and Thomas, 2005; Ng and Forbes, 2009; Abeyta, 2013). Other harmful social and cultural trends exert a powerful influence. These include monetization of education, entitlement, instant gratification, and egotism, which destroy education in general and the development of creativity and innovative spirit of students in particular (Kerby et al., 2014). Such grave societal issues must be dealt with forcefully.

Second, it is well known that higher education has been historically slow to adopt innovations for various reasons (Hoffman and Holzhuter, 2012; Marcus, 2012; Evans, 1970). Because it is complex (due to cohesion and continuity of science) and labor intensive, higher education is particularly difficult to make more productive (Brewer and Tierney, 2012). Secondary school is even more conservative than universities because they cater more and more to students’ well-being and safety than to their preparation for real life and work (Gibbons and Silva, 2011). Both secondary and higher education function as two separate and rather closed systems in their own rights. They are not only loosely connected to the wider world but also suffer from a wide disconnect between high school output measured in graduate learning outcomes and college entrance student expectations. It seems that “[…] the systems and values of industrial education were not designed with innovation and digital tools in mind. Innovation, whether it is with technology, assessment or instruction, requires time and space for experimentation and a high tolerance for uncertainty. Disruption of established patterns is the modus operandi of innovation. We like the fruits of innovation, but few of us have the mettle to run the gauntlet of innovation” (Levasseur, 2012). It is paramount, nonetheless, to accept that “innovation is linked to creativity, risk taking, and experimentation” (Brewer and Tierney, 2012, p. 15), which must be a part of the education system.

Innovation is difficult to spread across school and academia because it disrupts the established routine and pushes implementers out of their comfort zone. Terry Heick writes that “[…] many K-12 schools give lip-service to the concept of innovation in mission statements, on websites, in PDs (professional development), and during committee, council, and board meetings, but lose their nerve when it’s time to make it happen. Supporting something seen as secondary (innovation) in the face of pressure, far-reaching programs, external standards ranging from Common Core to Literacy, Technology, and Career Readiness becomes a matter of priority and job security. While education begs for innovation, arguments against it often turn to tempting, straw man attacks” (Heick, 2016). In many instances, innovation in educational institutions does not take priority over pressing routine issues – really, abiding by the state standards is more urgent.

Teachers and school administrators are commonly cautious about a threatening change and have little tolerance for the uncertainty that any major innovation causes. Of course there are schools and even districts that are unafraid to innovate and experiment but their
success depends on individual leaders and communities of educators who are able to create an innovative professional culture. Pockets of innovation give hope but we need a total, massive support for innovations across society.

Third, one of the reasons for the slow pace of improvements in education is a sharp conflict between society’s welfare and political and business interests, as vividly illustrated when the NCLB took US education on the path of rigid accountability. It was used by standardized testing companies to reap huge profits (or, may be, vice versa, these companies influenced NCLB). The trend stifled true education and produced unsatisfactory learning outcomes that changed the nature of teaching, narrowing the curriculum and limiting student learning. (National Council of Teachers of English, 2014; The National Center for Fair and Open Testing, 2012).

Fourth, even when an innovation comes to life, it is of little worth without implementation (Csikszentmihalyi, 2013). Innovation is not about talking the talk but walking the walk. Moreover, an innovation can make a significant difference only when it is used on a wide scale. To create innovations is not enough, they need to be spread and used across schools and universities, a more difficult task. For the innovation to make a sizable effect, we need an army of implementers together with favorable conditions for the invention to spread and produce a result. Implementers in turn have to be creative and motivated to do their job; they must also have freedom to innovate in the implementation, security on the job to take risks, and control of what they are doing. Ultimately, they need be trusted (as are teachers in Finland) to do their job right. In short, there must be an “innovation-receiving system” (Evans, 1970), or a “change zone” (Polka and Kardash, 2013). Is this where one of the main problems of innovating lies?

A growing trend in higher education is a market approach wherein the main goal is set for “meeting the demands of the student population that is learning – a life-long population of learners” (Afshar, 2016). Universities today are busy innovating how to increase students’ satisfaction and create “exceptional,” “premier,” or “extraordinary” learning experiences rather than caring about their true knowledge and quality achievements. This is clearly an extension of the adaptive or differentiated approach to teaching and learning, thereby leading to customization of education (Schuwer and Kusters, 2014). But this view raises a question: are students’ demands and satisfaction the proper indicators of quality learning? When we began to be more concerned about how students feel in the classroom, what bothers them, and how best to accommodate them to make their learning experiences superior and anxiety-free, we began to set aside the quality outcomes of the learning process.

Every cloud has a silver lining, fortunately. When market approach is applied to higher education, as it is in the current national and global competitive environment, the contest for enrollments increases and forces colleges to decrease attrition in all ways possible. This requires innovative approaches. The institutions that depend on enrollment for their revenue appear more willing to innovate than traditional, public universities that enjoy government support. “Hence, innovation is likely to vary by several characteristics, including type of institution, institution size, market niche, and resources” (Brewer and Tierney, 2012, p. 22). Clearly, private institutions are more adept at innovating than public ones. The market is a powerful factor, however, the changes it may bring have to be tackled cautiously.

The hurdles to technology integration are described by Peggy Ertmer (1999) as external (first-order) and internal (second-order) barriers. The first-order barriers are purely operational (technological), while the second-order barriers are applicational (pedagogical). The difference in approaches to applying technology to teaching and learning (overcoming technological vs pedagogical barriers) might explain why huge investments in ET have brought little if any effect to the quality of learning outcomes.

Last but not least, innovations grow in a favorable environment, which is cultivated by an educational system that promotes innovation at all levels and produces creative, critical thinking, self-sufficient, life-long learners, problem solvers, and workers. This system enjoys
a stimulating research climate, encourages uplifting cultural attitudes toward education, and rallies massive societal support.

The ultimate question is, what innovations do we really need, and what innovations might we not need?

The Finnish example can teach us a good lesson. Pasi Sahlberg identifies a set of reforms popular in many countries that Finland has not adopted, including:

- standardization of curriculum enforced by frequent external tests;
- narrowing of the curriculum to basic skills in reading and mathematics;
- reduced use of innovative teaching strategies;
- adoption of educational ideas from external sources, rather than development of local internal capacity for innovation and problem-solving; and
- adoption of high-stakes accountability policies, featuring rewards and sanctions for students, teachers, and schools (Sahlberg, 2010, p. 10).

Instead, the Finns went their own, the Finnish Way, so profoundly described by Pasi Sahlberg in his bestselling book (Sahlberg, 2011). So would it be innovative not to adopt some reforms? A big question now arises, what is then the American way to build innovative education? And what would be the global way?

**What to do? Possible solutions**

To create innovations, we need innovators, and many of them. But though innovation is often a spark originated in the mind of a bright person, it needs an environment that can nourish the fire. This environment is formed and fed by educational institutions, societal culture, and advanced economy. Csikszentmihalyi underlines the importance of creating a stimulating macroenvironment, which integrates the social, cultural, and institutional context, and also microenvironment, the immediate setting in which a person works. “Successful environment […] provide(s) freedom of action and stimulation of ideas, coupled with a respectful and nurturant attitude toward potential geniuses” (2013, p. 140). Control over such an environment, he reasons, is in the educators’ hands.

Then, when the invention is created, it must fall into a fertile ground like a seed and be cultivated to grow and bring fruit. Csikszentmihalyi writes, “Creative ideas vanish unless there is a receptive audience to record and implement them […] Edison’s or Einstein’s discoveries would be inconceivable without the prior knowledge, without the intellectual and social network that stimulated their thinking and without the social mechanisms that recognized and spread their innovations (2013, p. 6)” The audience is not only the educators but also students, parents, policy makers, and all other members of society who act either as implementers or consumers of the innovation.

Coherent systemic support is essential for growing innovations. As the ITL Research project states, “Important school-level supports tend to be present in schools with higher concentrations of innovative teaching. Based on survey data, in schools where teachers reported higher average levels of innovative teaching practices, they also tended to report […] a professional culture aligned to support innovation, reflection, and meaningful discourse about new teaching practices” (UNESCO, 2013). The OECD report on teaching practices and pedagogical innovation also argues that “Teaching practices […] are factors affecting student learning that are more readily modifiable. Moreover, additional professional practices have received attention, especially those that help transform the school into a professional learning community” (Vieluf et al., 2012, p. 3).

Technology integration in education can be successful only when the human element is taken into consideration. This then integrates innovators, implementers, educational leadership,
professional community and, certainly, the learners. Walter Polka and Joseph Kardash argue that the effectiveness of a computer innovation project they developed “[…] was facilitated by the school district leadership because of their focus on the ‘human side’ of change” (Polka and Kardash, 2013, p. 324). They found correlation between the implementation process employed in the district and the concepts associated with the three general need categories of innovation implementers: organizational needs, professional needs, and personal needs, which contributed to the innovation’s success. Long-lasting changes require “[…] a mixture of cultural and institutional changes, commitment from those within the program, and active and engaged leadership,” writes Leticia De León, addressing technological innovations in higher education (De León, 2013, p. 347).

When we try to innovate education, we often leave students out of the equation. We do not innovate in students’ learning, their mind, attitudes, behaviors, character, metacognition, and work ethics enough. Yet, we try everything we can to improve teaching (delivery), while what we actually need is to improve learning. In education, nothing works if the students do not. According to the famous Bulgarian scholar Georgi Lozanov (1988), learning is a matter of attitude, not aptitude. This is where the greatest potential for improving education lies. As a renowned cognitive scientist Daniel Willingham writes, “[…] education makes better minds, and knowledge of the mind can make better education” (Willingham, 2010, p. 165).

The most important goal, thus, should be not so much to learn STEM but to cultivate innovative people in K-12, grow their autonomy, self-efficiency, and foster an entrepreneurial mindset or “a critical mix of success-oriented attitudes of initiative, intelligent risk taking, collaboration and opportunity recognition” (Zhao, 2012, p. 5). To help develop new survival skills, effective communication and critical thinking skills, and nurture curious, creative, critical thinking, independent and self-directed entrepreneurs, we must disrupt the ways of our school system and the ways our teachers are prepared. It may be worthwhile to extend the commonly used term “career readiness” to “life readiness.”

Research of exemplary educational systems across the world vividly demonstrates that teacher quality is the fundamental element of educational success: “It is especially teachers who shape students’ learning environments and help them reach their intellectual potential” (Vieluf et al., 2012, p. 113). Teacher education and professional development are definitely one of the primary areas that call for innovative approaches: teachers must be taught to teach well (Marcus, 2012). The “how” of the teaching (instructional methodology) is as important as the “what” (content) (Morais et al., 2004). A great resource for effective education is the instructional design and methodology used by teachers, as shown by the ITL Research project: “Across countries and classrooms, the characteristics of assigned classroom activities strongly predicted the 21st century skills that students exhibited in their work. Students are much more likely to learn to solve real-world problems and collaborate productively with their peers, for example, if their learning activities are carefully designed to offer opportunities for them to do these things. This finding suggests that professional development for innovative teaching might begin with lesson design” (UNESCO, 2013).

Teacher social status is one of the determining factors of the teacher quality. Teachers’ status in the most advanced countries like Finland, Singapore, South Korea, and Japan is very high. It reflects the quality of teaching and learning and also the level of pedagogic innovations. In our drive to enhance educational innovation, empowering school teachers and college instructors may be the most important task. Mattan Griffel writes, “We need to change the role of teachers. What kind of people do we consider teachers? How do we elevate teachers in society?” (Crichton, 2015). He believes we have to make them “rock stars” and bring new perspectives into the profession.

Eventually, the most recognized pathway to education innovation, writes Shelton, is “[…] basic and applied research […] with more and better leveraged resources, more focus, and
more discipline, this pathway can accelerate our understanding of teaching and learning and production of performance enhancing practices and tools” (Shelton, 2011). Research focusing on raising productivity and efficiency and improving the quality of learning has to increase in all critical areas of education. One crucial indicator of educational effectiveness is measuring the quality of learning that remains imperfect. “The lack of good measures has severely limited the degree to which market forces can discipline the provision of educational quality” (Massy, 2012). Developing clear and effective measures of educational quality is an important venue for future innovative research.

Societal support for innovative education and building up a new culture of educational preeminence both inside the education system and around it is paramount for its success. Brunner (1996) suggests viewing education in a broader context of what society intends to accomplish through its educational investment in the young. The best way to achieve superior education is to shape a new educational culture. As Pasi Sahlberg explains, “We are creating a new culture of education, and there is no way back” (Sahlberg, 2011, p. 2).

Innovation can be presented as a model in the context of its effects on the quality of teaching and learning within an educational environment, which is permeated by professional and societal cultures (Figure 1).

Americans’ love affair with the car extends to computers, iPhones, and the internet. Therefore, innovations in education focus primarily on technology and technology applications. Technocentrists want to see education more automated, more technology-enhanced, and more technology-controlled in the hope of making education more effective. The way of doing so would be through more sophisticated LMS’s, automated analytics, customization, or individualization of learning and developing the student as an avid consumer of digital information. While we realize there is no stopping the technological revolution, we educators must do all we can to preserve the primary mission of education, which is reflected in a humanistic approach that caters to the whole person wherein efforts are made to develop a free, independent, critical thinking, active, and effective thinker, doer, citizen, and worker. Educational innovations embrace both views, interacting and enriching each other for society’s common good.

**Globalization in education**

Along with developing our own innovations and creating a broad base for implementation, it might be useful to look outside the box. As the world becomes more and more globalized, national education systems are shedding their uniqueness and gaining a more universal, homogeneous look (e.g. the Bologna process, which has brought 50 national higher education systems to a common denominator in Europe and beyond) (Bologna process, 2016). Scholars indicate there is “[…] the need for US universities to keep up with the rest of
the world in today’s highly competitive educational marketplace” (Wildavsky et al., 2012, p. 1). It is also economically and culturally beneficial to learn from each other in the spirit of global cooperation and share one’s achievements with others. While in the context of globalization it may be convenient to have a common education system across the world, however, to satisfy the needs and expectations of the nation-state it is necessary to continue innovating within one’s own system. The rich international educational palette offers unique solutions to many issues facing US schools and universities.

What attractive innovative approaches exist in the world that could be applied to the US education system? To mention just a few, the Confucian culture of appreciating education in China, Japan, South Korea, and other South-East Asian nations which brings students’ and parents’ positive and respectful societal attitudes toward education and educators; cultural transformation in education and quality teacher preparation in Finland, Singapore, and Shanghai; organizational innovations in schools of Ontario, Canada. In Finland, a new ecosystem for learning was created (Niemi et al., 2014). Singapore, for one, has become one of the top-scoring countries on the PISA tests by cultivating strong school leadership, committing to ongoing professional development, and exploring innovative models, like its tech-infused Future Schools (EDUTOPIA, 2012b). In Shanghai, China, every low-performing school is assigned a team of master teachers and administrators to provide weekly guidance and mentorship on everything from lesson plans to school culture (EDITOPIA, 2012a). The list of international innovations to cogitate is, fortunately, extensive. Is this what our educational innovators could do something about?

Daniel Willingham demonstrates a very interesting angle in international education that substantially differs from ours: “In China, Japan and other Eastern countries, intelligence is more often viewed as malleable. If students fail a test or don’t understand a concept, it’s not that they are stupid – they just haven’t worked hard enough yet. This attribution is helpful to students because it tells them that intelligence is under their control. If they are performing poorly, they can do something about it [...] Children do differ in intelligence, but intelligence can be changed through sustained hard work” (Willingham, 2010, p. 131).

There are numerous exciting foreign examples for the US educators to learn from and innovate, implementing and adapting them to US schools.

Many US educators certainly learn from advanced nations’ educational experiences (Darling-Hammond, 2010; Stewart, 2012), but these innovations find a hard way into the school system. A right step in this direction is to integrate global education ideas into teacher preparation programs. A worthy case of opening up a wide world of global education to US teachers and developing outside-the-box thinking is a new specialization in the Master of Arts in Teaching program, “U.S. Education in Global Context” which has been offered at National University since 2014. The principal focus of this specialization is on advanced, innovative, and effective international approaches, ideas, and strategies in teaching and learning that address the needs of the nation and create contemporary school environments to accommodate diverse student populations. Specialization’s goals and objectives are designed to help students develop the knowledge, competencies, skills, and dispositions required of a globally competent citizen and world-class educator. Focusing on the universal need for continuous improvement in teaching and learning, this specialization provides students with a balance of philosophy and theory, practice and application through collaborative research projects and field-based activities. The ultimate outcome of the four-course specialization is an innovative, practical implementation project to apply in the candidates’ schools.

The Finns, Singaporeans, South Koreans, Hong Kongers, and citizens of other nations consider education the best way to improve their country’s economy, and it has worked. An even more remarkable consequence has been a change to their national cultures.
This provides a worthy example for other nations, including ours. To sum up, we need to create favorable conditions for growing our own innovations, while taking advantage of the best international theories and practices.

**Learning faster, learning better, and at a lower cost?**

You don’t have the time, you make the time (Thorin Klosowski).

Among many points for educational innovations time definitely deserves close attention. Time is a significant factor in education. Attempts to save time on learning and raise its productivity are well known to each of us. To increase learning efficiency using so-called accelerated and intensive approaches is a promising path for innovation. These two approaches demonstrate the difference between evolutionary and revolutionary disruptive approaches.

Innovation, as we know, can be called to life by social, political, or professional factors but the strongest is definitely economic. A flat world (Friedman, 2005) means global competition, faster production cycles, and more to keep up with. Time is speeding up. Requirements for workers are rapidly mounting in industry and business due to swiftly changing technologies and fierce international competition. It is impractical to spend a third of one’s active lifetime attending secondary school and college learning in advance what may not be useful on the job in the next 10 to 15 years because manufacturing, technology, and business will completely change.

Additionally, the cost of a college education is rising faster than inflation, though the outcomes are disproportionate to this rise: "[...] tuition has increased faster than inflation, without a comparable increase in the quality or results" (Brewer and Tierney, 2012, p. 13). If you ask students what worries them most, it is the cost of the next course and its value for their future job. Education has become more expensive and less affordable for many people. This also creates a heavy burden on the state’s budget. Therefore, educators need to find ways to make education more time and cost efficient (Hjeltnes and Hansson, 2005).

We can identify two possible roads to take. The first is to increase revenue, and this is what the majority of colleges and universities are doing. Raising tuition, however, has its limits; government support is drying out. Cutting costs, on the other hand, may undermine some essential aspects of higher education. The second road is to increase learning productivity defined as the output (learning outcomes measured in certain units) per dollar or per time unit (academic year, semester, month, week, day, or hour). The former can be used to compute cost efficiency, while the latter will help to define time efficiency. Time efficiency and cost efficiency of education are evidently interrelated. The most obvious source of enhancing educational productivity is integration of ICT; however, there are other ways.

Time is the most precious of commodities, especially for WALs. Our own survey of National University students who take accelerated programs, which allow them to graduate sooner than in conventional programs, shows that time is paramount when selecting their learning program (Serdyukov et al., 2003). When asked what is more important for them, the cost of the program or the time spent learning, 88 percent of surveyed WALs stated that time was more important, and they were willing to pay more for a shorter program of the same quality. So accelerated programs are often more competitive than the conventional extended ones. Serdyukov and Serdyukova (2012) posit that time efficiency of the learning process is a decisive factor in assessing a program or a course. In their opinion, colleges and universities, which are now evaluated based upon the quality of their education, will soon be selected and valued based on the time needed for the learning to take place.

In the same way, programs that cost less will be more competitive than those that cost more. With education budgets decreasing and numbers of learners taking part in education increasing, time and cost efficiency will play an increasing role in determining a program’s, and thus an institution’s, value.
When considering time investment, instructional activities are basically concerned with either learning more in the same time (i.e. growth in learning outcomes without increasing learning time) or learning the same amount of information in less time (decreasing learning time or compressing the course). As Serdyukov and Serdyukova (2006) write: “Can we, the educators, teach more effectively; can students learn more, better and in less time?” (p. 255). The answer to this question can have profound social, economic and personal significance as it may affect a learner’s career and lifestyle, societal attitude toward education, the rate of investment in education, and eventually the nation’s well-being (Barbera et al., 2015).

Consideration of time investment in learning coupled with recent innovations in cognitive psychology and ET is what brought to life accelerated and intensive programs. Various approaches and methodologies for providing faster and shorter education without compromising academic quality have been described in the literature (Scott and Conrad, 1992; Rose and Nicholl, 1997; Bowling et al., 2002; Serdyukov, 2008). They are grounded in the newest brain research in the cognitive and emotional potential of learners (Lozanov, 1978, 1988; Kitaigorodskaya, 1995), innovative approaches to teaching and learning that use nontraditional organizational forms, techniques and processes (Boyes et al., 2004; Serdyukov et al., 2003), ET applications, and even fancy programs of learning during sleep (Ostrander and Schroder, 2000). The most popular approaches are accelerated learning (AL) programs, which use a compressed, short-term course format, and intensive learning (IL) programs, which employ specially organized course structure, visuals, music, and suggestive techniques to open up students’ intellectual and sensitive capacities, thereby contributing to more effective learning.

Accelerated and intensive programs can significantly shorten the duration of the learning measured in class hours, days, weeks, or semesters. In some cases, they can also increase learning outcomes measured in the volume of knowledge constructed or skill sets learned in a given time. (Serdyukov, 2008).

A conventional semester model of college education may not suit a new generation of WALs who take school part-time and need to speed up learning to obtain employable competencies and skills. The AL model delivers a semester program in a shorter period of time than the conventional program model but with the comparable results. National University, for example, offers undergraduate and graduate-level programs using a nontraditional, accelerated 1 × 1 model of instruction (one month long, one course at a time) for adult learners (Serdyukov et al., 2003). Onsite classes usually meet two evening sessions per week for four-and-a-half hour each; in some cases, there are two additional Saturday morning sessions of the same duration. Thus, each course runs for eight evenings with one Saturday morning final session for graduate programs (totaling 40.5 hours) or two Saturday sessions for undergraduate programs (totaling 45 hours). Similar models are used by such schools as Cornell College, Colorado College, DeVry University, Northeast University, Grand Canyon University, Tusculum University, and Colorado State University Global.

Online courses also run for four weeks but instead of face-to-face classroom sessions students participate in threaded discussions (one or two per week), view live videoconferencing sessions (one per week), carry out weekly written assignments, develop projects, and in some courses complete mandatory field activities (e.g. teacher preparation programs require school visits for observing and teaching lessons).

The sequential approach when students take one course after another allows for more accumulated and integrated learning experiences. Besides, according to the student survey (Serdyukov et al., 2003), this 1 × 1 format helps to unshackle students’ minds and focus their attention and energy on a single subject. It can also make it easier to adapt to the same teaching/learning style in this instructional model. The advantages
observed for the sequential model appear to occur because the more intense, consecutive instruction reduces the number of distractions in the students’ lives, thus allowing for more focused attention and ultimately creating a more effective learning environment. Csikszentmihalyi's (1982) research suggests that “deep concentration,” “immersion” in an activity, and “undivided intentionality” lead to increasingly rewarding “optimal experiences” which nourish and strengthen the self. He also comments that “optimal experience stands out against this background of humdrum everyday life by excluding the noise that interferes with it in normal existence” (p. 22). This becomes evident when we consider the working adult’s hectic life and complicated everyday experiences. Scott and Conrad (1992) state that “concentrated study may cultivate skills and understandings which will remain untapped and undeveloped under the traditional system” (p. 417). Therefore, learning only one content area at a time has become one of the crucial factors of AL.

The intensive approach, a superior level of AL, has been used in many countries primarily for foreign language education, probably the most time-consuming didactic endeavor. One indicator of how efficiently a student has learned a foreign language is the number of words learned, retained, and correctly used in communication, both in oral and written speech (reading and writing). According to research (Longman Dictionary of Contemporary English, 2007), a person needs to know and be able to use two to three thousand words in a foreign language for basic communication. These so-called communicative skills can be assessed by the ability of the learner to accomplish a communication task in certain communicative situations. Duration of the study course at this level in a conventional institution can reach 200-300 hours. At a rate of two hours a week, the course duration may extend to 100 or more weeks (two years).

When an innovative, intensive instructional methodology, such as suggestopedia (Lozanov, 1978; Kitaigorodskaya, 1995; Rose and Nicholl, 1997), is used to teach a foreign language, the learning efficiency significantly rises, and the course duration with the same outcomes can be reduced by approximately 50 percent, as compared to a conventional college course. For instance, an initial intensive course can take up to 100 to 150 hours. The course is usually taught with higher frequency and longer lessons (usually four to five hours, two to three or more times a week). Thus, a complete course of study may be completed only in ten weeks (2.5 months). So time efficiency \( Et \) of an intensive foreign language course in the number of hours \( t \) of the order of 2 (200 hours of a conventional course \( c \) divided by 100 hours of an intensive course \( i \)):

\[
Et = \frac{tc}{ti}
\]

Time efficiency of the same intensive course in the number of weeks is of the order of 10: duration of a conventional course \( dc \) (100 weeks) divided by the duration of an intensive course \( di \) (ten weeks):

\[
Et = \frac{dc}{di}
\]

This is a case of disruptive, revolutionary innovation that produces a radical transformation in foreign language learning where learners achieve course goals and objectives in half the study hours and one-tenth of a typical course duration. This approach, which was extremely popular in Eastern Europe (Bulgaria, Soviet Union) in the 1980s and 1990s, was to a larger extent inspired by the rise of the Iron Curtain and prospective emigration to the west. Some variations or similar approaches emerged later in Germany, England, Japan, and the USA (Rose and Nicholl, 1997). Why it was not
recognized and did not spread throughout US schools and colleges may be partially due to a lack of need (English is spoken worldwide). In addition, it is labor intensive and demands high-level teacher qualifications (special preparation, dedication, excellent dispositions, inventiveness, and very hard work in the class). In addition, it must be taught in specially designed and equipped classrooms. Finally, it depends on students’ elevated intrinsic motivation, work ethic, trust and respect for the teacher, and perseverance, though for a limited time.

Both accelerated and intensive short-term courses demand highly efficient planning, organization, and management of the instructional process. Furthermore, to ensure efficient course delivery, innovative methods and technologies are required for effective presentation, processing, skill development, and real-life applications. Many accomplishments in AL and IL methodologies, incidentally, can be used to teach other than foreign language programs.

We formulated ten major principles that create the foundation of IL:

- learner-centered approach;
- specific structure and organization of the course and its content for consistent, “whole” student experience;
- effective content presentation in various formats and modalities;
- immediate application of new knowledge in authentic situations in the class and real life, and gaining practical outcomes of the course;
- iterative process of knowledge construction and skill development (Serdyukov and Ryan, 2008);
- situated learning (Lave and Wenger, 1991) that uses real-life situations as the basis of learning activities and, especially, in developing professional competence;
- continuous active communication, collaboration, and cooperation among students in various small- and big-group activities;
- high level of intrinsic motivation developed and constantly supported through emotional involvement of each student in team work and learning process;
- instructor’s suggestive, supportive, and efficient teaching style incorporating incessant involvement with the class; immediate, objective, and stimulating feedback; continuous student support;
- systemic use of ET in classroom and homework both for content acquisition and skill development, for communication and collaboration, and for maintaining students’ high level of cognitive, physical, and emotional state;
- application of suggestive techniques, such as relaxation, ritual structure of classroom activities, positive environment, emotional involvement, and music; and
- combination of intensive work and total relaxation.

This approach is rooted in consistent, systemic application of all these principles.

The formula for IL is as follows: The more organized and efficient the instructional system, the more focused the student, the more effort is produced, the better the effect of learning, the faster the rate of learning, and the shorter the process duration (Serdyukov and Serdyukova, 2006). This is why all accelerated and intensive courses are always short (two weeks to 1-2 months long). If no significant effort is applied to learning, then there is no effect, no increase in productivity, and consequently, no opportunity to shorten the duration of the course.
So, accelerated programs that speed up learning by compressing the course duration, while requiring the same number of hours for the same learning outcomes, are an evolutionary innovation. Intensive programs that provide better outcomes in a considerably shorter time are a revolutionary innovation. We can state now that when an innovation ensures significantly better outcomes and saves on cost or time by at least an order of 2 (100 percent) or more, we can call it a revolutionary innovation.

Measuring time in learning can be instrumental for increasing its productivity. Learning to manage time productively is especially acute for independent learners and online students for whom effective time management is a well-known issue. Therefore, teachers need to be taught to use time effectively. In teacher preparation programs, for instance, we recommend that teachers use time estimates when planning lessons (Seredyukov and Ryan, 2008; FEA, 2016). Thus, making learning more time and cost efficient offers a promising venue for further innovations.

**Conclusion**

US education desperately needs effective innovations of scale that can help produce high quality learning outcomes across the system and for all students. We can start by intensifying our integration of successful international learning models and creating conditions in our schools and colleges that foster and support innovators and educational entrepreneurs, or edupreneurs (Tait and Faulkner, 2016). Moreover, these transformations should be varied, yet systematic, targeting different vital aspects of education. Deep, multifaceted, and comprehensive innovations, both tangible and intangible, have the capacity to quickly generate scalable effects.

Radically improving the efficiency and quality of teaching and learning theory and practice, as well as the roles of the learner, teacher, parents, community, society, and society’s culture should be the primary focus of these changes. Other promising approaches should seek to improve students’ work ethic and attitudes toward learning, their development of various learning skills, as well as making learning more productive. We also have to bring all grades, from preschool to higher and postgraduate levels, into one cohesive system.

As the price of education, especially at colleges and universities, continues to rise, cost and time efficiency of learning, effective instructional approaches, and methods and tools capable of fulfilling the primary mission of education all will become critical areas of research and inventive solutions. Colleges and universities must concentrate on expanding the value of education, maximizing the productivity of learning, correlating investments with projected outcomes, and improving cost and time efficiency.

Whatever technologies we devise for education, however much technology we integrate into learning, the human element, particularly the learner and teacher, remains problematic. So, while taking advantage of effective educational technologies, we must situate those modern tools within a wider context of human education in order to preserve its humanistic, developmental purpose and, thus, make more effective use of them.

Computers for schools are ready, but are we ready? Our understanding of how students learn and how teachers teach and craft their methodology in technology-based environments remains lacking. Questions to ask are whether current methods help increase learning productivity, and as a result, time and cost efficiency. All technology applications require a solid theoretical foundation based on purposeful, systemic research and sound pedagogy to increase efficiency and decrease possible side issues. When integrating novel technologies in teaching and learning, we must first consider their potential applicability, anticipated costs and benefits, and then develop successful educational practices.

Therefore, the key to a prosperous, inventive society is a multidimensional approach to revitalizing the educational system (structures, tools, and stakeholders) so that it breeds learners’ autonomy, self-efficacy, critical thinking, creativity, and advances a common
culture that supports innovative education. In order to succeed, innovative education must become a collective matter for all society for which we must generate universal public responsibility. Otherwise, all our efforts to build an effective educational system will fail.

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The role of the university in accelerated learning and innovation as a regional ecosystem integrator

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Abstract

Purpose – The purpose of this paper is to present an adaptation of a program that is at the intersection of two dynamic force fields. The first relates to imperatives impinging upon and inherent in higher education. The second ties to the concept of ecosystems as spaces for aligning actors and resources to create value.

Design/methodology/approach – Tables I-III present pre-test and post-test means and p-values for the paired sample t-tests for the measures.

Findings – As expected, post-test means are consistently significantly higher (or lower depending on item wording) for a shift in beliefs away from self-censoring and prejudging ideas during ideation and more toward greater openness in the ideation process.

Originality/value – The paper examines the outcome of an educational program.

Keywords Social entrepreneurship, Innovation, Accelerated learning

Paper type Research paper

Introduction

This paper presents an adaptation of a program that is at the intersection of two dynamic force fields. The first relates to imperatives impinging upon and inherent in higher education. The second ties to the concept of ecosystems as spaces for aligning actors and resources to create value. As noted by educational thought leaders, the confluence of such forces may be an indication of an inflection point that signals disruption to long-standing constraints as to how we think about education as well as offering extraordinary strategic opportunities (Brandenburger, 2013).

This work contributes to the higher education innovation literature by prototyping a program which points to a broader conception of the role of the university as an ecosystem integrator much like the role of the coral reef in sustaining biodiversity. As such the university can create nontraditional contexts for resources and actors to be more consistently, systematically, yet flexibly aligned as a means of addressing regional problems/needs. For example, the prototype regional development program includes individuals participating in a variety of activities as part of a degree or certificate program, with those participating for purely professional and personal development blurring the degree-non-degree boundary. Creating sustainable, intensive learning platforms which allow for the rapid development of new iterations can reduce future...
program development costs and can mitigate risks of future disruption by more flexibly reconfiguring as needed.

The higher education landscape
As noted in a 2014 white paper from the American Council on Education, the landscape for higher education is in turmoil. Changing demographics, disruptive competition, eroding trust, reduced public financial support, and questions surrounding costs and productivity are a sampling of issues that complicate the context of higher education. Further, the one area where higher education institutions have traditionally grounded their value propositions – academic credentialing – is being challenged (American Council on Education, 2014).

For example, in 2013 the US Education Department sent a message to colleges: financial aid may be awarded based on students’ mastery of “competencies” rather than their accumulation of credits. This has major ramifications for institutions hoping to create new education models that do not revolve around the amount of time that students spend in class (Perry, 2013). As another example, flash forward, the year is 2025, and unlike her parents, Laura had not walked across a stage to mark the end of her formal education. Instead, she earned a series of credentials by mastering skills that qualified her for her chosen career. In two years, Laura developed foundational skills in critical thinking, communications, and ethics, among other areas, and sharpened her quantitative skills, earning her a competency-based degree. She then studied independently through massive open online courses, participated in a 12-week immersive boot camp, completed a university architectural certificate, and worked as an intern for a design firm. She did all this while attending frequent networking meet-ups to explore and pursue full-time job opportunities and spending most of her free time in a design studio where she interacted with peers and mentors (Sledge and Fishman, 2014).

The business of universities in an era of exponential change must shift from simply transferring knowledge to students to providing them with access to the latest knowledge via unique platforms, developing their skill sets through mentorship, and then immersing them in situations that encourage them to probe and push the boundaries of current knowledge and practice (Thomas and Brown, 2011).

As our nation enters a new era that will depend upon effective community building, colleges and universities can play new and meaningful roles in creating the capacity for active and engaged collaboration and collective action to address complex challenges that will shape the world we live in now and in the future. Our challenge is to develop a mindset in which a diversity of backgrounds and experiences and ways of thinking about the world and responding to challenges can be seen as a necessary condition for achieving excellence. This belief, accompanied by new working relationships, values, and skills that draw upon diverse perspectives will be essential if we are to educate a nation and participate in community building through collective impact models (Ramaley, 2015).

The ecosystems metaphor
Coined by a botanist in the first half of the twentieth century, the term ecosystem referred to a localized community of living organisms interacting with each other and their environment. Noticing relevant parallels between the worlds of biology and commerce, Moore (1993) reported the concept to the increasingly interconnected and rapidly changing context of business. Moore noted the trend of successful business evolution involving attracting resources, creating cooperative networks, and co-evolving capabilities around innovation.

Initially embraced by the technology sector, the concept has now moved beyond buzzword status and represents a metaphor that impacts the mental models of leaders as they make...
decisions in a wide variety of business domains. For example, companies such as Apple, Facebook, Alibaba (China), Softbank (Japan), Nokia (Finland), and SABMiller (South Africa) all make explicit their intent of developing and strengthening aspects of their ecosystems (Kelly, 2015). According to Kelly (2015), “ecosystems are dynamic and co-evolving communities of diverse actors who create and capture new value through increasingly sophisticated models of both collaboration and competition” (p. 5). While this definition allows for different ways of thinking about the concept, several aspects have been identified that contribute to the development and understanding of successful ecosystems. Ecosystems:

1. exist on strong platforms;
2. engage diverse actors;
3. drive new collaborations;
4. accelerate engaged learning and innovation; and
5. create unique value (Kelly, 2015; Hagel, 2015; Bruun-Jensen and Hagel, 2015).

Ecosystems are positively altering how organizations think about and behave with respect to the business fundamentals of leadership, strategy, business models, core capabilities, and value creation. So too, higher education may benefit from the application of this powerful metaphor to better understand its role in creating new ways to successfully address needs and problems in their regional ecosystem which ultimately contributes to universities’ sustainable, competitive advantage.

We now provide background for a pilot regional development program developed from a strong pedagogical platform and then address unique aspects of the program through the lens of the defining aspects of ecosystems.

The context for the program
The context for the program is a relatively young university founded in 1965 to address the educational needs of an underserved region of the Midwest. The university’s rapid growth attests to its value to the region in that it is now a comprehensive public university enrolling approximately 10,000 undergraduate students in 70 majors. Recognized by the Carnegie Commission as an “Engaged University” its vision is simple but powerful – “Shaping the future through learning and innovation.” Further evidence that innovation is in the DNA of the university is the vision for its college of business which emphasizes an entrepreneurial mindset including innovative thinking and openness to new ideas. The college has a defined initiative to foster entrepreneurial education, engagement, and outcomes in the region.

The regional development program
Originally funded by a grant from the Lilly Endowment, the program’s purpose is nurturing citizenship to enhance the quality of life and to boost the retention of intellectual capital in the region. Through the program, participants expand their opportunities for creating new connections with other residents, with local and regional organizations, between communities, and between the university and the region.

The program originally began as a more “traditional” leadership development program with outside speakers and business experts leading sessions on a variety of topics such as visioning, developing critical thinking skills, and conducting a SWOT analysis and stakeholder analysis. Overall, this model was favorably received by participants and produced some tangible projects of benefit to the community and region. In 2013, the program was reviewed and it was decided that it was time to reposition the program in response to internal and external environmental imperatives. As such, the content of the program evolved into a focus on social entrepreneurship in which participants seek more
innovative solutions to a variety of regional problems or needs. The content portion is provided by two faculty members who created the entrepreneurship program in the college of business at the university.

The program includes a total of ten sessions over a five-month period beginning in January and ending in May. Most are full-day sessions and are typically held on Friday. There is one overnight retreat. Participants are required to develop a collaborative project which is presented at the conclusion of the program. The content portion is covered in the morning and the afternoon consists of visiting local businesses and sites of interest in the host county. Community leaders are invited to address the group over lunch. This allows participants to learn about the region and its quality of life, as well as to gain an appreciation for a sense of place.

The university covers all program expenses, including overnight accommodations, facilitation, meals, location rental fees, and materials. Participants provide their transportation to and from sessions and volunteer time to attend sessions and work on projects. Because the program is free and openings are limited, applicants must indicate their willingness and ability to participate in all sessions and complete out-of-class project work, which often requires several team meetings.

The impact of strong platforms – the interdisciplinary entrepreneurship minor as a platform for the program

Ecosystems typically exist on platforms. Platforms are organizational contexts often created and owned by a single entity designed for the participation of a number of actors to interact and achieve some purpose (Benkler, 2007; Kelly, 2015). Effective platforms can scale learning across an ecosystem which contributes to the creation and capture of new value (Hagel, 2015). The platform for the program is a nationally recognized entrepreneurship minor.

To maximize the impact, the minor is open to all undergraduate majors. It includes three required classes: Innovation and Ideation – for the development and initial testing of ideas; Feasibility Analysis – for market analysis and prototyping; and Entrepreneurial Strategy – a capstone which incorporates aspects of the first two courses in addition to business model development and financial analysis.

Reflective of current entrepreneurial thinking, the minor is designed to be lean and expedited yet produce a high impact on learning. The program uniquely integrates thinking from the entrepreneurial cognition, critical thinking, multi-sensory learning, technology transfer, experiential learning, self-identity, and learning transfer literature to comprehensively develop student entrepreneurial capabilities. The impetus for the proposed approach is driven by recognition of the need within industry and academe for curricula that develop and promote understanding of innovation processes, particularly with respect to an entrepreneurial mindset.

The entrepreneurship minor is helping drive the development of process and human capital development relevant to the region. Through the action-learning minor, we impact students and businesses through exposure to our processes and student preliminary thinking and final projects. Students complete an expansive ideation process which produces hundreds of ideas, eventually converging to a few unique ideas. The process then shifts to expedited market research and feasibility analysis, business modeling, and three-year financial pro formas. The program produces not only novel ideas but also individuals with the capabilities that can contribute to regional absorptive capacity to identify, assimilate, and exploit knowledge from its environment.

Driving diverse actor collaborations

A distinguishing feature of ecosystems is that they are oriented toward the achievement of something beyond the scope and capabilities of any one actor with innovation, often the product of integration across different areas of knowledge and expertise (Kelly, 2015).
In such an integrated system, every participant contributes and extracts value (resources, relationships, and learning) from their collective investment in the shared “commons” (Kelly, 2015; Hagel, 2015).

Since initiating the regional development program, hundreds of people have gone through the program. Participants are selected annually from a pool of applicants residing in nine counties. Participants expand their opportunities for creating new connections with other residents, with local and regional organizations, between communities, and between the university and the region. These connections are intended to transcend traditional boundaries of towns and counties.

A second aspect of diversity relates to occupation. Program teams are composed of individuals with different professional experience. For example, one recent team consisted of Julie – an Assistant Director of career services, Rebecca – a Grant Administrator, John – a Vice President of a large manufacturing facility, and Josh – a Supervisor for a large public utility. Another team was composed of Valerie – a Cooperative Extension Educator, Paula – a Resource Development Specialist, and Kerseclia – an Academic Outreach Coordinator. A third team consisted of Bethany – a Division Director for a large nonprofit, Nancy – an Entrepreneur, and Jason – a Technology Commercialization Manager.

Another way the team diversity is managed is through the intentional use of creative problem-solving differences. It has long been understood that if team members are too similar in their viewpoint, decisions can be made more easily, but overall effectiveness may suffer (Janis, 1971). More recently, support exists for forming teams based on their cognitive style, as this increases the innovative performance of problem-solving groups (Basadur and Head, 2001).

Since adopting the social entrepreneurship model, the program has utilized the Basadur Creative Problem Solving Profile to form heterogeneous teams by identifying cognitive-style preferences for creative problem solving. For example, teams are composed of individuals with various strengths across the range of creative problem-solving orientations: ideation, conceptualization, optimization, and implementation. This type of diversity compliments individual experiences and professional career roles thereby offering opportunities for unique cognitive intersections within teams.

Overall, regional vitality is enhanced through a process of intersecting not only external (geographic and organizational) but also internal (professional knowledge and cognitive problem-solving style) vectors to create new knowledge much like the role that cross-pollination plays in the biological realm in creating hybrid plants. While regions with many large firms have the luxury of a store of knowledge and R&D processes in place to allow for existing intellectual capital to be developed and intersected, our region has a larger share of firms that are not as likely to have these types of knowledge stores and processes in place. As such, the program uniquely contributes to the process of knowledge creation and dissemination in the region by driving diverse actor collaborations.

**Accelerating engaged learning and innovation**

Accelerated learning can be conceived of as involving a “specific instructional approach that utilizes non-conventional, effective methodology” (Serdyukov, 2008, p. 38). While accelerated learning has been defined in a number of ways in the literature, our accelerated, engaged learning approach can best be described as intensive learning. Intensive learning implies not only a quantitative condensing of material but also the use of a qualitatively different (immersive) pedagogy (Serdyukov, 2008). Note that comparisons of the effectiveness of accelerated/intensive learning to traditional approaches demonstrate a pattern of results with accelerated learning as effective in terms of learning outcomes, and in some cases, more effective than traditional approaches (Tatum, 2010). Positive learning outcomes combined with greater efficiency support the value of intensive learning approaches.
Paralleling the dynamics in education, current imperatives in the business environment relate to the need to effectively and efficiently translate learning into innovation (Eighteen et al., 2014). For many companies, it is the most important hiring/partnering criterion as they look for individuals and organizations that will challenge status quo thinking. This trend accounts for the growth of innovation hubs such as InnoCentive which connects thousands of problem solvers and innovators across the globe as well as European business leaders call for the growth of local and regional innovation ecosystems (Ericsson, 2015; Dunne et al., 2014). The focus of many of these new relational forums is to address societal problems that generate sustainable value (Eggers and Muoio, 2015).

The first several classes of the program are focused on ideation/innovation – immersion into entrepreneurial mindset development, innovative thought, openness to new ideas, opportunity recognition, collaboration, and team coaching. The entrepreneurial mindset is not just about being an entrepreneur … it is about possessing unique thought processes and the actions of complete ownership of whatever participants are involved in … it is also about effectively and efficiently communicating ideas.

This part of the program is designed to provide participants with an opportunity to explore creative problem – solving, self- and other-based expectations, self-identity, purpose, and foundational ideation/innovation concepts as well as engaging the student in reality-based ideation. The objective for the students is to develop their awareness and abilities in understanding the potential role that ideation/innovation can play in the regional ecosystem value creation process.

In the next couple of sessions, participants evaluate the viability of their ideas. Participants use expedited first blush analysis to hone the number of ideas down into a more manageable subset. They then engage in more detailed feasibility analysis to examine aspects of the problem/pain an idea addresses, its uniqueness, and the market potential.

The last three sessions help participants to bridge the gap between entrepreneurial thought and practice by actively immersing students in the strategic entrepreneurial process. This consists of conceiving of all of the activities that create and deliver value for customers/clients as a means of creating sustainable competitive advantage for an organization. It involves business model development and financial analysis as well as communicating the final idea, its feasibility, and the business model in an atmosphere of team collaboration and coaching.

We now focus more detailed attention on the unique aspects of the first few classes utilized by the program, self-identity reflection and the ideation process, as a means of illustrating approaches that have potential for accelerating learning and innovation.

The program has utilized aspects of the self-identity literature to address how participants come to view themselves as entrepreneurial thinkers. Identity formation is an important area for educators interested in transfer of skills beyond the classroom setting. Millennials as well as nontraditional students have been characterized as desiring supportive yet empowering environments that include mentoring to help them develop new skills. Immersion activities are assignments which engage students in active learning by structuring the course objectives around experiential tasks. Experiential-active learning has been found to crystallize understanding and promote higher-level learning much more effectively than passive forms of learning such as lectures. Furthermore, entrepreneurship and innovation are more effectively learned through hands-on experiences, rather than conventional passive learning (Wagner, 2012). Thus, immersions in activities along with frequent, specific, future-focused coaching are ideal components of pedagogy for maximizing short- and long-term learning outcomes for these cohorts.

Early in the program, participants are asked to reflect on talents and passions and how they might be uniquely married to reflect their “true” identity. This reflection can better connect them to a network of mentors and like-minded others. Participants are engaged in immersive assignments and then instructed to journal reflections on their experiences with
the process. We also address issues such as fear, failure, and resilience which provide rich opportunities for self-learning. While the background phase assignments and journaling are completed individually, the majority of the entrepreneurial engagement assignments are completed in small groups during class. Thus, students experience much less lecture than the typical programs and, instead, experience a more continuous process of thinking and developing ideas in groups, and reflecting individually on their thinking in groups.

With regard to the role of the facilitator, whom we refer to as coach, we typically go around the room while students are engaged in activity, and, through monitoring the process, develop a much better feel for student thinking that allows us to be better “real time” coaches. In addition, we randomly ask for students to share their journal reflections at various points during the program and allow for coach and participant feedback on reflections. Reflection on one’s experiences is vital for the elaboration process as it facilitates the organization and crystallization of understanding into cognitive categories related to experiential or active learning. The immersive/coaching model is an ideal fit for the program as it seeks to help participants develop a more complete understanding of the entrepreneurial process and a more holistic understanding of themselves.

We now describe the unique ideation process utilized in the program. In a recent Booz and Co. research project (Jaruzelski et al., 2012), 57 percent of respondents reported their company as only marginally effective at idea generation. Further, only 25 percent of companies characterized their company as highly effective at both ideation and converting ideas to development. Yet Booz and Co. found that effectiveness in the early stage of innovation is a strong predictor of financial performance.

The current approach is aimed at enhancing and expediting idea generation and conversion. Participants start with purpose statements or existing regional problems/needs statements which are then intersected with random combinations of mega-trends, concepts, visuals, videos, and assumption reversals to develop pools of unique potential idea solutions to regional problems. Students then employ first blush analysis to rapidly hone the idea pool to the most viable ideas to then move to feasibility analysis. Note that the use of multi-sensory stimulation is in keeping with the work of Mayer (1997). This research identified a clear “multi-media effect” in which participants who are exposed to coordinated visual and verbal stimuli generated more creative solutions on problem-solving transfer tests than participants exposed to one modality (cf. Celuch et al., 2014 for a more detailed description of the ideation process).

Creating unique value
Ecosystems serve communities by helping to both capitalize on and fulfill basic human nature. The social sciences, philosophy, and theology confirm that, fundamentally, people want to achieve some level of competence in an area of their life. Most also want to belong, understand and be understood, and many want to make a positive difference in their community or region (Kelly, 2015). In fact, because of the rapidity of change in our environment combined with the complexity of society’s challenges, the need for more creative and collaborative ecosystems to develop unique solutions has never been greater (Eggers and Muoio, 2015).

A key issue relates to the value creation of the newly reoriented program in comparison to the past program. In terms of quantitative ideation output, groups of participants engaging in the unique ideation process appear to generate many more potential ideas with more variability across ideas in the social entrepreneurship-oriented program than in the more “traditional” format. More importantly, the quality of ideas/projects appears to be enhanced. Without question the earlier program offered some viable projects relevant to informational and tourism needs of the region. However, as can be ascertained from the exemplars provided below, for the social entrepreneurship-oriented program, the nature of the projects reflects a trend toward projects that are broader in focus, address more significant regional problems/needs, and include more unique intersections of regional resources and stakeholders.
Below are two examples of projects developed prior to reorienting the program to the social entrepreneurship mindset.

**Regional Hispanic community survey:** the survey was designed to capture the concerns of the growing Latino community in the Southern Indiana region. The survey would serve to profile the characteristics of the local Hispanic community, define the needs of the Hispanic community, and determine more accurate population numbers of the Hispanic community.

**Warrick County airport visitors’ kiosk:** created as an informational kiosk; providing information to traveling visitors of potential interesting sights to visit in Warrick County, Indiana. The kiosk is placed at the baggage claim area next to the Convention and Visitors Bureau informational kiosk at the Evansville Regional Airport. As one touch-point of communication, the goal is to help promote Warrick County.

Below are two examples of projects developed out of the current social entrepreneurship-oriented program.

**Southern Indiana career camps:** addresses a current disconnect between industry and education in preparing students for the job market of today and tomorrow. This misalignment creates what is called the “gray collar gap” – which continues to contribute to the skills gap and prevents employers from finding the appropriately skilled employees for critical manufacturing positions that are available. This skills gap is caused partially by the fact that students graduate without the knowledge of opportunities as well as without being able to apply skills. By 2025, the focal Midwestern state is on pace to be short 600,000 skilled workers in the manufacturing sector. The career camps provide a unique collaboration between education, community, and a specific industry in providing middle and early high school students with vocational opportunity awareness. The main outcome of the career camps is for a student to develop a strategy with education and industry to create a “career plan” that exposes the student to self-exploration, career exploration, and education/training exploration prior to high school graduation.

**Mobile fresh market program:** addresses healthy nutrition needs of disadvantaged, food-insecure communities and helps reduce the six billion pounds of fresh produce waste in the USA each year. The lack of access to healthy food for these communities is a growing concern across the nation. Specifically, in the focal Midwest region, a large number of individuals living in these communities travel twice as far to reach a typical grocery store as they do to reach a fast food chain or liquor store, mostly attributable to a lack of transportation opportunities. This circumstance contributes to poor diets, higher obesity, and other diet-related diseases. The fresh market program will take advantage of a fresh produce supply chain from local farms, grocery stores, and supercenters (Walmart, Target, and Sam’s Club) and employ a mobile food truck for convenience to meet people in their disadvantaged communities assuring access to fresh produce; providing education relevant to healthy eating; and accepting WIC/SNAP benefits (government program subsidies) for purchase of fresh produce.

Consistent with design intentions, the pilot program experience has the potential to transfer the impact beyond the program. For example, in the words of one former participant, “As a result of the program, I made changes in the direction my life was headed. I’ve returned to a career that is more of an avocation than a job. The experience helped me set a new course with a new way of thinking.” Another program graduate has approached the coaches with an idea for a new business. One former participant has utilized program concepts and practice in the alumnae chapter of her international sorority where she recently received national recognition for her work in physical and mental health program planning with a primary focus on the black community. She has also received state-level recognition for her regional health education work.
Thinking innovatively and participants’ pre-test-post-test changes related to the ideation process

Innovation in organizations is a competency capable of generating competitive advantage (Tidd et al., 2005; Barsh et al., 2008). As a result, understanding innovation processes has been identified as an imperative by business and educational realms (AACSB, 2010; The Chronicle of Higher Education, 2013). More specifically, it is crucial that we understand the situational processes that can engender innovative ideas to solve complex issues (Davis, 2000; Isaksen et al., 2009).

Individual innovativeness has traditionally been viewed as a trait, rather than a learnable competency. However, recent evidence suggests that creativity in the context of organizational innovation is predominantly learned (Dyer et al., 2009). As such, we maintain that innovativeness particularly as it relates to ideation skill can be enhanced. Therefore, the purpose of this section of the paper is to examine the pilot program elements which create an environment where unique and potentially valuable ideas can be generated. Such capabilities allow participants to better understand and contribute to innovation in their professional endeavors.

An important outcome of the entrepreneurial revolution of the past 20 years is research on entrepreneurial cognition which includes all facets of cognition that are relevant to entrepreneurial processes. These include opportunity recognition, decision making, and complex problem solving in the context of venture creation (e.g. Baron and Ward, 2004; Krueger, 2004; Mitchell et al., 2002).

One area of the entrepreneurial cognition literature that is pertinent to the current study is research on the entrepreneurial perspective or mindset which can be developed by individuals (Kuratko, 2005; Krueger, 2007). At the core of the entrepreneurial mindset is opportunity recognition which is an orientation toward identifying and acting on options for new ventures (Krueger, 2000). Developing more potential opportunities increases the likelihood of finding the best one(s) to pursue (Krueger, 2000). Beyond maximizing the quantity of ideas, evidence suggests that practices that can break the cognitive inertia associated with “typical” brainstorming can increase the variability in ideas thereby strengthening the overall quality of ideas (Reinig and Briggs, 2008; Terwiesch and Ulrich, 2009).

As noted earlier, based on the work of Mayer (1997), we use multi-sensory stimulation in idea generation. This research identified an effect in which participants exposed to visual and verbal stimuli generated a median of over 50 percent more creative solutions on problem-solving transfer tests than participants exposed to one modality. This effect was observed across multiple studies and in one instance resulted in over 75 percent more creative solutions generated (Mayer, 1997).

With respect to quantitative analysis, 18 of 23 participants enrolled in a recently completed program completed this assessment. Individuals in the program experienced the pedagogy described above. The assessments utilized a pre-test-post-test design with participants assessed at the beginning (January) and end (May) of the program.

The questionnaire contained multiple items associated with an ideation beliefs measure, an ideation self-efficacy measure, and an ideation norms measure. The ideation beliefs consisted of nine-item scales related to participants’ evaluation of statements tied to the idea generation process (Basadur, 2002). Justification for the use of the ideation measure relates to the prominence of deep beliefs as the foundation of entrepreneurial attitudes and intentions (Krueger, 2007). The ideation efficacy measure was assessed via three, seven-item scales related to perceptions of having the skills and confidence in the skills for generating unique ideas (adapted from Celuch et al., 2010) (Cronbach’s α = 0.86). The ideation norms measure was assessed via three, seven-item scales related to perceptions that entrepreneurs, individuals in large firms, and individuals in small organizations use innovative thinking (adapted from Celuch et al., 2010) (Cronbach’s α = 0.80). Efficacy and norms were measured...
due to the central role of these cognitions in the development of a mindset and self-identity related to entrepreneurship and critical thinking (Krueger, 2007; Celuch et al., 2010). It was expected that practice and experience with the approach outlined above would significantly enhance specific ideation-related beliefs, ideation self-efficacy, and ideation-related norms.

Results

Tables I-III present pre-test and post-test means and p-values for the paired sample t-tests for the measures. Note that, as expected, post-test means are consistently significantly higher (or lower depending on item wording) for a shift in beliefs away from self-censoring and prejudging ideas during ideation and more toward greater openness in the ideation process. Further, perceptions relating to ideation self-efficacy and norms were also significantly strengthened.

These pre- and post-test results show evidence of participant change in cognitions as a result of involvement in the social entrepreneurship program emphasizing innovative solutions to regional problems/needs. Recall that platforms exist to engage diverse actors, drive new collaborations, accelerate engaged learning and innovation, and create unique value. Beyond project ideas from the program, part of the unique value of this type of engagement relates to the changes in beliefs tied to the ideation process, efficacy, and norms which can translate to future innovative behavior (Krueger et al., 2000). Further, the technology transfer literature (which is also concerned with the ecosystem enhancement) notes that the transfer of process may be more important than the transfer of product ideas as it is the development of human capital (Bozeman, 2000) which is critical for future sustainability of the ecosystem development.

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td>We should cut off ideas when they get ridiculous and get on with it</td>
<td>6.17</td>
<td>3.56</td>
<td>0.000</td>
</tr>
<tr>
<td>I feel that people at work ought to share all their ideas because you never know when a crazy-sounding one might turn out to be the best</td>
<td>6.22</td>
<td>8.11</td>
<td>0.000</td>
</tr>
<tr>
<td>Judgment is necessary during idea generation to ensure that only quality ideas are developed</td>
<td>5.94</td>
<td>3.78</td>
<td>0.001</td>
</tr>
<tr>
<td>I wish people would think about whether or not an idea is practical before they open their mouths</td>
<td>6.28</td>
<td>3.67</td>
<td>0.000</td>
</tr>
<tr>
<td>You need to be able to recognize and eliminate wild ideas during idea generation</td>
<td>6.67</td>
<td>3.83</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table I. Means and p-values for pre- and post-test ideation beliefs

<table>
<thead>
<tr>
<th>Item</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideation self-efficacy</td>
<td>4.57</td>
<td>5.78</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table II. Means and p-value for pre- and post-test ideation self-efficacy

<table>
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<tr>
<th>Item</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideation norms</td>
<td>5.52</td>
<td>6.22</td>
<td>0.008</td>
</tr>
</tbody>
</table>

Table III. Means and p-value for pre- and post-test ideation norms
Conclusion

As higher education stands at this inflection point characterized by blurring service boundaries and competitive disruption, the need for institutions to strategically create distinctiveness that leads to competitive advantage has never been greater. Historically, education is a service where “customers” do a good deal of the work to produce short- and longer-term outcomes. As a result, resources have been directed at understanding reciprocal communication and interaction as a means of engaging students. Yet like businesses, universities recognize that they operate in a broader ecosystem beyond the institution-customer/student intersection and can thus uniquely contribute and capture value from their broader systems. Thus, in order to create genuine value in educational service delivery of the future, there is a need for more highly developed understanding of the institutional-ecosystem intersection. The present paper aims to contribute to the higher education literature by prototyping a program which points to a broader conception of the role of the university in the ecosystem development.

The prototype program described in this paper points to a number of implications for the future of higher education services in regional development:

- The university can play the role of the ecosystem integrator. As with the prototyped program, the university creates the space for resources and actors to more consistently and systematically align as a means of addressing regional problems/needs.

- The university can create new educational service platforms. As delineated in the paper, the regional development program was based on an entrepreneur minor platform. In turn, the regional development program can now spawn new platforms to address regional and global imperatives. This illustrates the power of strong platforms as they become “autocatalytic”, or self-accelerating, with an effective platform allowing more rapid development of the next iteration (Brand, 2009). In addition, such platforms can reduce program development costs and, since they are not structured as bureaucratically as a formal degree program, can mitigate risks of disruption by more flexibly reconfiguring as needed.

- The university can impact its region by co-creating transformative experiences as part of sustainable platforms. As with the pilot program, participants can develop new capabilities aimed toward co-creating unique solutions to pressing local and regional challenges. Outcomes of such experiences hold the potential of intentionally expanding and redefining the value propositions of higher education institutions.

- The fundamental boundaries that have defined educational relationships will continue to blur. For example, the program includes individuals participating as part of a degree program, certificate program, and those participating for purely professional and personal development thus blurring the degree-non-degree boundary. Further, participants receive face-to-face coaching as well as virtual coaching thus blurring the in-person-digital boundary.

- The notion of the university creating and capturing value as a regional ecosystem integrator will spur new business models that further blur the lines between tangible vs intangible incentives and public vs private sector financing. For example, shared interests, values, and mutual benefit can serve to partially incentivize participants’ efforts in the ecosystem enhancement. Further, the program was initially funded through a grant from the Eli Lilly Endowment and discussions are now underway to consider alternative funding models.

In terms of practical implementation, a primary strength of the lean yet high impact approach used in the program is that the process can be used in virtually any training environment that requires developing a social entrepreneurship mindset. Aspects of the
program have been successfully applied in five-week formats (as the Technology Commercialization Academy which partners business and engineering students with the aim of technology transfer) as well as for employees within an organization (as an Administrative and Professional Staff Workshop aimed at organizational process improvement). The unique ideation process is particularly advantageous for the nonprofit as well as the corporate environment as the greatest return on innovation efforts can be captured by improving idea generation, as this stage is relatively inexpensive compared to subsequent product or service development stages.

In conclusion, the prototype program is about connection. Over the past three years the program has helped uniquely connect university and college visions, the university to the region, program content to relevant literature, participants and their ideas to the region, participants to participants and coaches, and finally, participants to themselves. Ultimately, these connections manifest in the role of the university as an ecosystem integrator for the purpose of accelerating learning and innovation in the region.

References


Further reading


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A case study on narrative structures in instructional MOOC designs

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Abstract

Purpose – The purpose of this paper is to share the lessons learned in implementing specific design patterns within the “Dr Internet” massive open online course (MOOC).

Design/methodology/approach – MOOCs are boasting considerable participant numbers, but also suffer from declining participant activity and low completion rates. Learning analytics results from earlier xMOOCs indicate that this might be alleviated by certain instructional design patterns – critical aspects include shorter course duration, narrative structures with suspense peaks, and a course schedule that is diversified and stimulating. To evaluate their impact on retention, the authors have tried to implement these patterns in the design of the “Dr Internet” MOOC.

Findings – Statistical results from the first run of the case study MOOC do not indicate any strong influences of these design patterns on the retention rate.

Research limitations/implications – With inconclusive statistical results from this case study, more research with higher participant numbers is needed to gain insight on the effectiveness of these design patterns in MOOCs. When interpreting retention outcomes, other influencing factors (course content, pacing, timing, etc.) need to be taken into account.

Originality/value – This publication reports about a case study MOOC and gives practical hints for further research.

Keywords MOOC, Case study, Instructional design, Dr Internet, Narrative structures

Paper type Research paper

Introduction

With its origins in Northern America, massive open online courses (MOOCs) have conquered not only Europe but educational systems worldwide. The phenomenon can indeed be called global, as Anant Agarwal (2016), the CEO of edX (www.edx.org; one of the most popular American MOOC platforms) has done. He points out “that MOOCs have […] demonstrated potential benefit as a catalyst for change within universities and all over the world” (Agarwal, 2016). Although completion rates are typically fairly low compared to the number of enrolled participants, Agarwal (2016) continues, “MOOC platforms have helped entire countries build their labor forces and create conduits for dramatic social change.” MOOCs can help in making knowledge available for everybody without limitations in time and space, at least theoretically. However, the so-called democratizing process of education that MOOCs were supposed to trigger did
not take place in the way experts predicted it almost ten years ago (Dillahunty et al., 2014; Hansen and Reich, 2015), yet Laura Pappano (2012) still declared “the year of the MOOC.”

The MOOC’s dropout problem
In the time that has passed between these first expectations regarding MOOCs and their current standing, scientific research has focused on different aspects within this area. In addition, MOOCs have undergone classification, several subtypes have been identified and still more seem to be forthcoming. Researchers talk about different “MOOC Derivatives” (Hollands and Tirthali, 2014) for slightly modified types of MOOCs, like the personal open online course, the mini-MOOC, or the small private online course, to name just a few. The original dichotomy of xMOOC (based on traditional course structures) and cMOOC (focused on interaction and connectivist principles) was forced to expand. Still, different instructional types and design approaches have led to multiple occurrences of the same phenomenon, like high dropout and hence low completion rates (Colman, 2013; Fidalgo-Blanco et al., 2014; Khalil and Ebner, 2014).

As a result, there is a growing body of recommendations from experts and MOOC providers (usually based on learning analytics, see Veletsianos et al. (2016), results from earlier xMOOCs, specific empirical research as well as literature reviews, such as Bonk et al., in press) with regard to strategies against the decrease in participant activity (Jasnani, 2013; Khalil and Ebner, 2013a, b).

If we emanate from “the typical completion rate of below 10%, approximately 7.5%” (Jasnani, 2013, p. 6) or even less, namely, “from around 3% to 15% of all enrollees” (Hollands and Tirthali, 2014, p. 42), it is not surprising that the investigation of possible reasons for this phenomenon is a pressing concern (Colman, 2013; Khalil and Ebner, 2013a, b). In his online survey, Dan Colman (2013) identified several reasons why participants dropped out instead of finishing a MOOC they had registered for. There are various criteria tightly linked to unfulfilled expectations of the learner; for example (all quotations cited from Colman, 2013):

- The time component: “Takes Too Much Time.”
- The knowledge component: either the course “Assumes Too Much Knowledge” or it was “Too Basic, Not Really at the Level of Stanford, Oxford and MIT.”
- The instructional (design) component: there might be “Lecture Fatigue” due to the fact that “MOOCs often rely on formal video lectures.” Participants think “MOOCs would be better served if they relied more heavily on interactive forms of pedagogy.” This aspect leads to the second instructional argument, namely, “Poor Course Design” and the wrong decision of tool usage, namely, “Clunky Community/Communication Tools.”
- The financial component: “Surprised by Hidden Costs.”

Besides the learner's personal expectations, there are criteria that focus on the peer group, its behavior, and the kind of socializing within the MOOC:

- The social component: “Bad Peer Review & Trolls.”

Finally, there is the participants' attitude toward the MOOC itself that can be seen as an important criterion whether to attend and complete a MOOC or not:

- The personal component: it was not the primary goal to do a MOOC or to finish it:

“You’re Just Shopping Around” as only parts of it are interesting and important: “You’re There to Learn, Not for the Credential at the End.”
As can be seen, these reasons are pretty heterogeneous and range from very personal, individual components to more general course-related components and the peer group in a wider sense. These components can be seen as important nodes in the sense of a connectivist approach, the “Learning Theory for the Digital Age” as George Siemens defined back in 2004. Crucial principles as described by Siemens (2004) are that “Learning and knowledge rests in diversity of opinions,” as well as “Learning is a process of connecting specialized nodes or information sources.” There are two important core skills, namely, “Nurturing and maintaining connections is needed to facilitate continual learning” and the “Ability to see connections between fields, ideas, and concepts” (Siemens, 2004). The learners themselves get to decide what and how they want to learn, and in what ways they want to deepen their learning experience in specific fields of knowledge.

With these core skills in mind, Hanan Khalil and Martin Ebner (2013a, b) looked at the different possibilities of interaction within MOOCs and the influence these interactions have on the learner’s motivation. They found out that interaction is a crucial aspect in MOOCs when it comes to the learner’s satisfaction, which in turn is a main decision-making aid when deciding on whether to continue or drop out from a MOOC. In their studies, the authors concluded that there were at least three relevant forms of interaction: among learners; between learners and teachers; and between learners and learning resources, i.e. the content. These three actors form the so-called instructional triangle, as shown in Figure 1.

Kelli Nipper and Paola Sztajn (2008) adopted the instructional triangle for mathematics and added the interactions among students to the interdependence between students and teacher, and content, respectively. Students in this case are the learners or “participants” in a more conventional sense, the teacher is the “organizer” and mathematics is the “content” (Nipper and Sztajn, 2008, p. 336). Regarding the contexts, there are several aspects that warrant consideration, for example, the course design (in contrast to the course content), the financial aspects (as mentioned above), and more general institutional aspects. With the triangle in mind, instructional concepts have been aiming at creating a course design that satisfies not only these three stakeholders, but also adapts to the specific MOOC-related context in a way that enhances and the learner’s experiences and his motivation to continue the course.

![Instructional triangle](source: Nipper and Sztajn (2008))

Figure 1. Instructional triangle
Instructional designs for MOOCs

Learning contexts also play a role in traditional classroom or conventional online teaching, but it would seem that they are even more important when it comes to designing MOOCs. In their pedagogical guideline for MOOC practitioners, Elke Lackner et al. (2014) listed six categories that have to be taken into account during the different phases of MOOC design and development. These phases are based on ADDIE (Kopp and Lackner, 2014), the most commonly known instructional design framework focused on core requirements, structure, participant requirements, assignments, media design, communication, and resources (Branson et al., 1975). The teacher’s role is redefined and/or enriched to become a teacher-facilitator-moderator, as well as the choice of the content, the course language, and the participants’ role. The course creator, i.e. teacher, has to decide whether they choose a rather specialized and narrow topic that usually only allows them to address a small target group of “experts,” or a topic that might be of interest for a broad and diverse audience. The same holds true with regard to language: if they decide to do a course in English, the target group is potentially larger than that with a national language such as Italian or German. However, if the teachers want to address a non-academically inclined target group in a specific region, it might be important to choose the regionally spoken language.

The audience, i.e. the participants, is the most crucial player when it comes to course concepts. The teacher can neither predict the number of participants that attend a MOOC nor their social, economic or geographical background, and when thinking of a specific target group during the conceptual phase the teacher cannot be sure that the attending audience will match the fictive target. Additionally, as Colman (2013) showed, a bad peer group or trolls are indeed reasons to abandon a MOOC; hence, the social context of the participants, related to a main claim of connectivist learning settings, must not be neglected. Kopp and Lackner (2014) come to the conclusion that MOOCs need a special instructional design that accounts for an unpredictable, heterogeneous audience and their specific expectations and behaviors, in order to foster participation and retention. Last but not least, learners exhibit different types of motivation to attend a course, and they need specific competences, such as the ability to learn in a self-directed way, in order to make the most of a MOOC (Bonk et al., 2015; Song and Bonk, 2016). This learning process may take place inside the MOOC or within a wider context outside the course, e.g. social networks (Veletsianos et al., 2015).

Design patterns for MOOCs

As traditional instructional design strategies seem to struggle with the challenges created by MOOCs, alternative instructional approaches should be considered. One promising approach that has already received a lot of attention is the application of specific instructional design patterns. They have a tremendous influence on the learner’s motivation, which in turn is crucial for the instigation of learning processes and continuation (Lackner et al., 2015). In contrast to traditional instructional guidelines, “patterns support a wider variety of application scenarios” (Bauer and Baumgartner, 2012), since not only the subject itself but also the context has to be considered. As Reinhard Bauer and Peter Baumgartner (2012) sum up: “Applied to a concrete design process this means that it is not possible to design an isolated ‘thing’ […] ignoring the world around this artifact […] and within this artifact […]. The goal is a holistic approach” in course design that does not only integrate immanent factors, as proposed by traditional instructional design models like ADDIE (Branson et al., 1975), but also covers experiences and is based on good practices as well as existing designs and concepts. Hence, an effective instructional design pattern combines “a clear articulation of a design problem and a design solution […] offering a rationale which bridges between pedagogical philosophy, research-based evidence and experiential knowledge of design” (Goodyear, 2005, p. 92). If a design problem or challenge presents itself, specific design patterns may help in finding an adequate solution.
In their paper MOOCs as granular systems: design patterns to foster participant activity Elke Lackner et al. (2015) formulated a design proposal for MOOCs that was based on learning analytics results from preceding xMOOCs and an extensive literature review. This main theme of this design proposal can be summed up under the term granularity. From this rather generic design aspect, three major design patterns were deduced.

Four-week MOOCs
Research and experience have shown that most MOOCs last about four to eight or sometimes even 12 weeks (Jasnani, 2013). However, there is evidence to suggest that a “concept of ‘modularity’” is advisable, and that “shorter courses are both easier to create and to complete” (Hollands and Tirthali, 2014, p. 92), because “granular courses are more digestible” (Jasnani, 2013, p. 14). Since the most dominant point of dropout seems to be week 4, the design pattern suggests the construction of four-week courses, which accommodates one facet of the above mentioned time constraints as a reason for dropout (Colman, 2013). Furthermore, it is easier for the participants to schedule learning frames within a shorter period of time, i.e. four weeks instead of eight or even 12 weeks.

Granular certificates
As orientations and motivations toward learning and learning systems are always changing, new certification processes should be considered. One step might be the integration of badges, which have been shown to help keep up learners’ motivation (Santos et al., 2013; Wüster and Ebner, 2016). As Colman (2013) pointed out, participants of MOOCs do not always wish to finish the MOOC as a whole – instead they are interested in particular segments, weeks or modules (see “personal component” above). A certificate or a statement of accomplishment is typically issued at the end of a MOOC, once a participant has gone through a determined, complex syllabus. Those who just attend specific modules or select topics do not have any visible acknowledgment of their learning process, which seems to be a fairly typical issue in informal learning processes in general. Badges for portions of the course could help solve this design problem (Wüster and Ebner, 2016).

Suspense peak narratives
Storytelling and a fascination for stories are a deeply rooted anthropologic trait “Wir Menschen sind erzählende Wesen” (Spath and Foerg, 2005) – “We humans are narrating beings.” Human beings need stories, they have an interest in them, they like to narrate and listen to stories. This anthropologic desire can be used for marketing issues (Spath and Foerg, 2005), in journalism (Flath, 2012) as well as for effective learning settings (Koening and Zorn, 2002; Salpeter, 2005). Ever since Medieval Age storytelling, people have used micro-learning units and specific narrative structures to animate the audience to follow narration (Bakker, 1993). Nowadays, some aspects of this literary phenomenon are often employed in modern television formats or serialized novels, for example, in the form of the so-called cliffhanger: “A Cliffhanger plot device ensures readers will buy the next installment in order to read and find out what happens” (LiteraryDevices Editors, 2016). Within MOOCs, this device could form a design pattern when tasks are set like riddles, meaning that a question will only be answered in the following week, combined with encouragement for the participants to discuss possible solutions in a forum with their peers, thus also increasing interaction (a connectivist principle). Another possible manifestation of this design pattern concerns the video resources often used in MOOCs. A longer video can be split up in two shorter video sequences with the cut made in a suspense-packed, tragic or highly informative moment. Ideally, the videos themselves would be telling a story, consisting of role plays or a dialogic and hence dialectic structure; as a consequence, the suspense peak pattern can be realized more intensely.
This suspense peak or cliffhanger design element is one out of seven “elements of digital storytelling” (University of Houston, 2016), identified by the Center for Digital Storytelling (CDS), namely, the “Dramatic Question” which, according to the CDS, opens a question or a problem that is solved only in the end of a story in order to create the viewer’s necessity to stay tuned. These elements can be seen as traditional narrative elements that derive from a long literary tradition as categorized by Gérard Genette (1972) in the early 1970s in his book *Figures III*. Narratology according to Genette deals with different elements of text: the narrator’s voice, the duration, frequency, and mode of narration, the latter comprising the narrator’s perspective and distance (i.e. its focalization). The six remaining elements are the following.

“Point of View” means the author’s or narrator’s perspective as described by Genette in mode and voice. Furthermore, the author’s or narrator’s basic attitudes play an important role within this element as they give the audience a hint on how to read a story. “Emotional Content” can be described as content that affects the audience and establishes ties between the different stakeholders, similar to the ties within the instructional triangle (see Figure 1). This element is accompanied by a fourth one, called the “Gift of Your Voice,” i.e. the means to achieve a personal connection with the story and that helps the audience to understand its course and its context. The fifth and sixth element, “Economy” and “Pacing,” coincide with Genette’s duration and frequency. “Economy” means the tightrope walk to give as much information as necessary but to not too much. The audience should not be overtaxed yet well informed by the content. “Pacing” means that the audience has the possibility to consume content in their own pace, according to their own needs. The story’s progression should neither be too fast nor too slow, neither overwhelming nor boring. The last of the seven design elements of digital storytelling, the “Power of the Soundtrack,” means the power of audio elements such as sounds and music, which enrich a story, accompany or contrast the narration, create a specific atmosphere and guide the audience. Music and sounds can play an independent role within a story or support the narration (think, e.g. of the music’s role in horror stories).

Our main question concerning the case study is if those described instructional patterns have an influence on learners’ behaviors with regard to their retention rate.

### The Dr Internet MOOC – a practical example

The existing body of research on MOOC retention highlights many areas that could prove fruitful for improvement efforts. For example, findings with regard to dropout motivation can and should inform didactical models on the one hand and practical aspects of MOOC design on the other. In this paper, we would like to focus on the efficacy of narrative design patterns, and in order to put these theoretical insights into practice and to evaluate their effectiveness in improving MOOC retention, they were implemented in the best possible way during the conceptualization phase, design, and development of a fairly unique xMOOC called “Dr Internet.” This course was the centerpiece of a comprehensive research project, which is the main reason why it was selected for additional testing of some of the described design patterns: there was an interdisciplinary team of researchers and practitioners involved in designing and implementing the MOOC, more extensive data collection, and an attractive topic that was expected to procure large numbers of participants that would help to study activity patterns.

### Background

General practitioners as well as specialized physicians have noticed an increasing tendency among their patients to visit the doctor’s office with previously acquired medical information, obtained from online sources like popular websites, patients’ forums, etc. The extent of the medical knowledge available online can be quite impressive, but has often been found to be inconsistent and difficult to evaluate (Benigeri and Pluye, 2003). Consulting the internet on medical issues bears some obvious risks: under- or overestimation of the
severity of physical symptoms, insecurity about doctors’ competence and a subsequent lack of trust, or downright substitution of professional medical treatment for advice from questionable sources, to name just a few. All of these risks might impair the health outcomes of patients (Robertson et al., 2014). However, there is also a tremendous potential to democratize the access to medical knowledge (and its understanding), which has previously been a highly restricted privilege, and to boost health literacy among the general population and especially within some hard-to-reach social groups (Brodie et al., 2000).

This phenomenon is the focus of an interdisciplinary research project on which three Austrian universities cooperate: the Karl Franzens University, Graz University of Technology, and the Medical University (all based in Graz, Styria). The central research question is about whether the internet helps or hurts in the endeavor to increase health literacy among the general population and how these developments affect the physician-patient-relationship. The project was designed to engage the topic on various levels; there is a sociological branch of research that is concerned with empirical studies (interviews with general practitioners and a questionnaire-based survey among their patients), a philosophical arm that focuses on ethical issues in this regard, and various smaller segments.

The central component of this research project is the Dr Internet MOOC, which is accessible at the first and so far only Austrian MOOC platform called “iMooX” (www.imoox.at), hosted by the Karl Franzens University and the Graz University of Technology (Ebner et al., 2015). The videos, all specifically created for this course, are licensed under a Creative Commons License, so anybody is free to access and use them as long as there are no commercial interests involved, as so-called open educational resources (Ebner et al., 2016). The materials will continue to stay available even after the initial MOOC and the research project have concluded.

Narrative MOOC design
The task presented to the learners was to assess and diagnose several medical case studies that were visualized in the form of short videos, in which a patient would display or describe physical symptoms of illness. After watching the video content, the participants were instructed to use the internet in order to research possible diagnoses for the patient in the video, and then take a quiz on the case study. The primary didactic aim of the course was to train competences rather than just increasing knowledge. It was advertised as an opportunity to develop and compare one’s own skills in internet-based diagnosing in a safe environment, thereby raising awareness for a controversial topic and instigating critical thinking processes when it comes to evaluating information and opinions (Zimmermann et al., 2017).

The MOOC was created with two main objectives in mind: to gather data that would complement the other research efforts (Zimmermann et al., 2016), and to raise awareness for a critical but prolific approach to online searches for health information. For both purposes, it was necessary to attract a sizeable number of participants and to design an attractive MOOC that would keep them engaged in order to avoid high dropout rates. We thus tried to implement several key design elements as described by the CDS that have been identified as potentially helpful in fostering MOOC retention (Lackner et al., 2015; Sadik, 2008) and can be labeled as narrative structures.

Several of the design patterns that have been discussed above were part of the conceptual framework during the design and development phase of the Dr Internet MOOC and they were implemented in quite a few essential aspects, six of whom should be scrutinized in more detail: content adaptation to the target group, a special interactive quiz format, a course structure based on the “storytelling approach” that includes serial videos to create suspense peaks and a framing narrative incorporating a narrator, a shorter course duration and a video schedule that offers stimulation and variety, yet is easy to follow.

Choice of the content. The choice and presentation of the content can be crucial when it comes to addressing the intended target group (Lackner et al., 2014). The Dr Internet MOOC
and its objective to help people in navigating a changing understanding of the relationship between doctors and patients as well as managing the wealth of online information that could be relevant for their physical well-being was assumed to qualify as so-called emotional content for a large group of people. Thus, it was expected to attract a large and heterogeneous group of participants. To meet their predictably heterogeneous needs and expectations the course design was adapted and the focus was set on a narrative structure that should be activating and easy-to-understand though interesting-to-follow.

Special interactive quiz format. MOOCs typically use multiple choice questions to test the participants’ knowledge gain, but this format was not applicable when judging medical case studies. Since there are no definitive “right” and “wrong” answers when it comes to diagnosing, and standard testing would not really meet the requirements of the above mentioned emotional content, we designed an interactive quiz format that is closer to a poll than a traditional knowledge test. The participants were given a selection of eight diagnoses for each case study, and were asked to rate their likelihood on a four-part scale starting with “unlikely” as the weakest and ending with “very likely” as the strongest category. While there was no feedback on whether or not their estimations were correct, participants did have the opportunity to compare their results to the collective ratings of a group of trained physicians who had been surveyed before the start of the MOOC. Additionally, there was also the option of comparing one’s own choices to those of other MOOC participants who had already taken the quiz. These averaged quiz results were updated instantly, and with more people casting their votes, the group result was constantly changing and could look quite different at various points in time, therefore providing an incentive for the participants to come back later and check it more than once.

Serial videos. Leaning on the narrative approach, we constructed two more extensive case studies where the story of one patient was told in two videos instead of one. As a result, these serial videos were released over the span of two weeks. The supposed “cliffhanger” effect, or the dramatic question as it has been termed by the CDS, was used to provide an incentive to stay engaged in the MOOC and to come back to this case study in the following week. To similar effect, all of the medical cases had a corresponding “resolution video” that was also released in the subsequent week, and in which the general practitioner who created the case studies explains which one of the proposed diagnoses he believes to be the most likely one and why.

Narrator. This general practitioner acts as narrator and a golden thread guiding through the different video episodes, i.e. the frame of the stories narrated within the MOOC. Against the tradition introduced by Boccaccio in his fourteenth century Decameron, a collection of 100 novellas, there is no macro story. The frame does not narrate a fictive story but acts as the frame for several fictive stories. According to Genette’s (1972) typology, the narrator’s voice is hetero-diegetic and extra-diegetic, as he is not part of the novellas, i.e. the videos. He is, though, a person the participants can trust in, since he is an expert in this field, as opposed to the concept of an unreliable narrator, which is the main component of the cliffhanger structure. His appearance on a weekly basis serves as the frame that organizes the process of content reception. Regarding focalization, the narrator is non-focalized, as he knows, tells, and considers the thoughts and stories of each protagonist in his personal analysis, i.e. the above mentioned gift of your voice. The audience thus gets more familiar with the case studies, the general practitioner’s experience, and opinion.

Duration. The standard MOOC duration of eight weeks was reduced to six weeks. Previous research on MOOCs indicated that there is a typical decline in activity and increase in dropouts around the fourth week. While this would imply an ideal course...
duration of four weeks, we had to take other organizational factors into account and arrived at the compromise of six weeks duration. Each week's workload was estimated with three hours, which included watching the video case study, doing online research to master the quiz and engaging in forum discussion. Economy, the digital storytelling device named by the CDS, guided the selection of the resources and design of the activities, and the three-hour-model was calculated on a generous basis. With regard to the pacing device, there were no fixed appointments or dates within these six weeks, except for the fact that the course was timed on a weekly basis and started Monday mornings with a new chapter and the corresponding materials.

**Video schedule.** Due to the six weeks duration of the course, it was decided that six case studies would be an adequate number. The devices of economy and pacing led the conceptual considerations, and since it would have been very predictable and not particularly engaging if the presentation followed a simple model of one case per week, we constructed a more diversified video schedule (see Table I). The idea was to provide a stimulating variety of videos on offer that would neither bore nor overwhelm the participants. The videos themselves were rather short, with an average duration of about five minutes. The relation between discourse time and narrative time can be described as focusing on a short discourse time, and doing so without pro- and analeptic references, i.e. flash-backs or flash-forwards. Obviously, a chronological narration that is reduced to one main narrative thread is easier to follow, but more likely to arouse boredom; which was considered to be only a small risk with videos of such short length.

### Results from the first run of the Dr Internet MOOC

Due to the fact that the MOOC was only one part of a bigger research agenda, participants were required to fill in a mandatory questionnaire before entering the MOOC for the first time. This questionnaire mainly included questions on health-related matters and previous experiences when looking for health information on the internet, but it also provided a set of basic sociodemographic variables[1]. Overall, the MOOC did not attract a particularly large crowd of users during its first run (October 27-December 6, 2015). Out of 370 registered participants, 206 did in fact enter the MOOC and completed the questionnaire (56 percent),

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Table I.
Video schedule for the Dr Internet MOOC

- Case study with one video
- Case study with serial videos
thus qualifying as active learners. The majority of these were female (62 percent) and the average age was 39 years (minimum 15 years, maximum 75). Singles constituted the dominant civil status (58 percent), followed by married (32 percent), divorced (8 percent), and widowed (2 percent) users. With regard to educational level, we see a familiar picture that has been reported from many other MOOCs (Dillahunt et al., 2014; Hansen and Reich, 2015; Neuböck et al., 2015): well-educated participants are heavily overrepresented, with almost 90 percent having completed either high school (33 percent) or a university degree (56 percent).

For an evaluation of the implemented design elements, we obviously have to look at dropout and activity rates throughout the course. Anybody who either took a quiz, read or wrote something in the forum, or watched a video in any given week was classified as an “active participant.” Again, we encounter some fairly typical results: 124 active participants started out in the first week, and 52 still remained in the last week of the course. Figure 2 gives an overview of the decline in the numbers of active participants: as we can see, the biggest drop in participant numbers did not occur in week 4, but between weeks 2 and 3, where there was a loss of almost 40 percent (from 139 down to 84 users). After that, the numbers are stabilizing, and the decline is almost linear. When comparing the small group still active in week 6 ($n = 52$) with the big group that filled in the questionnaire in the beginning ($n = 206$), it can be noted that most sociodemographic variables change very little (gender proportions are now almost equal, single participants drop out at a higher rate than married ones, and the proportion of university-educated is only slightly higher than of those who completed high school). Overall, it can be said that the dropout rates seem to have a weak relationship with sociodemographic characteristics.

The interpretation of these results regarding the effectiveness of the implemented design-based elements is not straightforward. On the one hand, weeks 2 and 3 featured the first two-week video, which coincides with the highest loss in user numbers over the six weeks course duration (see Figure 2). On the other hand, the second two-week video was released during weeks 4 and 5, where we see only a slight drop in numbers. After the initial peak in week 2 and the following week’s loss, the slope of the curve is gradual rather than steep, so there is likely no single effect in the design that caused direct and noticeable dropouts among all participants. When looking only at those participants who completed any quiz in each week, there is a much less pronounced drop in numbers after week 2,
and an actual increase between weeks 4 and 5. This could indicate that there is a subgroup of participants that is more interested in the video and quiz features of the MOOC, and that to them the storytelling approach might have been more attractive.

The overall decline is substantial, yet compared with the drastically low completion rates that are usually associated with MOOCs (Hollands and Tirthali, 2014; Jasnani, 2013), the result is quite adequate. Depending on whether the completion rate is calculated as a percentage of registered or active users, the Dr Internet MOOC achieves 8 and 14 percent, respectively. Still, these results do not mark a significant improvement in retention as had been expected from the theoretical assumptions discussed above. In summary, this MOOC did not produce any solid evidence to indicate that the implemented design-based elements were in fact making a difference.

Discussion and conclusion
While the results from the Dr Internet MOOC do not provide any support for the effectiveness of the design patterns in questions, there is also no clear indication that they do not work. The attendance numbers fell short of expectations, so further research with larger sample sizes is needed to produce more data on the subject. While it is hard to discern the reason for the rather small turnout, several factors can be assumed to play a role: the timing of the course dates at the beginning of the school semester, which is generally a good time, but also means that this MOOC was competing for participants with a few other courses on the same platform, the channels used for advertising, in this case mainstream media rather than targeted promotion for an internet-affine audience, and the (academically speaking) low-threshold topic, since the typical MOOC users are disproportionately well educated (Dillahunt et al., 2014). It might also be possible that the compulsory questionnaire at the beginning of the course could have kept some registered users from active participation, although there is no evidence for this assumption when looking at the data – 56 percent of those enrolled qualify as active learners, a fairly average proportion (Koller et al., 2013).

The lack of retention effects could be due to a variety of reasons, for example, the specific way we implemented those principles – the screenplay for the videos might not have delivered the right kind of cliffhanger, and the suspense peaks might not have been perceived as such. The narrator’s framing role could have been developed in a more pronounced and less subtle way – we did not include an introductory video in which the general practitioner introduced himself and his role within the course structure. It might also have been more effective to let the general practitioner activate the forum discussions to strengthen his role as a guide. Additionally, while the MOOC’s topic was fairly attractive in the eyes of the press, it was also unconventional in the sense that it did not convey a lot of factual knowledge, and thus the results may not be representative of more traditional MOOCs. In fact, it is highly plausible that the kind of knowledge conveyed in MOOCs (e.g. competence building vs knowledge gain) determines some of their specific characteristics (like materials and activities offered) and thus also affect the effectiveness of some design patterns.

Based on the data from this course and experiences with previous MOOCs, we have identified another potential design problem in line with the pacing device that could have a significant influence on participants’ dropout: the scheduling of weekly modules. It is tempting to think that the waiting time for either a case resolution or more videos of the same interesting topic is something that persuades participants to log in next week when new content is available. However, this model similar to the suspense peak approach might not work for everyone, and there is evidence that some people actually lose interest when they have to wait for access to the materials they want to see. They might forget about it in the meantime, they are not interested in making the MOOC part of their weekly routine, or they could be unable to take time out of their busy schedules on a regular weekly basis. Data
from the Dr Internet MOOC shows that there is only a very small group of users who log in weekly and participate in the available features as they are released. The overwhelming majority has fewer logins, but many of them catch up on material that is new to them.

This phenomenon has inspired some debate about self-paced as opposed to session-based MOOCs. Both approaches come with benefits and disadvantages: self-paced learning without fixed start and end dates cannot provide the same kind of community of many participants learning the same things at the same time, and there are no deadlines, which to some can be a powerful motivation to complete course tasks (Shah, 2015). However, it would seem that the self-paced concept is gaining momentum; a survey conducted among European institutions of higher education revealed that a subsample of MOOC providers attributed higher relevance to the freedom of learning at one’s own pace than to fixed start and end dates (Jansen and Schuwer, 2015).

There are several measures that could help to address this particular variation in learners’ preferences. On the one hand, there is the option of structural changes to the weekly schedules of MOOCs in the direction of self-paced learning, and a higher degree of learner empowerment in general (Guàrdia et al., 2013). On the other hand, the session-based concept could benefit from e-mail reminders for the participants to inform them about new content and to encourage them to return to the course. Even though learner’s structural preferences might vary among the population of MOOC participants, it is reasonable to assume that a stronger focus on these preferences is in any case a promising strategy for future research on MOOC retention.

While course design is among the most important factors for retention in MOOCs, it is far from being the only one. There is always a certain fraction of participants who enroll for MOOCs because of the interesting topic or one specific aspect they are interested in. Earning a credential, an acknowledgment or a statement of accomplishment was never their intention in the first place. They might just want to see the first week of a MOOC out of curiosity for the topic, but once they got an idea of the MOOC’s concept and the extent of the materials offered, their curiosity is satisfied and they drop out early on, as seen with the Dr Internet MOOC. Sadly, there is only so much that MOOC providers can do about this.

In conclusion, it has to be stated that even though the topic as well as the course design and requirements of the Dr Internet MOOC were designed to be low threshold, only a relatively small number of participants enrolled for the course. The narrative design patterns used to develop the MOOC did not have the intended effects on retention that the course creators had hoped they would have. Further research regarding the motivations for dropping out or finishing a course is an urgent desideratum – aspects like participant’s interest, required effort and perceived usefulness are not only important cognitive factors shaping the learning process, they also warrant a more in-depth consideration in the process of developing and implementing suitable design patterns to enhance motivation in the best possible way. However, the lack of sizeable results with regard to the design-based improvement of retention can be seen to raise other questions concerning the current prominent focus on dropout and completion rates in MOOCs. After all, these parameters largely stem from a more traditional educational context and might not always provide a fruitful perspective on inherently different learning platforms that result in diverging learning behaviors. A different, less problematizing focus both in research and practice could draw on the strengths of online learning environments rather than their weaknesses, and retention rates might benefit from this approach nonetheless.

Note
1. The original questionnaire is available upon request, please contact the primary author.
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Problems and solutions for using computer (networks) for education

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Abstract

Purpose – The idea to use computers for teaching and learning is over 50 years old. Numerous attempts to use computers for knowledge dissemination under a variety of names have failed in many cases, and have become successful in others. The essence of this paper can be summarized in two sentences. One, in some niches, applications tend to be successful. Second, attempts to fully eliminate humans from the educational process are bound to fail, yet if a large number of aspects is handled well, the role of teachers can indeed be much reduced. The paper aims to discuss these issues.


Findings – In some niches, applications of e-Learning technology tend to be successful. However, attempts to fully eliminate humans from the educational process are bound to fail, yet if a large number of aspects is handled well, the role of teachers can indeed be much reduced.

Research limitations/implications – A number of features that seemed essential in earlier e-Learning systems turn out to be superfluous.

Practical implications – New e-Learning systems have to concentrate on quality of content, not complex technology.

Social implications – E-Learning the right way helps learners, teachers and institutions.

Originality/value – Experiments reported verify or do the opposite of often loosely stated opinions.

Keywords E-Learning, MOOCS

Paper type Research paper

1. Introduction

I will try to discuss the major issues involved in knowledge dissemination using computers (often called e-Learning) following my own experiences. This certainly introduces some strong bias. However, I do not try to avoid this since I have followed and experienced most developments over the last 50 years myself. Examples and anecdotes will prove some of the points, and will hopefully be both entertaining and useful.

Let me state clearly that this is not a research paper, but a survey of developments, many of them ending up in a dead-end road. I believe that this is what makes this paper also of interest for further research and innovation by showing that certain things do not work or work only if special attempts are made. To make it evident what lessons I have learnt and what one should never forget I will put such “aspects learnt” in boldface.

There is no doubt that Programmed Logic for Automated Teaching Operations (PLATO) was the first e-Learning system using computers, and for that time quite impressive, as it was used in an early timesharing system more than 50 years ago. It originated in the 1960s at the Urbana campus of the University of Illinois. Professor Don Bitzer became interested in using computers for teaching. With some colleagues he founded the Computer-based Education Research Laboratory. Bitzer collaborated with a few engineers to design the PLATO hardware. To write the software, he collected a staff of creative eccentrics ranging from university professors to high school students, few of whom had any computer background. Together they built a system that was at least a decade ahead of its time in many ways.

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It is almost impossible to exactly define what PLATO was and how it developed, since it went through an endless process of improvements over the years. The paper (Bitzer, 1986) is an attempt to recapture some developments that I will not discuss in detail. But it is worth noting how powerful the system was, and how many of the good ideas in it around 1970 were only rediscovered decades later! Basically, PLATO around 1970 was still based on black and white terminals able to display mainly written text. Terminals were connected to a central computer presenting information to users whose identity was known and whose behaviour (every key pressing) was carefully monitored. Thus, it was possible to find out where the material presented was too difficult for students at a certain stage in their studies, how long they needed to go through a section. Further, multiple choice questions allowed to understand the level of understanding. This allowed to adjust learning material created with the authoring system called TUTOR. Thus, it was recognized at this early stage that unobtrusively obtained student feedback is important to make it possible to modify material for individuals or groups of individuals and that continuing testing of the level of understanding to provide alternatives and to provide encouraging feedback are crucial issues.

It is truly amazing to see that important issues such as “student feedback is essential” have been ignored in many systems developed later, and even today often not enough feedback is collected without bothering students and often with much too little evaluation of the feedback.

In the years up to about 2000 (when the internet started to be widely available) in North America three main streams are observable:

1. Plato’s development continued and its deployment spread, including offering terminals with graphics and particularly important messaging, between users online at the same time or allowing communication of students at least asynchronously with instructors.

2. Systems to create sophisticated and animated graphics as part of the “courseware” were developed. One of the many such products was “Macromedia Director”, a product to develop stand-alone (typically CD based) learning material. However, note that all those many stand-alone systems did not allow to collect specific feedback, except by using tedious questionnaires!

3. The emergence of hypertext/hypermedia systems used in timesharing systems typically in university settings provided the possibility to work highly interactively with linked material, including text, animations, graphics, even sound and video. All this was based on Ted Nelson’s vision to develop a model for creating and using linked content he called “hypertext” and “hypermedia”. Ted Nelson began implementation of a hypertext system named Project Xanadu in about 1960. However, his first and incomplete public release was finished much later, in 1998. He later worked with Andries van Dam to develop the Hypertext Editing System in 1967 at Brown University. In August 1987, Apple Computer released HyperCard, a powerful alternative to Macromedia Director, yet again with no networking facilities to speak of. Yet its impact, combined with interest in Brown University’s Intermedia and similar undertakings that seemed to provide new and better platforms for e-Learning, led to broad interest in and enthusiasm for hypertext and new media. Yet all this did not provide a serious impact except as instrument to argue for more funding. This started to change a bit with the advent of the internet, particular the web.

The development in Europe from the late seventies to the turn of the century was somewhat different. In 1969, a British Engineer Sam Fedida proposed to equip TVs (everyone had one by that time, most with a remote control pad that could be used as simple input device) with a bit of additional electronics, called “decoder”. This would be connect via phone-lines to a
network of servers to allow users to retrieve information, to order anything offered and to write simple messages (akin to today’s SMS). The first nationwide systems on that basis, called officially videotex (not to be confused with videotext!), were introduced in the seventies first in Great Britain and then successively in most European countries. In Austria, my home country, I was responsible to recommend whether to also take this approach. I recommended an alternative: to use the same basic idea, but add enough electronics in the decoder to turn it into a small programmable colour-graphic computer and equip it with a full keyboard. Thus, the MUPID, a colour-graphic networkable, programmable device was born, with all programs and data stored in network of videotex servers (today it would be called “in the cloud”). Due to the fact that the network of servers was run by the nations’ telecom authorities messaging without spam was easy, senders of messages and information providers could be identified by the users, and micropayments were possible, since the amounts were just added to the monthly phone bill.

Thus, in addition to stand-alone “e-Learning Computer Labs” (at this point in time under abbreviations like computer assisted learning or instruction, computer-based teaching or training and others) videotex and MUPID offered networked variants. This is documented in Videotex (1982), Longley and Shain (1983), Maurer and Sebestyen (1984) and particularly in Maurer (1985, 1986). It allowed the use of colour and of different types of animation. Figure 1 shows four screen dumps from information downloaded with MUPID from the nationwide network. The top row shows that even full-fledged dictionaries were already available at the time, and small pages charges (1P in the example) could be collected after warning the user (a feature still missing in today’s internet!). The second row shows two game applications: it was possible to play chess synchronously and asynchronously with arbitrary many persons, at the same time engaged in a (written) chat with other players. The second row shows that games like exploring parts of the

![Figure 1.](image-url)
universe, including (limited) animation were possible. Indeed, one of the gaming applications proved popular to the extent that the system collapsed under its load during Xmas 1984!

However, only 50,000 MUPIDs were produced in Austria and Germany. The typical IBM PC was getting more accepted, so SW and protocols had to be adapted to PCs and to whatever networks were available, reducing the possibility to use full colour and powerful communication facilities, including central supervision of learners, feedback between learners and courseware supervisors and between learners. It is possible to argue that because of this, first attempts of truly networked e-Learning with all kinds of communication facilities were delayed by almost 20 years until the internet was starting to become accepted and inexpensive enough to allow its use on a large scale.

Nevertheless, one rather unique commercial e-Learning undertaking was started around 1986 as joint work with CDC (using an authoring tool similar to PLATOs Tutor, mainly developed by the late John Garrat) called Computer Supported Teaching of Computer Science (COSTOC) making use of colour and animation as mentioned above. At some stage over 300 one-hour lectures were available and where used in a number of labs in Europe and two in the USA: one at the University of Texas at Dallas under the directorship of Fillia Makedon, and one by the University of Denver under the directorship of the late Peter Warren. Figure 2 shows a few samples. In the first row you see the cover of a brochure on the system and next to it a multiple choice question: it is remarkable that even at this stage the system was capable of handling spelling errors, thus the wrong spelling Autria of Austria was recognized! The bottom two pictures come from a university course on sorting algorithms by Hofbauer and Maurer (1988). Particularly the left picture, showing the sifting down of a value as part of heapsort makes it clear that animation was indeed a powerful tool.

For more literature see Makedon and Maurer (1987a, b), Maurer (1987, 1988), Koegel and Maurer (1987), Makedon et al. (1987), Huber et al. (1989). This very partial list shows the

![Figure 2.](image)
immense interest in what was then called “presentation type CAI” with colour graphics, animation, and some feedback and testing facilities.

However, with the exception of Austria and Germany the COSTOC lessons could not be downloaded from a nationwide network, but at best from some university network, reducing the important feedback to courseware developers. Communication between students and tutors usually required an extra component tailored to the local circumstances and interrupting the learning stream. Hence, most efforts in e-Learning between 1985 and well past 2000 were based on stand-alone or only very locally networked groups of PCs or workstations. That is, they were limited to local e-Learning labs, or even just to e-Learning on an isolated machine with material available via some external storage device ignoring the lessons made already with PLATO. We will discuss this period in the next section.

2. The time of e-Learning labs, and what can be learnt from them (1985-2005)
Throughout the time we are discussing now, the number of PLATO type learning environments was growing for some time[1], with significant improvements particularly on the display front. Indeed it is almost funny to observe that ever new breakthrough on the display-end caused a wave of hype: “Now we finally will see e-Learning to replace teachers!” This happened with the first NeXT Computer and the NeXTstation in 1990: they provided the first time black and white movies and audio sequences that could nicely be incorporated into presentations without extra gadgets (like Philip’s Videodiscs). Yet, the 50,000 units of NeXT machines, about the same as the number of MUPIDs produced, are often seen as the ONE big flop of Steve Jobs. A much better picture compression using JPG (first approved by international bodies in 1992, and fully accepted in 1998) or MPG (for videos), with first workable solutions starting in 1994, again were hailed as revolutionizing teaching. The resolution of display devices got better and better.

However, all the many computer labs installed for e-Learning, even the best, did OK, but not really well. We will discuss this using the COSTOC system mentioned earlier that the author was very involved in, since is typical for what happened and whose woes are typical for what happened and is still happening today.

All e-Learning material in the period discussed was basically run either on stand-alone computers (the SW had to be downloaded via some net, or installed from some external storage device) or it was run in special labs with typically 30-60 workplaces, connected to a central server. The material was of presentation type, i.e. consisted of a number of “frames”, each frame typically containing some textual, pictorial and diagrammatic material, sometimes including animations (in the better systems the speed of animation controlled by the user), and including video or audio clips. The frames could also contain some navigational features. Typically, multiple choice questions or even question allowing textual answers could make sure that users understood the material. If necessary, this would allow to introduce some background material or conversely to omit some material already understood. Usually some simple feedback or access to FAQs would be possible.

With the exception of video and audio clips the system COSTOC allowed for all of the above, including (unique for the time at issue) textual analysis. The fact that based on the outcome of questions the material presented afterwards could be different, notions such as intelligent tutoring system (ITS) and of goal-oriented learning by structuring material in stages leading to a specified goal stated beforehand were introduced. The fact that such e-Learning systems were only partial successful can be traced to four basic issues. First, the fact that preparing well structured, good looking and useful material was far beyond trivial. Second, additional material or shortcuts were usually provided using links as introduced in hypermedia systems (and now of course omnipresent in the internet). Such links can easily be confusing leading to the “lost in Hyperspace syndrome”. Third, only very limited feedback from students to courseware developers and between students and tutors was possible, often
none at all. Fourth, many psychological issues have been overlooked for a long time. I am inclined to say that this is even still true. I will address briefly all four aspects:

1. Preparing well structured, good looking and useful material is far beyond trivial. Often, material provided for students was done by teachers for their students. Note that nobody writes a nice textbook for just one group of students, so why should a teacher bother to spend an exorbitant amount of work for one class or a class repeated a few times, unless there would be a financial incentive or it would at least be feasible to exchange material with other teachers. It is interesting to note that in some commercial environments financial compensation was used: this is the main reason why some large companies invested successfully in courseware and e-Learning environments. In educational settings developing courseware was rarely compensated financially or academically. Thus, except for some enthusiasm only the idea to at least be able to exchange courseware seemed attractive, yet incompatibilities between systems made this very hard to achieve. The late Eric Duval www.ae-info.org/ae/Member/Duval_Erik/ was fighting for years to achieve an international standard (Forte et al., 1997; Duval and Forte, 2008). Eventually an agreement on a standard between Europe and the USA was achieved, but developments just seemed to ignore it.

To ease the burden of preparing courseware some very sophisticated techniques were developed over time, and some interesting ideas converted into reality. One is to “author on the fly”, i.e. while teaching (by recording voice and writings on a whiteboard) material for later use is created. This idea was introduced by Thomas Ottmann from the University of Freiburg. However, there were other stumbling blocks: different university teachers teaching the same course are likely to still select different topics. Hence, to share material it is necessary to build it in a very modular way, each module reusable in different contexts, an impossible task if there are links criss-crossing all over the place. This leads to:

2. Additional material or shortcuts were usually provided using links that could easily be confusing, leading to the “lost in Hyperspace syndrome”.

Even more to the point, most researchers in e-Learning realized the need for modularity of material. This is almost impossible in the presence of a dense network of hyperlinks. It is Nick Scerbakov from Graz University of Technology that realized that akin to the first second generation knowledge management system Hyperwave (Maurer and Tomek, 1990) and particularly (Kappe et al., 1992) one could do without links. This was refined in Maurer et al. (1995) and finalized as book in Maurer and Scerbakov (1996): this established the HM-Paradigm as a crucial concept for all who dislike the dictatorship of links:

3. Not enough feedback facilities from students to courseware developers and between students and tutors were available as part of e-Learning set-ups. Only with the advent of universal e-mail and later social media quite a bit of communication is now possible between all parties involved, hence built-in communication facilities are not a critical issue any more.

4. Many psychological issues have been overlooked, and are still overlooked.

I want to base this subsection on personal experiences that are typical, but will have been encountered in one way or another by anyone really dipping deep into e-Learning using e-Learning labs and hence should be observed by all who try to use e-Learning.

Before moving to Graz University of Technology end of 1977 I was Professor at the University of Karlsruhe, Germany. I hated my job to teach each year incoming students the basics of computer science and programming and such: to teach in the largest auditorium to 400+ students was an exercise in frustration. As much as I would try, behind row 25 little attention would be paid to what I would say.
I was determined to change this. I used a professional video lab to produce 44 units of 45 minutes of video each, each with an additional hour of backup. Each unit started with a joke (hoping this would make sure students would come in time). After 15 minutes there would be another joke (15 minutes of concentration is all one can expect). Some task had to be done 15 minutes later with explanations of the solution (again, to break monotony), and one more joke at the end (hoping that students would stay to see the last joke).

To tell the truth: I spent more time on preparing the jokes than the material! The backup units were for those who had the feeling they had not understood everything in the main units. That is, they consisted mainly of some extra explanations and many examples. Each unit was shown about 20 times by a tutor in small rooms (for 35 students maximum), according to a widely advertised timetable. Tutors could interrupt the video if questions were asked. The class was accompanied by tutoring sessions where homework and problems were discussed. Thus, students had little personal contact with me, but ample contact with tutors almost their age.

I am not sure that my efforts really paid off for me: I had invested lots of time, but as a consequence I did not have to teach the course any more myself; a graceful move by my Dean.

The evaluations of this system by students, and their performance, were very gratifying. I also had learnt a lot. We have to live with short periods of concentration. Think about this: at some stage teachers would have had a blackboard they would write on. When full, they had to wipe it; this was not a waste of time but a welcome interruption for students. When architects installed six movable blackboards to make it unnecessary for professors to wipe them, they were damaging the educational process!

Let me also parenthetically tell an anecdote that I hope will help to catch your attention again! When I left Karlsruhe, I was asked if they could still use my videos and the set-up I had introduced. Obviously, I had no objection. Some six years later I gave a seminar in Karlsruhe. I walked by some classrooms where my videos were shown. Then I realized that many young students looked at me in a strange way. Finally, I understood: they knew me from the videos, had never seen me in person, had considered me dead for a long time: a ghost was walking on campus!

Anyway, my positive experience with the video-instruction lab convinced me: if I do the same at my new university, but use an e-Learning lab where interactivity would be much better it would be a hit. Well, I had to learn a few things that I believe everyone reading this should know.

Courseware development was a hassle. But then there were top professors and good friends who helped out, like Ian Witten (NZ), Arto Salomaa (Finland), Thomas Ottmann (Freiburg), Lutz Wegner (Cassel), Jürgen Albert (Würzburg), etc.

Thus, I could use this material in our beautiful e-Learning lab, with a roster, where students could reserve time slots to work on one of the 40 machines. I was dismayed to see after two weeks that both lab and roster were still mostly empty. It dawned on me that since the knowledge was available till the end of term, there was no hurry to use it right now. No need to leave an evening party early, as some might have done to catch an important ordinary lecture at 8 a.m. next day! I found a trick solution: one night I filled one-third of the roster with invented names. A day later the roster was full: students suddenly panicked that they would not have enough time slots!

More to the point: if you offer material in e-Learning you have to impose rigid discipline. Maybe the best is to have small tests (exams) everyone has to take every two weeks or so, to avoid that the learning is left to the last possible moment (when lab and computer networks may not even be able to handle the load). You do not allow students to drink or eat when you give a lecture. So do not permit this in the lab, either. I am convinced you can think of further ways to make sure that students learn all the time in small increments. This is why the German Bank Academy run by my good friend Joachim Hasebrook for many years had
good success with e-Learning: employees would have one day to work through some material that would be dealt with in interactive mode the next day. I will return to the book (Hasebrook and Maurer, 2004) a bit later for other reasons.

Another important lesson I learnt is that e-Learning if done right is well accepted to a certain extent, but if it used too much it is not appreciated. To be specific: the first year of the e-Learning lab in Graz with two courses taught this way was a big success. When we added two more courses the year thereafter, enthusiasm was “strangely” more muted. Adding more courses the year thereafter caused student protests: “We like to learn a bit outside ordinary lecture-halls, particularly if lecturers are bad and courseware is good. But we do not want to do this for more than a few courses”. The message seemed clear but there was also the lingering idea that the first year was only well received because the idea to learn this way was novel; and once this wore off may be even a few courses would not be acceptable? Well, this is one of the positive messages of this paper: do not worry, even if the novelty effect wears off: students are happy to use e-Learning as long as it is not overdone.

Thomas Ottmann conducted a very interesting experiment with his Freiburg lab. In a large class on data structures about 100 students used the e-Learning material, a similarly large group would attended his lectures. At the end of the term, the final exam caused some temporary jubilation of all e-Learning supporters: the students using the lab did significantly better! However, the same students who did better in the e-Learning subject did worse in other subjects. Ottmann had set up his experiment impressively sophisticated and could prove what we suspected: the e-Learning mode did not convey knowledge better, but students were attracted to this novelty and spent more time on this subject, at the expense of other subjects. The experiment was repeated by the late Peter Warren in Denver and the late Jennifer Lennon (1994) in Auckland in a modified way. Two important facts emerged: e-Learning is fairly equivalent to lectures but one has to make sure that students do not spend too much time with it. Most important, one has to make sure that e-Learning material does not waste students’ time! In particular, the idea to use some gaming facilities in e-Learning material may endear the material to students but can turn out to be quite time consuming, an argument sometimes overlooked (Guelt et al., 2005; Pirker and Gütl, 2015) unless compensated by, e.g. a competition “who is first?”.

Let me explain this with a very simple example. I have seen many e-Learning modules where learners could fire a cannon or such and have to find out, looking at the simulated flightpath what angle is optimal to achieve the largest distance. After some 15 minutes of experimenting most students end up with the (correct) guess that close to 45° is optimal. However, this is a complete waste of time, since a simple calculation will yield the proof that 45° is optimal. Let \( v \) be the velocity of the shot, \( x \) the angle of the shot and \( t \) the time that the shot touches ground, then clearly the width \( w \) of the shot is \( w = t.v.\cos(x) \). The height \( h \) of the projectile at time \( t \) is of course given by \( h = t.v.\sin(x) - (g/2)t^2 \), where \( g \) is the gravitational acceleration. The projectile hits the ground when \( h = 0 \), i.e. when \( 0 = t.v.\sin(x) - (g/2)t^2 \). Solving for \( t \) gives \( t = (2/g).v.\sin(x) \), and plugging this into the formula for \( w \) we get \( w = (2/g).t^2.\sin(x).\cos(x) \). To find the maximum for \( w \) we find the first derivative of \( w \) with respect to \( x \), set it to 0 and simplify, ending up with \( \cos(x) = \sin(x) \), implying \( x = 45^\circ \). Thus, rather than experimenting for some time and then hoping to have found the right answer solving a simple “min-max problem” proves that 45° is optimal. And even more: the angle is both independent of the velocity and the gravitational force!

I have seen still more boring material where students, e.g. have to practice solving half a dozen systems of linear equations: once they have understood that is done by converting the system to “triangular form” by subtracting some lines form others it is just frustrating for students that they have to perform now boring trivial manipulations many times.
There is one famous case when a number of attempts were made to help students get some practice in calculating the derivative of a function. The basic idea is that a programme (repeatedly) generates some random function \( f(x) \), the programme finds the derivative \( g(x) \) using the few simple rules for doing so, and students also compute the derivative of \( f(x) \), call it \( h(x) \) (it is the “quotient rule” and the “chain rule” that sometimes confuses students). Anyway, the computer now “only” has to check if \( g(x) \) and \( h(x) \) are identical. However, it has been shown by Matijasevic in 1968 that this is an unsolvable problem, see Rozenberg and Salomaa (1995). That is, there is no way one can write a programme that for arbitrary functions \( g(x) \) and \( h(x) \) determines if the two function are identical. Thus, all early attempts to write a programme for practicing derivations were unsuccessful. However, in Gillard and Maurer (1990), a pragmatic approach solves the problem: both functions are evaluated at 100 randomly chosen points. If their values agree in all cases it is clear that they are, very likely, identical. Cris Calude from Auckland actually showed that under mild assumptions if \( h(x) \) and \( g(x) \) agree at 100 random points the likelihood that they are not identical is about \( 10^{-50} \), i.e. very small indeed. Thus, for all practical purposes the method did solve the unsolvable problem and this exercise module has been used at various universities.

After this bit of excursion into mathematics let me return to one very important issues that has to be taken very serious since it is often ignored: avoid wasting students’ time. Thus, as important video clips are in some instances for instructional purposes, make sure they are not longer than is essential. If you use interactive diagrams or such, make sure you only show what is really important in compact form. Do not use pictures unless they really convey important information or unless they are used to break monotony. After all, one of the most surprising results in the book (Hasebrook and Maurer, 2004) – based on 10,000 of users! – is that multimedia material often distracts, and wastes time, rather than being helpful.

As the internet became more and more widespread the idea that material in the internet could be used for instructional purpose became clear to more and more persons. I am proud to say that together with my good friends Cris Calude (NZ) and Arto Salomaa (Finland) we started the first fully refereed free online journal in 1994: www.jucs.org. The journal was the first of its kind (free submission, free reading) and is still going strong. Just convince yourself by using the URL mentioned.

Of the many papers written on using material form the internet for educational use let me mention a few early papers: Lennon (1994), Lennon (1995), Marchionini and Maurer (1995), Maglajic and Scerbakov (1997), Dietinger and Maurer (1997), Maurer (1996). The efforts to include material in the web as extension of other learning material never stopped (Maurer and Mueller, 2011).

It also became more and more clear that e-Learning should really be seen in a wider context: knowledge management, see Maurer (1999).

3. Success and failure of e-Learning environments till about 2000
I believe I have made it clear that there are many important points one has to observe when setting up an e-Learning environment. In summary, e-Learning setups have been successful in many cases long before the turn of the century, yet those aimed at completely replacing ordinary teachers failed. I will now outline where e-Learning has proved particularly useful. The advent of new technologies after 2000 has not changed the situation dramatically as I will mention in the last Section 4.

In general, e-Learning has been more successful in companies (or high priced educational institutions) than in schools and “ordinary” universities. The main reason is that a rigid schedule, immediate tests if material has been digested, or some other imposed control or financial reason to get something for what has been paid for, makes learners use the
resources whether they particularly like them and whether they are top notch or not. Also, in such environments negative feedback is taken very serious and acted upon.

In settings where there is more freedom, where work on some subject can be delayed in favour of other endeavours it requires other incentives to use e-Learning widely. However, situations abound where e-Learning is of real help. I will just mention a few typical cases.

When students have been sick, or they come from a different environment e-Learning may be the only chance to catch up. I have used courseware to make sure students come to a seminar with the necessary background. In such cases, the material will allow students to skip large parts if they know the material, but will have to invest some energy if not sufficiently familiar with it. Thus, I was able to assume that knowledge required to follow was universally available when my seminar started. I have also found e-Learning quite useful for refreshing knowledge. Persons who were quite familiar with material in some area, but not having used it for a long time, could use e-Learning to again understand all that was required.

Of course there is the old argument that e-Learning is useful because one can choose the speed one is comfortable with, and can learn when time is available: a young mother or a working individual just may not have the time to attend a lecture or such. In addition, if educational institutions are at a considerable distance much commuting time can be eliminated. Those arguments were exactly the ones used to argue for “open universities” even before much technology was available. Learning this way does require a degree of self-discipline and/or outside control.

E-Learning material can also be very useful for learning specific skills. I remember fondly that the most successful training courseware I developed was for learning how to tie knots necessary to get a sailing license. The courseware came with three pieces of strings. For each type of node it would pictorially show with pictures of the strings, step by step, how the strings have to be manipulated.

This kind of approach applies to both manual and intellectual tasks where the main aim is to learn how to follow a certain strategy step by step. Looking at today’s situation where many things can be learnt best by following YouTube clips or such it is clear that step-by-step diagrams or video clips for teaching have been underestimated a long time.

For me collaboration with a traditional board game manufacturer was particularly revealing. We wanted to teach kids the rules for a game, be it chess, a card game, some newly invented stuff, etc. The idea to write in simple language the rules for the game involved failed: parents would often not take the time to read (and explain) the rules to the kids, and by the time kids were able to read “with understanding” they would be eight or nine years for games considered for five-to-six-year olds. Even 15 years ago, we started to shift emphasis by shipping games not with a booklet explaining the rules but at that time with a video cassette that even four-year olds could slip into their TV set. The material on the videotape did not explain the rules, but showed tiny scenes of a game played by kids, good moves rewarded by smiles, bad ones by frowns or a gesture that the move was even illegal. From those bits of watching the game kids would learn quite efficiently. Videotapes were later replaced by CDs or such, and today by video clips. IKEA is still conservative enough to hand out a booklet with complex diagrams rather than some electronic material showing us how to assembly a complex piece of furniture step by step.

It became also clear that working for hours on a computer to learn something may not be ideal. But to blend it with other activities when needed (“blended learning”), particularly to integrate it into ordinary work (“learning on the job”) became more and more possible and attractive when working in a network environment, when access to needed information is readily available. Other attempts emphasized “learning by doing” or
“learning by experimenting” but, as mentioned before, although this may work or even be fun it usually takes an inappropriate amount of time to achieve the desired aims. E-Learning (or better e-Teaching) can in many instances still be much improved by using ideas as mentioned above. However, there are also areas were the ideal methods to teach have often appeared long before the advent of computers. In such cases one has to carefully weigh if e-Learning is appropriate.

One interesting example is language learning. To just learn the translation of words from one language to another, for a long term the “stack technique” was used with very good results. A typical version is this. Learners get a pack of cards. One side of each card has the word or phrase in, say, English, like “young girl”, on the other side the translation into the language to be learnt, say Italian, i.e. “bambina”. The cards are placed as a stack with the English side on top in “spot one”. The learner takes card after card, each time before turning over speaking the translation aloud and writing it on slip of paper. If the answer is correct, the card is placed, again English side up, on a growing pile in “spot two”; if the answer is incorrect or unknown, the correct answer is looked at, read aloud, and the card placed on a growing pile in “spot three”. Eventually the stack in spot one is empty, the cards of the stack in spot three are shuffled, placed in spot one, and the process continues. This is repeated until all cards are in the stack at spot two, i.e. each word has been translated correctly once. Usually the stack in spot two is now shuffled, placed in spot one and the process repeated. If this is done five times each word has been translated correctly five times and will stick in memory for some time. A bit of refreshing a few days later will show how much has been retained beyond the learning session, indicating whether further refresh cycles may be advisable.

Clearly, above process can be easily carried out exactly as described by on a computer with a simple programme. Here is the surprise: many attempts have shown that the manual way produces better results. It is generally accepted that the haptic/tactile actions carried out are of more help than just using the keyboard. Why I mention this example is to point out that traditional techniques can sometimes not be carried over one-to-one to computers.

Note in passing that language labs have been around long before they were computerized, using sophisticated versions of what was described above, and particularly useful because even with today obsolete techniques like tape cassettes the important issue of pronunciation can be handled to some extent. With modern computer-based language labs this can still be improved by checking the pronunciation of the learner against what it should be (this is trickier than it might appear, since comparison of pronunciation must take into account different pitches and speed of pronunciation).

Let me finish this section by claiming that the programming work at improving and using e-Learning had its heydays in the period covered. The first large e-Learning conferences started around 1985. In 1987, International Conference on Computer Assisted Learning was first organized by the University of Calgary, later by Acadia University at Wolfville by Ivan Tomek and at University of Texas in Dallas by Fillia Makedon: the number of participants kept growing so some organization had to step in. It was Gary Marks, head of AACE www.aace.org/, who took over: it was my privilege to work with him on founding the conference series ED-MEDIA. When the participants exceeded some 1,500 we decided to split off the conference series WebNet that later turned into e-Learn. Both ED-MEDIA and e-Learn are still continuing: I pulled slowly out of both of them after 2000 for two reasons: it was time for younger blood and I had the gut feeling that the conferences were changing more and more from a strong computer-science component (my area) to a more pedagogical orientation. I was not completely wrong. The flavour of ED-MEDIA has changed enough by 2016 that this year only very few participants were computer scientists.
4. E-Learning after 2000

Due to the availability of inexpensive networks the emphasis shifted from e-Learning labs to e-Learning environments that were independent of a room full of computers. Rather, any computer connected to a network would be a device that could be used for learning and teaching, i.e. could be used for web-based teaching/training, as already visible in Helic et al. (2002, 2004).

New systems went beyond e-Learning by including course management and learning management. In modern systems, contact between learners of teachers/tutors is considered important. Feedback, even anonymous is desirable (Dreher and Maurer, 2005). Students are encouraged to make notes in learning material (Korica and Scerbakov, 2005), and even the idea of tours guiding students by a mentor emerged quite early (Helic and Scerbakov, 2001).

Even simple smartphones allow to review material with a small quiz on the way to school or the job in the public transport system (Schinagl and Maurer, 2007).

Some of the learning management systems (LMSs) started to supply quite sophisticated communication and collaboration features. The “WBT – Master” (Ebner et al., 2014; Scerbakov et al., 2015; Schaffert and Ebner, 2010) allowed students to communicate with each other and the instructors, team-shared data was available, tutoring online was offered, notes and other feedback tools were provided, etc. However, although the system served close to 100,000 students over time, many of the communication facilities were next to superfluous. Most communication was done via the same social media used otherwise. Thus, use systems for communication already known to students, do not try to do “better” by providing a new system/interface. On the other hand, it is tempting to try to apply social media also for learning, like in Ebner (2009), Ebner and Harmandic (2016).

A further agent of change was the emergence of MOOC (essentially quoting Wikipedia) “a Massive Open Online Course aimed at unlimited participation and open access via the web. In addition to traditional course material […] many MOOCs provide interactive user forums to support community interactions among students and instructors. MOOCs are a recent and widely researched development. They were first introduced in 2008 and emerged as a popular mode of learning in 2012”.

As LMS the (also open source) software Moodle https://moodle.org/ is now one of the most widely accepted.

Research in e-Learning today focusses not so much on new technology but on how material has to be prepared to be successful, and how students use it (Khalils and Ebner, 2016; Taraghi et al., 2013). This is also explained clearly in Serdyukov (2015). One system called iMooX that has proven very successful was developed by a team in Graz (Neuböck et al., 2015): a typical lesson consists of a number of clips of three to seven minutes, each clip followed by some test questions to ensure that the material has been “digested” properly. The material is very popular by students since it also comes in compact written form for those who do not want to spend time watching videos. Figure 3 shows a bit of a course on “English for Chemists” important for students in Austria, since their mother tongue is German, their English is ok but not specialized, yet all advanced courses are taught in English.

In summary, one can expect that large course repositories are here to stay and every educational institution will have to make them available. Concerning LMS, their only important communicational features are likely to be forums (allowing discussion between instructors and students) and online tutors, available via some channel during certain office hours. Otherwise, standard social media systems will be used for communication, eliminating the need to have such features built into the LMS.

5. The future of e-Learning

There are many ways to teach and to learn, with and without computers. I hope that my looking back at successful and not so successful attempts has at least shown one aspect
clearly: one large homogenous system for e-Learning does not make sense. Never put all eggs in one basket.

The real challenge for innovation in e-Learning is to find the correct mix of techniques, with the mix depending much on application areas, students and scenarios.

A few short video clips followed by some test question may be nice, but then maybe just "presentation type material", or if possible material presented by a human teacher who, for a change, is not sticking to PPTs, but captures attention by the "missionary spirit" that fascinates the leaners is one of the many, many ways to go.

Main credo: do not be boring, switch media, use competitiveness and use technology when suitable or when good as surprise. Above all: the quality of the teacher who is lecturing or who has prepared material is most important.

The two statements that the author believes are blatantly wrong are:

(1) One can make learning arbitrarily easy and entertaining. No. To get good at some sportive activity you have to work and let your body sweat a bit; to be good at some cognitive activity you have to work a and let your brain sweat a bit. That does not mean that you should ban gaming or entertainment from e-Learning, but you have to use the right amount.

(2) The (Western) world has invested hundreds of billions of dollars on computers for e-Learning, often driven by commercial interests. Let us continue to do so. No. It may well be that the same amount used for training more and good teachers would have been more effective. That does not mean that we should not (indeed we should) use computers in all educational institutions, but we have to use the right amount.

Here then is the enormous challenge we are facing: let us try to describe very large number of circumstances where learning is essential; and the let us find the right mix of approaches for each situation. To put it bluntly: many of us have believed there will be an ideal solution for e-Learning. Now we know: we have to find the ideal solution for e-Learning depending on a staggering variety of scenarios and possibilities. This is what this journal should be about.

Note
1. The main driving force, Control Data Corporation (CDC), once one of the leaders in supercomputers, slipped into deeper and deeper financial problems. What remained, folded in 1999. This was also a big blow to PLATO development, yet COSTOC was able to use some of the know-how including the above mentioned programming genius John Garrat.
References


Problems and solutions for using computer


Further reading


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Cultural competence and relational closeness: examining refugee education

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Abstract
Purpose – The purpose of this paper is to provide a historical and current accounting of the state of refugee education in both the USA and Sweden. The growing diaspora of people around the globe implores educators to utilize effective models and strategies to meet the needs of refugees, as well as to advocate policies that aid in this utilization. Sweden has the highest rate of refugee acceptance in Europe, and the USA has the greatest number of immigrants in the west.
Design/methodology/approach – A review of the literature formatted to provide the reader with a historical accounting of the states of refugee education in both host nations, as well as the current states. Strategies and promising policies are introduced based on the literature and the author’s own research conducted in Sweden.
Findings – The paper addresses the history and present situations of two host nations, Sweden and the USA, who have differing education systems and histories of immigration. Concerns and two possible solutions offered were to increase opportunities for interaction between native and refugee populations; and bolster funding for the education of refugee school-age children and adolescents, and adults so that effective strategies and environment described in the literature can be put into place by effectively trained educators. These solutions could improve the cultural competence among all peoples in both nations, better enabling the two countries to provide economically and socially sustainable environments for all of their inhabitants.
Research limitations/implications – The examination of these two nations’ education of refugees may shed light on the worldwide challenges of refugees and mass immigration.
Practical implications – The solutions offered in the paper could improve the cultural competence among all peoples in both nations, better enabling the two countries to provide economically and socially sustainable environments for all of their inhabitants.
Originality/value – A comparison of US refugee education with that of a high-volume European host nation does not yet appear to have been published.

Keywords Global education, Refugee education

Paper type Conceptual paper

Introduction
In recent decades, economic globalization and political instability created great movement among people across the globe. Last year alone, 65 million people were “forcibly” displaced, the highest number since Second World War, and four times more than in 2005 (United Nations Refugee Agency, 2016). Globalization has led some to “self-outsource” looking for better economic conditions. This is exemplified by workers from Greece, Romania and Spain to other parts of the European Union, as well as by Central American and Mexican workers legally and illegally crossing into the USA. The resulting diaspora burdens the infrastructures of the host nations where healthcare, housing and education are impacted (Offe, 2016).

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What follows is a report of a two-site case study in Sweden that examined the challenges of educating refugees. The review of the literature provides an examination of challenges created by the mass-migration of displaced people, focusing on two receiving nations: Sweden and the USA. The former has the highest per capita acceptance of refugees in Europe: over 160,000 in 2015 with an overall population of 9.3 million (Lane, 2015). The USA, by contrast, has a population of over 320 million and accepted only 70,000 refugees in 2015, but it is a nation with a reputation for being a nation of immigrants and holds great economic and political importance in the world; therefore, making a noteworthy comparison to Sweden. What the literature and this study conclude is that the use of culture competence and relational closeness may be best to address the challenges of educating displaced peoples not only in the USA and Sweden, but across the globe.

**Review of the literature**

Integration and assimilation

Refugees are a subcategory of immigrants. According to the US Department of State:

> The United States considers for admission as refugees persons of special humanitarian concern who can establish persecution or a well-founded fear of persecution in their home country on account of race, religion, nationality, membership in a particular social group, or political opinion.

With the Incheon Declaration of May 2015, the United Nations has set a goal to “ensure the provision of 12 years of free, publicly funded, equitable quality primary and secondary education” for all by 2030 (United Nations Educational, Scientific and Cultural Organization, n.d.). In order to honor this declaration, it becomes crucial for all host nations to provide refugees with quality educational experiences, especially (but not exclusively) children and adolescents who are five times more likely to not be in school than natives (United Nations Educational, Scientific and Cultural Organization, 2016). Integration into the host nations’ dominant culture is viewed by many to be of the utmost importance in ensuring that refugees, and all marginalized people, obtain a quality education (e.g. Salomone, 2010; United Nations High Commissioner on Refugees, 2015).

In general, the main goal of host countries in the past half-century has been to integrate rather than assimilate all immigrants, including refugees (Ewing, 2012; Salomone, 2010). That is, to welcome them into their society and allowing them to keep most, if not all, of the culture that they bring with them. For many years, the Swedes have attempted to integrate immigrants into what they hoped to be an organic culture rather than assimilate them into one that is, and would remain, static. The USA also has stated policy to this effect. These policies, however, are not without opposition as demonstrated by the recent increase in Nativism in both nations (Crouch, 2014; Dooley, 2012).

When comparing Swedish immigration history to that of the USA, it appears that, although sometimes not intended, integration has prevailed for non-European immigrants while European immigrants mostly assimilated into the dominant (Anglo-Saxon) culture (Ewing, 2012; Lindsey et al., 2009). In the late nineteenth and early twentieth centuries, tens of thousands of Swedes emigrated to the USA quickly abandoning their native tongue and many aspects of their culture (Moberg, 2005). Yet, Mexican, Cuban and Puerto Rican immigrants, for example, have not. They have learned English, for the most part, but still use their languages and live much of their cultures (Salomone, 2010). It is quite apparent how Mexican culture has influenced the dominant US culture by visiting the south-west. The same can be said for many Asian immigrants whose cultures have influenced the dominant (Anglo-Saxon) culture. But this was not intentional. Much effort was and has been made to “Americanize” immigrants, to strip them of their cultures, to assimilate them into the dominant culture. Salomone (2010) states that the Americanization of early immigrants (mostly European) was “acculturation” when repressive and xenophobic interests with,
sometimes, magnanimous desires to aid the new immigrants forced them to lose their cultures in favor of the dominant one (see also Ewing, 2012). Theodore Roosevelt, a noted Nativist, spoke of a crucible that would “turn out people with one flag, one language” (Salomone, 2010, p. 21). This crucible was also known as the “melting pot” theory that was based on a “sentimental view of amalgamation of immigrants” found in Israel Zangwell’s 1908 play simply entitled “Melting Pot” (Salomone, 2010, p. 20). The influential educator Elwood Cubberly of Stanford University was one of the leading Nativists of the early twentieth century, someone who feared immigrants would “dilute tremendously our national stock” (Salomone, 2010, p. 20).

The current state of immigration in Sweden and the USA

Immigrants and refugees in the USA amounts to about 13 percent of the nation’s population (Migration Policy Institute, n.d.) while Sweden’s immigrant and refugee population is about 15 percent of its nine million (Sveriges regering, n.d.). The rate of immigration for the Scandinavian nation, however, far exceeds that of the USA which has accepted roughly one million legal immigrants on an annual basis in the twenty-first century. This one million amounts to about 0.3 percent of the US population each year. Sweden, by contrast, accepted 115,000 in 2013 (Sveriges regering, n.d.) which is approximately 1.2 percent of its population or four times the rate of the USA. Regarding refugees, the USA received nearly 70,000 in 2014 whereas the figures for Sweden were more than 142,000 in 2014 (World Bank, n.d.) and more than 160,000 in 2015 (Lane, 2015). Sweden not only received twice as many refugees but also received them at a rate that was 75 times that of the USA.

As media reports indicate, the massive influx of refugees into Europe has caused much strife throughout the continent. This influx, as one might deduce, causes great strain on host societies, both economically and politically (Knight et al., 2009). The civil war in Syria has been the catalyst for the most recent increases in refugees but Sweden, as mentioned previously, has been a magnet for refugees for decades, accepting Eastern-Bloc citizens fleeing Soviet domination following WW II, Bosnians in the 1990s, and Iraqis during the start of the US-led invasion of that country in 2003 (Swedish Institute, n.d.).

Politically, the immigration/refugee dilemma came to the forefront in the 2006 Swedish national elections when a center-right coalition promised to curtail immigration (Scrutton and Ahlander, 2013). In 2010, the Sweden Democrats, historically a very minor party with Nativist beliefs with member connected to neo-Nazism (Crouch, 2014), earned seats in parliament when they garnered 5 percent of the national vote and even more seats in 2014 when they received 10 percent of the vote. Their key objective is to reduce immigration and, by doing so, they hope to keep Sweden “Swedish” (Shapiro, 2015).

Despite a thoughtful attempt to integrate immigrants into the (intentionally) malleable Swedish culture, problems persist. The author found this in 2013 as a by-product of his research of progressive Swedish schooling practices, replicating his 2001 study. The topic of how to meet the needs of immigrant students as well as how to integrate them into the community was brought up time and again in interviews with teachers and students (Nordgren, 2013). Recent media reports support these findings. For instance, the Øresund Bridge between Malmo and Copenhagen has found itself under higher security (CXC Global, 2016), a New Year’s Eve celebration in Stockholm was marred by reports of molestation by immigrants (Shapiro, 2015), and several nights of unrest leading to burned cars and buildings outside of Stockholm (The Guardian, 2013). Despite these conflicts, Swedish people agree that they should continue to support refugees and keep their borders open to them, but it is understood that new policies must be put in place to address these struggles (Shapiro, 2015).
The USA has seen a rebirth of Nativism exemplified by the building of a partial wall across the southern border with Mexico that is guarded by vigilantes, a post-9/11 hysteria aimed at Muslim immigrants, and the election of a president who stirs Nativist sentiment (Liasson, 2015). This reflects fears of “the other” by those who may be left behind by globalization and neoliberal policies and mirrors European movements such as Brexit (Habermas, 2016). With growing income disparity, US Nativists seek to close the nation’s borders to keep out new immigrants who, they fear, will take jobs from natives, and further make the nation even more multicultural than it presently is, thereby, “diluting” the dominant Anglo-Christian culture (Coates, 2011).

Education of refugee populations

Schooling of refugees offers unique challenges to educators; most crucial may be integration into the dominant culture. Oh (2012) believes, historically, refugee education was to assimilate rather than integrate: “Formal education has characteristically been employed to promulgate, reify and legitimize certain constructions of collective social identity be they religious, ethnic, political, ideological, cultural, or social class” (pp. 73-74). While in agreement, Dooley (2012) asserts that refugees must be positioned to become intellectual class members in order for them to be truly integrated. As many refugees and immigrants bring with them much-needed skills and high levels of education, becoming a member of the intellectual class would be part of the natural order of events, it would seem. However, Dooley contends, xenophobia and institutionalized racism can inhibit or even stop this positioning. Another obstacle is the mismatch of credentialing which can find a physician from Syria, for example, unable to practice medicine in her accepting nation. Oftentimes, refugees not only come from poverty, but were educated in a “pedagogy of poverty” of mere transmission of facts rather than high-cognitive learning; this not only hinders class advancement but can be perplexing obstacle to educators (see Haberman, 1991; Zhao, 2009, 2012).

A way to address these challenges is to provide learning environments that are not only accepting of the immigrants’ culture but invites it, actively seeking their input. Kirova (2012) offers support to Pierre Bourdieu’s assertion that people can suffer a “negative internalization” when their own cultural capital has little value in the dominant culture. By actively seeking ways in which the capital that immigrants bring into the school (and society) then integration will more likely occur. Kirova goes on to recommend that schools show value for the parents’ knowledge, as well as the students’, and to allow them to maintain their own language as the Swedes seem determined to do (something that is still quite a matter of debate in the USA (Grovum, 2014)).

Educators of special needs students in the USA have long supported integration of diverse learners into the “mainstream” (Osgood, 2005). This has also been found to be effective for immigrants and refugees, supporting what Banki (2012) terms “Relational Closeness,” a concept and strategy used in “Intergroup Contact Theory.” Relational closeness seeks to bring natives and refugees closer together, relieving tension that will likely exist. When managed correctly, research suggests it improves individual cooperation among all parties (Forbes, 1997).

Cultural competence

In order for integration to be successful, ensuring schools have “culturally competent” teachers and administrators is essential according to some scholars (e.g. Banks, 2002; Diller and Moule, 2004). Cultural competence is generally defined as the ability of one to accept the behaviors and beliefs of someone from another culture as well as one’s ability to adapt to an alien culture (Gutierrez and Rogoff, 2003; Lindsey et al., 2009). By empathizing with the students, and having the willingness to gain an understanding of their cultures and
situations, teachers will be more capable and willing to meet the educational as well as social-emotional needs of the students (Diller and Moule, 2004). The Swedes have a great history of tolerance, a willingness to accept differences among its native people as well as immigrants (Lane, 2015). This is an important attribute when one wishes to increase cultural competence (Gutierrez and Rogoff, 2003).

Effective teachers create strong relationships with their students to improve trust as well as communication (Goldstein, 1999); relationship building and communication are key attributes to cultural competence (Gutierrez and Rogoff, 2003; Lindsey et al., 2009). Integration would seem to benefit greatly from a population with high cultural competence where differences are accepted and, perhaps, even celebrated for the diversity they bring to the culture. Educators with high cultural competence can help students integrate into the school culture, enriching the educational experiences of all students (Banks, 2002; Diller and Moule, 2004). Close relationships between teachers and students not only improves the learning culture (McGrath, 1998) but also empowers students to become a life-long learners, striving to improve their lots in life and, thus, providing stronger contributions to the economy and society (Darling-Hammond, 2010; Nieto, 2004). Although refugees ostensibly are temporary immigrants, returning to their home nation when is safe to do so, only about 15 percent do return, according to the United Nations Refugee Agency (n.d.). Given that as many as 85 percent of the world’s 16 million refugees will remain in their host nation, it seems it is incumbent upon host nations to ensure that these populations can be successfully integrated.

Methods
In an attempt to determine if two schools in small Swedish communities impacted by large numbers of refugees were meeting the needs of refugee students, a two-site case study was developed and implemented. This study proposed to answer the overarching question:

- What impact does the recent influx of refugees have on schooling process in these two rural communities?

Based on the review of relevant literature pertaining to the research question and sub-questions, the researcher adopted a mixed-methods approach consisting of surveys for teachers and students; interviews of teachers, students and principals; and a document review (national policies pertaining to immigrant and refugee education). The surveys and interview questions are found in the Appendices section.

The settings were two, small towns in Northern Sweden each with a significant number of immigrants and refugees (numbers of refugees are assigned to each community based on its population as part of a quota system (Swedish Institute, n.d.)). Swedish education is controlled locally by municipalities or “kommunerna.” The towns in which this study took place each had about 2,000 inhabitants and were situated in two separate kommunerna serving multiple small towns. The school sites were secondary schools serving both high school aged and adult populations of refugees but shared facilities (e.g. cafeteria) with traditional schools.

Both principals were interviewed in person and via e-mail. Teachers in Kommun A were interviewed en masse with 17 in attendance in what was also a presentation of the research proposal. These teachers were invited to participate in e-mail interviews. Students at Kommun A were interviewed in a small group. At Kommun B, teachers were interviewed individually (n = 3) but all were invited to the e-mail interview. These interview data were analyzed qualitatively seeking themes and patterns in responses as well as novel responses requiring further investigation.

Surveys were conducted using SurveyMonkey where all teachers and students were sent a link to the survey via e-mail. Participants were given a 30-day window to respond, after which all data were collected and analyzed both quantitatively and qualitatively.
Findings
In an attempt to answer RQ1 was deemed important to also examine ancillary questions the researcher hoped to get answered by the research:

*RQ1. What impact does the recent influx of refugees have on schooling in two rural communities in Sweden?*

This section reports the findings as they relate to both the primary and ancillary questions.

**Primary question**
The greatest impact seems to be in the local funds needed to compensate for a perceived lack of funding from the federal government to educate refugees. One principal commented that a school received less per refugee than it would for a native-born Swede. The schools were meant for transitioning refugee students into the Swedish system for natives. With inadequate funding, an effective transition where the student is fully capable of the challenges of the regular school could be difficult to achieve. The transition to a regular school as well as into the Swedish society, can be improved with more opportunities for interactions with native Swedes, other than teachers. The principals, teachers and students, themselves, all realize this and want to see the communities offer more opportunities.

**Ancillary questions**

*What impact does this influx of refugees have on teachers’ practice in the classroom?* Both schools served refugees, only (although they shared facilities with regular schools) so the actual practices of the teachers was focused totally on their specific needs. Some teachers had training at the university specific to teaching Swedish as a Second Language (*svenska som andraspråk*) (or SSA). Others have taken professional development to teach SSA students. Still others are in need of this professional development and are seeking to get it.

*What impact does this influx of refugees have on administrators’ work in the schools and districts?* The two principals were hired to lead schools who serve refugees. The greatest concern was funding to ensure the students’ needs are met, but they are also keenly aware that more professional development is needed for teachers. Both principals are highly collaborative and use a democratic style of leadership (supported by teachers’ comments about their principals as well as culled from the interviews with the principals, themselves). It was apparent that both principals were flexible and were willing to take risks. At one school, scheduling was changed up as often as monthly in order to ensure the teachers and students were receiving the time necessary for each subject area.

*How are teachers addressing the needs of recent refugees?* Mostly through trial and error, it seems. Some have university degrees in SSA, and others have some training in it, while others have no such training or education. They must rely on their basic teacher education to ensure that proper pedagogical practices are in place. What both schools have found (through trial and error) is that individualized learning is necessary. Each student comes to the schools with different levels of Swedish language acquisition as well as knowledge and skills in various subject matters. In response, teachers have formed individualized plans for the students, and utilized small group and one-on-one instruction for the bulk of their daily practices.

*How are administrators addressing the needs of recent refugees?* As mentioned above, the principals are seeking local funds from their respective communities to bolster the federal funds which are not meeting the needs of the refugees. Additionally, they are using flexible scheduling and democratic structures to empower the teachers so that they can utilize individualized instruction.

*How are the communities addressing the needs of recent refugees?* Each community is offering additional funding to the federal funding, and they are supervising housing for
unaccompanied minor and even adult students. Great care is taken to ensure that someone who knows each refugee’s language and culture is available to supervise this housing, although the supervisors do not live in the housing if the students are adults.

_Do refugee students believe their education needs are being met?_ As far as the schools are concerned, then yes, they do believe their needs are being met. They had many accolades for their teachers and their schools. The only request they made was to have more “språk kaffe” opportunities in the communities where they could mingle with Swedes to become more fluent in the language and to better immerse themselves in the culture.

In short, the schools in this study seemed to be attempting “best practices” in meeting the educational needs of their diverse groups of refugee students as reported in the literature; that is, cultural competence and relational closeness. As described in the next section, these educators appeared aware of the need for these two innovative practices/concepts, yet understood that they were falling short in both. At least 16 languages are spoken by these students as their primary mode of communication, ostensibly learning Swedish as rapidly as possible so as to be ready to integrate into Swedish society. Furthermore, those with secondary school status must quickly learn other schooling content as well as Swedish. The needs of the students to learn Swedish (and other subjects, if they apply) and to better integrate into society can be improved with more opportunities to interact with native Swedes. In addition, the data reported a need for more funding for education of refugees, education that would appear to be more expensive, given the unique needs of this population, but the schools actually receive less to educate them than they would if they were native Swedes.

**Discussion**

The data and the literature point to the need for increased integration of refugee students into the Swedish culture. A concern mentioned by many of the study’s participants was what appears to be a lack of relational closeness as espoused by Banki (2012). Both refugee integration and education literature suggest increased cultural competence among teachers can increase educational success for refugees and improved chances of integration by increasing relational closeness (Banki, 2012; Dooley, 2012; Kirova, 2012). The Swedes have been attempting to increase cultural competence on a national level beginning in their school systems for some time: the Swedish National Curriculum for Compulsory Education has explicitly stated the importance of learning to be tolerant for decades (Skolverket, 1994). The USA, by contrast, has no national school system but instead has 50 autonomous state systems and 14,500 fairly autonomous district systems. Therefore, no cohesive, unified policy or movement to increase cultural competence currently exists in the USA. It should be noted that enacting nationwide educational change in the USA is onerous, if not impossible, as demonstrated by the resistance to such “national” reforms as No Child Left Behind and The Common Core. The US federal government contributes, on average, only 8 percent of a school district’s operating expenses (United States Department of Education, n.d.) so there may be little incentive to buy into such movements, even those mandated by law (Hargreaves and Shirley, 2012). It should also be noted that with the increased political polarization in the USA, anything brought forward by a presidential administration will likely have 50 percent of Washington, DC and state-house politicians against the measure (Ravitch, 2013). As noted previously, even the Swedes with a national movement toward cultural competence are experiencing increased Nativism. A groundswell of tolerance would need to be seen in both nations in order for cultural competence to increase. This groundswell may come from increased interactions with the native and refugee populations as familiarity has been shown to decrease conflict (Rubenfeld and Clement, 2012).

The turmoil caused by massive growth in displaced people does not seem as if it will subside in the near future. Even if Nativism leads to more anti-immigration measures taken by both the Swedes and Americans, the world will still be forced to address this phenomenon. Those nations
with mass emigration due to social and political conflict and/or economic deprivation (e.g. Syria, Iraq, Afghanistan, Somalia, Mexico and Eritrea) show no signs of improving their political and economic situations (Offe, 2016); and host nations cannot realistically keep “unwanted” immigrants from finding a way to their lands, despite the growing Nativist movement. As the diaspora increases, it becomes crucial for nations such as Sweden and the US to improve educational services for refugees, both P-12 aged students as well as adults. Refugees and all immigrants must contribute to both the economies and the democratic processes of their host nations in order to maintain economic prosperity and social stability in these lands (Salomone, 2010).

Conclusion
This paper provides a synopsis of the current state of refugee education in both Sweden and the USA, and an overview of the importance of integration of refugees into their host nations’ societies; and anchored by findings from a two-site case study conducted in Northern Sweden. A major concern stemming from the case study data were a lack of integration into the small communities due to lack of opportunities, mirroring the literature. Two possible solutions offered were to increase opportunities for interaction between native and refugee populations (relational closeness); and bolster funding for the education of refugee school-age children and adolescents, and adults so that effective strategies and environment described in the literature can be put into place by effectively trained educators. These solutions could improve the cultural competence among all peoples in both nations, better enabling the two countries to provide economically and socially sustainable environments for all of their inhabitants.

As the diaspora of displaced peoples continues to exist and expand across the world, education of refugees becomes vital for all those directly and indirectly affected, including nation states. With no short-term possibility of their returning to war-torn nations such as Syria, Iraq, Afghanistan and Somalia, it is incumbent upon the host nations to provide educational opportunities for the refugees so that they can contribute to the economic and social wellbeing of those nations as well as provide them the opportunity to live in a relatively safe and harmonious land.

References


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Refugee education
Appendix 1

<table>
<thead>
<tr>
<th>Item</th>
<th>Responses</th>
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<th>Responses</th>
<th>Responses</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 How many immigrant or refugee students do you teach?</td>
<td>None, zero</td>
<td>Fewer than5</td>
<td>6-10</td>
<td>11-15</td>
<td>16 or more</td>
</tr>
<tr>
<td>2 How many of your immigrant students do you think arrived in Sweden after 1 January 2015?</td>
<td>None, zero</td>
<td>Fewer than5</td>
<td>6-10</td>
<td>11-15</td>
<td>16 or more</td>
</tr>
<tr>
<td>3 For example, if you have students you know were born in Sweden, Syria, and Russia, your answer would be 3</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5 or more</td>
</tr>
<tr>
<td>4 What languages other than Swedish and English do your students speak?</td>
<td>Please write answers in these boxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 On average, how long have your REFUGEE students lived in SWEDEN prior to coming into your classroom?</td>
<td>Less than 6 months</td>
<td>6 months to 1 year</td>
<td>2 years to 3 years</td>
<td>More than 3 years</td>
<td></td>
</tr>
<tr>
<td>6 On average, how long have your REFUGEE students lived in your COMMUNITY prior to coming to your classroom?</td>
<td>Less than 6 months</td>
<td>6 months to 1 year</td>
<td>2 years to 3 years</td>
<td>More than 3 years</td>
<td></td>
</tr>
<tr>
<td>Please answer items 7 through 17 with the answer that best fits your present beliefs or thinking about each statement</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7 Teaching first-generation Swedes is more difficult than teaching native-born Swedes</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>8 I am in need of more support to help me teach my immigrant students</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>9 My immigrant students receive sufficient support services prior to coming to my classroom</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>10 My immigrant students receive sufficient support services when they are in my classroom</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>11 I received sufficient education at my university to teach immigrant students</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>12 I received sufficient education from my school to teach immigrant students</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>13 My school sufficiently supports immigrant students</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>14 My community sufficiently supports immigrant students</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>15 My community sufficiently supports the parents of immigrants to ensure that their children are prepared for school</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>16 The Ministry of Education (Skolverket) sufficiently supports immigrant students</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
<tr>
<td>17 The Swedish national government (Sveriges regering) sufficiently supports immigrants to ensure that their children are prepared for school</td>
<td>Strongly disagree 1</td>
<td>Disagree 2</td>
<td>Agree 3</td>
<td>Strongly agree 4</td>
<td>No opinion</td>
</tr>
</tbody>
</table>

Table AI. Survey sent to teachers via SurveyMonkey
<table>
<thead>
<tr>
<th>Item</th>
<th>Responses</th>
<th>Responses</th>
<th>Responses</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I was not born in Sweden</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>I was born in Sweden, but my parents were not</td>
<td>Yes</td>
<td>No</td>
<td>One of my parents was born in Sweden, the other was not</td>
</tr>
<tr>
<td>3</td>
<td>I began living in Sweden after 1 January 2015</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>I speak good Swedish</td>
<td>Yes, I strongly agree with this statement</td>
<td>Yes, I agree with this statement</td>
<td>No, I disagree with this statement</td>
</tr>
<tr>
<td>5</td>
<td>I believe speaking good Swedish is important</td>
<td>Yes, I strongly agree with this statement</td>
<td>Yes, I agree with this statement</td>
<td>No, I disagree with this statement</td>
</tr>
<tr>
<td>6</td>
<td>I speak good English</td>
<td>Yes, I strongly agree with this statement</td>
<td>Yes, I agree with this statement</td>
<td>No, I disagree with this statement</td>
</tr>
<tr>
<td>7</td>
<td>I believe speaking good English is important</td>
<td>Yes, I strongly agree with this statement</td>
<td>Yes, I agree with this statement</td>
<td>No, I disagree with this statement</td>
</tr>
<tr>
<td>8</td>
<td>I enjoy having people who were born in other nations in my classes</td>
<td>Yes, I strongly agree with this statement</td>
<td>Yes, I agree with this statement</td>
<td>No, I disagree with this statement</td>
</tr>
<tr>
<td>9</td>
<td>I learn better because I have students from other nations in my classes</td>
<td>Yes, I strongly agree with this statement</td>
<td>Yes, I agree with this statement</td>
<td>No, I disagree with this statement</td>
</tr>
<tr>
<td>10</td>
<td>I could learn better if I did not have students from other nations in my classes</td>
<td>Yes, I strongly agree with this statement</td>
<td>Yes, I agree with this statement</td>
<td>No, I disagree with this statement</td>
</tr>
<tr>
<td>11</td>
<td>I have friends who were born in other nations</td>
<td>Yes, I have many friends born in nations other than Sweden</td>
<td>Yes, I have some friends born in nations other than Sweden</td>
<td>No, I do not have any friends born in nations other than Sweden</td>
</tr>
</tbody>
</table>

Table AII. Survey sent to students via SurveyMonkey
(continued)
Appendix 3. Interview questions

**Teachers**

- Do immigrant students whose parents had jobs coming into Sweden receive better educational services than refugee students? Should they?
- What are the main concerns with teaching immigrant students?
- What positive impact have immigrant students had in your classroom and/or school?
- What support, if any, have you been given to effectively teach immigrant students?
- How have your interactions been with the parents or guardians of immigrant students?
- Are immigrant students adequately served in your school? Your community?
- What do you believe would improve the educational attainment of immigrant students?
- What else would you like to tell me about working with immigrant students?

**Administrators**

- Do immigrant students whose parents had jobs coming into Sweden receive better educational services than refugee students? Should they?
- What support has *Skolverket* (Swedish Ministry of Education) and/or the local community given you to better meet the needs of immigrant students?
- How have your interactions been with the parents or guardians of immigrant children been?
- How do you work with immigration authorities in your community? How do they work with you and your schools?
- What do you believe would improve the educational attainment of immigrant students?
- What else would you like to tell me about working with immigrant students and parents?

---

<table>
<thead>
<tr>
<th>Item</th>
<th>Responses</th>
<th>Responses</th>
<th>Responses</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 I work on school assignments with students who were born in other nations</td>
<td>I often work with students who were born in other nations</td>
<td>I sometimes work on school assignment with students who were born in other nations</td>
<td>I never work with students who were born in other nations</td>
<td></td>
</tr>
<tr>
<td>13 I spend time with students who were born in other nations when I am not in school</td>
<td>I often spend time with students who were born in other nations when I am not in school</td>
<td>I sometimes spend time with students who were born in other nations when I am not in school</td>
<td>I never spend time with students who were born in other nations when I am not in school</td>
<td></td>
</tr>
<tr>
<td>14 I would like to learn more about the foreign nations from which students in my school were born</td>
<td>Yes, I would like to learn more about these nations</td>
<td>No, I would not like to learn more about these nations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 My school is a good place to learn</td>
<td>Yes, I strongly agree with this statement</td>
<td>Yes, I agree with this statement</td>
<td>No, I disagree with this statement</td>
<td>No, I strongly disagree with this statement</td>
</tr>
</tbody>
</table>

Table AII.
Students

- Were you born in Sweden? If not, where?
- Do you know if you are considered an immigrant or a refugee? Does it matter?
- What are some things about your school that you like?
- What are some things about your school that you do not like?
- What do you like about your classmates?
- What do you like about your teachers?
- How could your school improve to meet your needs?

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