Conception of an innovative school and its development opportunities in Latvia

DAVIS PLOTNIEKS

Purpose – Secondary education is seen as a fundamental component of lifelong learning system where individuals obtain specific skills, competences and values needed for everyday lives. Since that 21st century has changed the way individuals live and learn, education system and secondary education needs continues improvement and strategic innovation, to ensure successful results. The purpose of this paper is to compose a conception of innovative school for measurement of secondary schools and their adequacy for 21st century learning paradigm.

Design/methodology – This paper describes innovative conception of secondary education and provides criteria for measurement of an innovative school and opportunities to develop the innovative capacity for secondary education schools. This conception has been created by analysing case studies and approaches of leading innovative schools in the world.

Findings – Findings suggest that secondary education has several opportunities that can increase the learning capacity within a secondary school, drawing attention to use of information and communication technologies, learning environment within a school and process and content of the studies.

Practical implications – The innovative school conception and conclusions from measuring the adequacy of a secondary school for 21st century learning paradigm, can serve as a tool for basic evaluation of a secondary school, indicating its improvement opportunities for strategic innovation, to ensure successful and efficient study process results.

Originality/value – This model presents conception of an innovative school based on leading practices in the world and provides conclusions about its development opportunities within Latvia. The findings provide an alternative view about the development of secondary education system and serve a basis for further research.

Keywords: education, innovation, innovative school, lifelong learning, 21st century school, future school.

1. Introduction

Education and training is seen as the fundamental part not only of the economic growth, but also for the development of society with its values and living standards. Since that 21st century is seen as the paradigm shift from traditional human work and physical resources to more sophisticated ones, such as human capital and human intellect, necessary skills and competences for developing economy and society are under continuous change. The education and training thus in the 21st century need to provide the appropriate mix of basic skills and motivation to learn. This transition in society and economy emphasizes the need to constantly improve, change and adjust the education and training system for todays needs where creativity, innovation, entrepreneurship, use of modern digital technologies and active citizenship and sustainable development is seen as a competences that need to be provided by the education and training system. This view has been supported in the work of *OECD* (2000) and *EC* (2008a).

Secondary education is seen as a fundamental component of lifelong learning system where individuals obtain specific skills, competences and values needed for everyday lives. These skills, attitudes and knowledge are not only necessary in knowledge society, but also create basic values for each individual. In this context secondary education can bee seen as the frontier after which individuals face adult life where problem-solving, teamwork, self-

direction, and the use of information and communication technologies (ICT) becomes a part of their lives. This view has been supported in the work of *ISTE* (2000), *Partnerships for 21st Century Skills* (2008), *Sawyer* (2006). The role of secondary education with its implication on society is growing, thus highlighting the questions about the quality and efficiency on how knowledge, attitudes and values are transferred to students in the age of secondary education.

Secondary education exists in constantly changing environment and the speed of chance frequently is dictated by the information age. Students have more opportunities for their entertainment than ever before. Their attraction to information, social networks, web based and on-line entertainment, audio-visual materials and „digital life" are growing along with technological development. School equipment and study content don't have equivalent speed of change, thus student interest for education and training are affected and can be reduced by these information flows and activities that are not supporting the process of skill learning and obtainment of needed competences and values. Education scientists, education professionals and teachers and other secondary education system stakeholders are continuously searching for new and effective ways of learning, looking for innovative solutions.

According to scientific evidence – even by using modern technologies the problem of student attraction to learning cannot be solved. Much wider and deeper change in the whole education process is needed. This view has been supported in the work of *Dynarski* et al (2007). In this context innovation in the secondary education must be carried out and concept of innovative school need to be defined. The purpose of this paper is to compose a conception of innovative school analysing successful case studies of innovative schools all over the world, scientific research results and outcomes of innovative school approaches that can serve as a benchmark for measuring secondary schools and their adequacy for 21st century learning paradigm.

2. Secondary school education

Education in the secondary school is how young individuals gain basic knowledge, skills and competences and develop fundamental attitudes and values that they need throughout their life. Since secondary education is just a component of a larger system – lifelong learning system, throughout secondary education schools need to lay the foundations for new individuals to guide them on the path of lifelong learning. This means that students need to acquire how to take responsibility for their own learning and individual development since lifelong learning is an independently guided process. This view has been supported in the work of *EC* (2008a).

Latest researches declare that the process how young individuals learn, acquire knowledge and develop their personality are in continues change. Teachers have the necessity to find new and creative approaches on how to attract students and provide the most efficient way for knowledge transfer. This view has been supported in the work of *Redecker* (2008) and *Simplicio* (2000). Besides the learning process the learning environment are changing very rapidly. Young individuals are surrounded by technology that gives them so far inexperienced opportunities, unlimited access to information and ways for entertainment. Video-games, mobile phones, digital media and social networks is just a part of the available resources that from one side gives students totally new opportunities while from other side distracts them from learning with interesting and attractive way on how to spend their time. These new technologies not only distract students with information overflow, but also bring new understanding of communication, information and meaning making. Information era creates a gap between student's individual environment and that one available in the school, since lot of schools cannot adjust their learning process and infrastructure with the one available for students individually. This view has been supported in the work of *Pedró* (2006), *Selinger* et al (2008).

Education system must be ready to meet new expectations as the style of living for students change and the competition conditions for education differ from time to time. The role of secondary school are changing as within emerging learning society some of the secondary school functions can be fulfilled by other actors of lifelong learning system, other institutions or forms of civic society. Unlike other spheres such as manufacturing, consumer electronics or medicine, education does not enjoy continuing innovation process and clear improvements due to organisational, financial and technical reasons. Even one of leading organisations evaluating policy experiences in their research admits that there is little scientific understanding of what goes on in schools. This view has been supported in the work of *OECD* (2000). This opinion encourages carrying out further research on how to improve the quality of education, schools, learning efficiency and innovation within all levels of education. This paper limits the scope of the research analysing skills needed for 21st century, case studies and approaches of leading innovative secondary schools.

3. Conception of innovative school

3.1. Skills and competencies for 21st century

There are many attributes defining innovative school, but in this research paper conception of the innovative school is determined taking into account already existing and tested new learning approach models that are functioning in secondary schools. Innovative school conception is based on conditions that in 21st century skills and competencies that need to be transferred from teachers to students have already been replaced by new ones compared with those in 20th century. When analysing education as a lifelong process (lifelong learning concept) basic or key competences needed in 21st century, at least on the European Union (EU) level, have been already predefined. The view that lifelong learning should be oriented towards learning key competences has been supported in the work of *EC* (2010) and these eight key competences are identified in the Table 1.

Table 1. European framework for key competences for lifelong learning

No	Key competence
1.	Communication in the mother tongue
2.	Communication in foreign languages
3.	Mathematical competence and basic competences in science and technology
4.	Digital competence
5.	Learning to learn
6.	Social and civic competences
7.	Sense of initiative and entrepreneurship
8.	Cultural awareness and expression

Source: EC (2010)

All of the above mentioned key competences should be supported by the initial education and training that equips all young people. While competences like mother tongue, foreign languages, mathematics and science are being taught emphasizing the "real-life application", work towards successful teaching of other competences such as further learning, critical thinking and creativity are still in its development phase and is lacking systematic approach in schools. This view has been supported in the work of *EC* (2010). Arguments why innovative school must concentrate on more efficient learning methods are described previously in the article, while arguments where the competitive advantage of an innovative school is hidden still need to be discovered.

21st century skills are needed for everyone, since they cover the background of evolution for every individual. Everyone can acquire these skills and the limits of skill learning often can be related to learning methods not the individuals. As an example that potential to develop these skills is hidden in every individual are supported by scientific researches. For example creativity and innovation is seen as the skills that need to be developed within the lifelong learning process and these skills need to be enhanced and cultivated to respond to the development of knowledge society. This view has been supported in the work of *EC* (2008b), *EC* (2008c), *EC* (2008d). Scientific research indicates that all people are capable of creativity from early childhood onward and creative potential can be found in every child. These skills can be encouraged or inhibited and their development depends on the kind of training people receive. This view has been supported in the work of *Esquivel* (1995), *Runco* (2003), *Sharp* (2004), *Craft* (2005). This opinion supports the motion that skills and competencies of an innovative schools can be based on EC already predefined key competencies, but the efficiency of teaching these skills depends on the methods used in education process and learning environment created within the school.

3.2. Education development framework and school models

Solutions on how to improve education are within the responsibility of the each school. Developing school curricula more oriented towards the skills and attitudes necessary to apply in real life situations follows the focus on competences. High quality learning for students in constantly changing education environment can be reached by continues improvement of education quality for every student that includes individual approach for students that need specific support. As the most important within-school factor affecting student performance teacher quality can be mentioned. Educating teachers and providing them necessary skills and attitudes for 21st century learning can increase this. EC has provided an education development framework that schools in 21st century need to challenge:

- focus on competencies,
- high quality learning for students,
- teachers and school staff.

All these three main areas of actions for developing 21st century schools can be covered if schools cooperate, share best and most innovative teaching practices and adopt them. This view has been supported in the work of *EC* (2008e).

In the 21st century parents are not the only stakeholders for innovative schools. Since the new generation after education phase will enter the labour market large corporations are interested in highly skilled workforce. There are several high level initiatives when big corporations are donating money and knowledge to help the education system reach 21st century demands. This view has been supported in the work of *Partnerships for 21st Century Skills* (2008). One of these corporations supports the development of Innovative Schools Programme where schools all around the world can participate to transform their teaching and learning. Within this programme good practise from innovative schools are gathered to share their practise and compare different models and approaches of innovative education. This view has been supported in the work of the *Microsoft Innovative Schools Programme* (2010).

In this research paper framework for an innovative school has been modelled using EC defined areas of action for education development adjusting them to innovative school models, practices and case studies derived from schools within Microsoft Innovative Schools Programme. Since the purpose of this paper is to compose a conception of innovative school, the reforms of education system and school legislative environment are out of the research scope. This research is limited to the school level. Schools participating in Microsoft

Innovative Schools Programme have various legislative and regulation environments, thus two primary paths of within-school reform are followed. One – school have enough autonomy to foster whole – curricular reform, while other – reforms take place within the existing regulatory framework. In this research paper best practise models are combined from both types of schools and the level of autonomy is taken into account. School autonomy is divided into two groups – schools with high and low level of autonomy. This view has been supported in the work of the *Microsoft Innovative Schools Programme* (2010).

3.3. Models of innovative schools

To analyse the models and methods used within the innovative schools in this research existing case studies, published materials, manuals, guidance papers and school communication was used. School models derived from schools participating in Microsoft Innovative Schools Programme and are listed in the Table 2. All of the practices that have been used in particular school was marked and added to the innovative school framework with the reference to the school listed in the Table 2. Reference number in the table shows in which school particular innovative methods approaches and technics are being used.

Table 2. Schools participating in Innovative Schools Programme

Ref. n.	Country	School for case study
1.	Brazil	Lumiar
2.	Germany	Ottobrunn
3.	Ireland	Dunshaughlin Community School
4.	Singapore	Crescent Girls School
5.	UK	Bowring Community Sports College
6.	UK	Broadclyst Primary School
7.	UK	New Line Learning Academy
8.	UK	Shireland Academy
9.	USA	Freedom Area High School
10.	USA	Plymouth Whitemarsh High School
11.	USA	Roads to Reform: Freedom Area High School
12.	USA	School of the Future
13.	USA	South Fayette High School

Source: Microsoft Innovative Schools Programme (2010)

Methodology for the research was established, consisting of three main areas that need to be challenged. These areas or fields of improvement consist of several components of development, containing the methods, approaches and practices used in innovative schools. These fields of improvement have been determined, components of development listed and methods, approaches and practices summarised. Methodology consists of three levels of minuteness, combining the most essential attributes for creating the conception of innovative school. Levels of the methodology are described in Table 3.

Table 3. Research methodology levels

1. level	2. level	3. level
Fields of improvement	Components of development	Methods, approaches and practices

Source: own contruction

3.4. Innovative school analyses and criteria for measurement

Innovative schools listed in table 2 adopt various techniques, methods and approaches that increase their learning outcomes. The efficiency of these activities are measured and evaluated by education experts from the Microsoft Innovative Schools Programme. In this

research paper from these in school implemented activities innovative school conception by developing specific framework has been created. Activities performed by the innovative schools are listed and structured according to the methodology developed by the author and presented in Table 3.

On the first level there are three fields of improvement that establishes the basis of framework of the innovative school.

- Learning culture
- Learning process
- Learning environment

Table 4. Criteria for innovative learning culture

Fields of improve-ment	Components of development	Methods, approaches and practices	Ref. n.
Learning culture	Democratic and open education management	Open decision making process Teachers and scholars are involved in decision making process, school forum for discussions, "great gatherings", everyone is welcome to comment, suggest or work on new initiatives.	4,7, 9,10,11 12,13
		Teacher to teacher collaboration designing curricula Collaborative learning platforms. Teachers develop curricula in partnership (interdisciplinary approach – "chemistry meets economics and business")	1,2,3,4, 7,9,10, 11,12, 13
		Knowledge integration into students life Theoretical and practical knowledge gained in school are tested in practice – visits in local administration, museums, NGO's, SME's, student contests etc.	1,7, 9,10,11 12,13
	Leadership and vision	School management supporting innovation Clear and specific vision determined. Individual meetings with staff. Teachers are being constantly inspired and supported to introduce new practices by school management.	1,5,7, 9,10,11 12,13
	Internal communication	Strong internal communication system Strong communication of vision and its objectives. School management ensures regular discussion of programme goals at staff meetings.	1,3,4,7, 8,9,10, 11,12, 13
	Learning communities	Sharing teacher experience Formed teacher groups sharing experience on student work analyses, teacher Peer observations, common topics of study, codeveloping curricula.	4,7,8, 9,10,11 12,13
		Student, parent and other stakeholder involvement in learning community Special school meetings where students and parents can share their opinions on study content and topics. Contribution of individual skills to school is promoted. School is open for wider public sharing its vision, targets and actions ensuring continuous improvements gaining feedback from other stakeholders.	4,7, 9,10,11 12,13
	Professional development practices	Teacher pedagogical skill enhancement Continues enhancement of teachers' technology skills, project-based learning, technology integration in curricula and pedagogic skills.	4,7, 9,10,11 12,13
		Integration of school vision and teachers skills Teachers' professional developments are in line with school vision. Ability to test new skills including them in study programs, curricula. Regularity of professional development activities.	4,7, 9,10,11 12,13

Source: Author analyses with reference to innovative schools

Schools like other human intellectual resources intensive organisations have particular culture. Scientific literature suggests that even if there are innovative bottom up initiatives, successful implementation of new learning techniques and revision of curricula have particularly better results if school has clear vision and strong leadership towards the new learning paradigm. This view has been supported in the work of *Harris* (2002), *Sebring* et al (2006). Criteria for clear vision, leadership and democratic education management are described in Table 4.

Introducing innovative learning culture within the school are the contributory factors for improvement of learning process. Criteria for improving learning process are described in Table 5.

Table 5. Criteria for innovative learning process

Fields of improvement	Components of development	Methods, approaches and practices	Ref. n.
Learning process	Learning 21st century skills	Communication in mother tongue and foreign languages Group and individual presentations in native and foreign languages, problem discussions, private interaction with students that improves communication skills.	1,3,4, 5,6,7,8, 9,10,11 12,13
		Competencies in knowledge construction Using basic mathematical, science and technology and digital skills students perform activities (group works, research projects, joint assignments) that allow building knowledge new to them.	1,3,4, 5,6,7,8, 9,10,11 12,13
		Social and civic competencies Human to human communication skills developed through group works, presentation, joint projects, discussions and group assignments. Students work with each other, teachers and other actors of learning process.	1,3,4, 5,6,7,8, 9,10,11 12,13
		Problem solving, innovation and entrepreneurship Students seek for solutions on problem solving without previously known procedure, risk awareness and initiative to take risks are learned.	1,3,4, 5,6,7,8, 9,10,11 12,13
		Learning to learn and self organisation Knowledge on effective learning, individual and group assignments to address problems without predefined answer, multiple stage assignments with criteria for self-evaluation.	1,3,4, 5,6,7,8, 9,10,11 12,13
		Cultural awareness and global perspective Learning to work in different cultural environments using wide range of knowledge and resources, addressing global problems without predefined answers.	1,3,4, 5,6,7,8, 9,10,11 12,13
	Inter-disciplinary approach	Project Principle Project principle integrated in curricula, e.g. project days combining knowledge use from different subjects for solving student-defined problems.	1,3,5,8
		Collaboration with other education actors Study process includes cooperating with students and teachers from other schools, non-school actors like local public authorities, NGO and others particularly within project days, special assignments, student contests and initiatives.	1,3,4, 5,6,7,8, 9,12,13
	Organisation of study process	Student choice on subjects and tools used Students can choose some of their subjects and tools used for study process.	7,9,10,11, 12, 13
		Feedback opportunities and self assessment Students can generate feedback about particular subject, teacher, methods used.	7,9,10,11, 12, 13

Source: Author analyses with reference to innovative schools

Innovative learning process consist of different components of development including restructuration of classes to interdisciplinary blocks where instead of learning particular subjects learning process is oriented towards student-centred learning and include use of project-based and collaborative learning. Methods for learning 21st century skills can differ from one school to another, while common feature is skill acquirement not fact learning and remembering. Innovative learning process can be significantly improved if along with innovative learning culture, innovative learning environment is established. Innovative learning environment are described in Table 6.

These three fields of improvement establishes the basis of framework of the innovative school that allows to define the frame for the second and third level of the conception, respectively components of development and methods, approaches and practices for innovative school.

Table 6. Criteria for innovative learning environment

Fields of improve-ment	Components of development	Methods, approaches and practices	Ref. n.
Learning environment	Physical learning environment	Flexible learning environments Flexible school space that can be transformed for changing needs – innovative pedagogy and better ICT integration, e.g. removing classroom walls and furniture.	2, 4,6, 7,12
	Integrated information and communi-cation technologies (ICT)	School web portal Interactive web portal, external and internal part allowing teachers, students and other stakeholder to ensure continues connection with school despite their location. Social network integration with school web portal and study process.	1,2,3, 4,5,6, 7,8,9, 10,11, 12,13
		Technology as everyday part of learning process Technology are integrated in curricula. ICT is used in different parts of learning process - home works, projects and group works etc.	2,4,6, 7,12
		Availability of modern technologies in school Computer labs, laptops, wireless internet, interactive whiteboards, digital cameras etc.	1,2,3, 4,5,6, 7,8,9, 10,11, 12,13
	Availability of learning environment	Learning environment - available for students Study environment and infrastructure are available for students after the school time for individual and homework development, individual and non-school projects that creates new knowledge.	2,7,12

Source: Author analyses with reference to innovative schools

This analyses shows that best practice models and approaches designing innovative school, at least within Microsoft Innovative Schools Programme, have significant overlapping, indicating that it is possible to create scientifically justified conception or model of innovative school. While the question on how to assess the level of particular school's innovation capacity or readiness still exist. School can be evaluated as non-innovative, partly innovative, moderate innovators, innovation adaptors or innovation leaders. Using the framework of innovative school, regular secondary education institution can be measured. But leading a non-innovative school does not mean that student results will be particularly lower than for the innovative one. Since this question on how to assess student results and future perspectives in labour market and society is out of the research scope it will be addressed in further research.

4. Innovative school development opportunities in Latvia

To evaluate the attitudes towards innovative school development opportunities and reforming secondary education system in Latvia, data from research performed by *Laboratory of analytical and strategic studies* (2010) were used. Survey with 1002 respondents serve as a reliable source of information on public opinion towards education system reforms. Data from previously conducted research shows that the significant amount of inhabitants of Latvia 73% supports the reforms in secondary schools. Only 3% of respondents deny and 17% of respondents are saying rather no to reforms in secondary education. When asked when students should have to acquire new technologies, 81% of respondents have pointed out the need to start acquiring this knowledge from 1st to 5th grade. From all respondents 84% admitted that they fully agree or partly agree that new technology would increase the learning outcomes. Opinion that in creation of study curricula parents and entrepreneurs should participate strongly or partly supports respectively 68% and 71% of respondents. From these data it is seen that public opinion is oriented towards school development, in particular using innovative methods, such as raising ICT integration in study process, establishing learning

communities and reforms in education system. This serves as a contributory argument for reforms rebuilding traditional secondary school models to more innovative ones.

Detailed survey of secondary schools, evaluating their readiness to become an innovative school has not been performed in Latvia. Only a small separately made three-school assessment has been performed. Results show that schools are using regular ICT such as computers and projectors in various study subjects, while the integration of the ICT in study process are only in its initial phase. Lack of digital materials for various subjects are one of the key aspects why students don't have a lot study content provided using ICT. Collaboration for teachers on sharing best practise and experience on new study methods, practices and integration of ICT in study process has not been widespread. The ICT available in schools have been physically and morally dilapidated. Teachers have mixed feeling about ICT integration in student work supporting the use of technology in student everyday life, from other side they are criticizing the use of the technology, since students distracts their attention from regular study process. This view has been supported by *Laboratory of analytical and strategic studies* (2010).

Analytical data shows that situation in secondary schools is rather convenient for developing innovative school models instead of maintaining existing old ones. Significant part of general public are in favour of reforms and secondary schools will meet declining amount of students from one side, but growing public interest in reforms and labour market requirements for 21st century skills from other side. Current status on how innovative each secondary school in Latvia is, has not been valued, while this conception of innovative school and framework for evaluation gives new possibilities not only to assess particular schools, but also to raise their innovative capacity by implementing new techniques in structured manner.

5. Conclusions

To determine the most effective ways for educating secondary school students' scientific evidence has still to be found out. It is clear that only by using the potential of modern technology best education results cannot be obtained – appropriate learning culture, learning process and learning environment need to be promoted. Since innovation is a process of change and continues improvement, this conception provides only the methodology for assessing and perhaps restructuring traditional secondary school to more innovative one. This methodology of innovative school cannot be completed and alike models of innovative schools are in constant rebuilding, continues improvement and strategic innovation to ensure successful results in educating students. Learning of 21st century skills, promoting interdisciplinary approach and creating learning communities are just parts of the framework within which the innovative schools operate. For detailed understanding of the conception of innovative school and implementing new, jet unknown fields of improvement, components of development, methods, approaches and practices best practise models from schools located all around the globe need to studied.

Restructuring old model secondary school to innovative one learning culture need to have strong vision and regular discussions amid education stakeholders who respects and cultivates the vision and values of innovative school. Open and democratic environment need to be established to promote innovation and feedback for teachers and students, while enhancing and inspiring teachers to raise qualification, acquire and use new teaching methods, seek for innovative problem solutions and new knowledge creation. Within the learning process acquirement of 21st century skills need to be emphasised, continues improvements in regular discussions (revisions) of study content, teaching methods and organisation of study process emphasizing the practical implication of knowledge gained in the school and interdisciplinary approach need to be promoted. Changing the supporting learning environment with integration of ICT in study process, providing flexible physical

infrastructure and expanding the availability of learning environment to students is an essential part of innovative school model. Innovative learning environment serves for attracting student attention with modern and up to date infrastructure, thus the school not only follows, but also provides an access for every student to the latest development in technology and infrastructure.

Participation in the conference is possible due to the financial support of the European Regional Development Fund project No. 2010/0294/2DP/2.1.1.2.0/10/APIA/VIAA/009

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