

Two sides of the same coin: Innovation education and entrepreneurship education in Iceland

Svanborg R. Jónsdóttir

Abstract

This article gives an overview of innovation education and entrepreneurship education in the Icelandic school system. Innovation education is placed in the official curriculum for compulsory schools in Iceland and entrepreneurship education in the curriculum for upper-secondary schools. A research on entrepreneurship education in vocational education and training in upper-secondary schools in Iceland is reported. Innovation and entrepreneurship education are seen as a continuum in Iceland and both subjects are struggling for time and space. Limited knowledge and understanding of the subjects in schools and an unclear definition seems to be holding them back.

Innovation education

Innovation education (IE) is a compulsory school subject in Iceland that started to develop in Icelandic schools from around 1990 (Svanborg R. Jónsdóttir, 2005). The pedagogy and methods of IE were developed mainly within Foldaskóli in Reykjavík the capital of Iceland (ibid). Two of the pioneers Rósa Gunnarsdóttir and Gísli Þorsteinsson developed teaching materials (Þorsteinsson & Gunnarsdóttir, 1996) published at their own cost that have since been the main basis for teaching innovation education in compulsory schools in Iceland. In 1999 innovation education became a formal subject within the Curriculum for Information and Technology Education (*Aðalnámskrá. Upplýsinga og tæknimennt*, 1999). The subject did not get a special time allocation in the curriculum and it was either to be taught as a special subject or integrated with other subjects. Innovation education is based on conceptual work which involves searching for needs and problems in the student's environment and finding solutions to them (Denton & Thorsteinsson, 2003). Gunnarsdóttir's research on IE showed that students that got innovation education lessons could be affected positively and through the innovation process develop a strong sense of self-efficacy (Gunnarsdóttir, 2001).

Encouraging the entrepreneurial spirit in young people is seen as important to achieve progress in employment, growth, competitiveness and innovation (Expert Group on Education for Entrepreneurship, 2004). The world today at the beginning of the 21st century changes rapidly and we must educate our students for a society of the future, a future that we don't know what will be like. The ability to gather knowledge and use it in a creative way is important for nations to survive in the community of nations (Gunnarsdóttir, 2001). Many scholars identify the importance of enhancing creativity and innovativeness for individual and societal reasons. Creativity at the individual and societal level is important: at individual level, when solving problems on the job and in daily life and at a societal level creativity can lead to new scientific findings, new movements in art, new inventions, and new social programs (Sternberg et al 2003). Enhancing innovativeness and creativity should benefit science and arts, business and personal life.

In innovation education the belief has been adapted that creativity is a generic personal trait in all individuals, which can be developed as a skill (Gunnarsdóttir, 2001). Innovation education requires a special mind set of the teacher, the mind set of the social-constructivist educator. Innovation education

is a subject where the students should have much influence on their own learning and themselves provide the basis for their projects. Students are active participants and the teacher's role is to facilitate and support the creative processes in the innovation work (Gunnarsdóttir, 2001; Jónsdóttir, 2006; Þorsteinsson & Denton, 2003). In spite of the relevance of such an education and good experience in a number of schools (Jónsdóttir, 2004) innovation education has not been widely accepted or understood in Icelandic schools, under 10% of compulsory schools teach it as a formal subject (Jónsdóttir, 2005).

Innovation education was, as mentioned before, placed within the curriculum for Information and Technology Education. There are four independent chapters in this curriculum: The use of computers, information education, innovation education and design and carpentry (in some Nordic countries called *slojd*). There is no special chapter about technology education but technology is a thread in all the other chapters especially in the one about innovation education. Innovation education as it is presented in the Icelandic curriculum in 1999 has many similarities to Technology Education in other countries i.e. in Canada and Australia (Haché, 2006; Williams, 2006) and others. Among many aims that they have in common is the emphasis on design and problem solving, to develop the ability to use a variety of methods and processes to solve problems (Hill, 2006; Hill & Smith, 1998).

Teaching materials in innovation education

The teaching materials that Gunnarsdóttir and Þorsteinsson developed were written as teacher resource material. The materials promote a systematic approach to teaching IE. The ideology of IE reflected in the material is: "people are the creators of their own world". The material was written with the aim of enhancing the students' creativity by teaching them certain ways of working and expression (vocabulary and drawings). The teaching materials were a series of four units meant for four years of teaching and were called *Innovation and Science*. Each had a different main theme as reflected in the names of the units: 1. Initiative - creativity, 2. Innovation - technology, 3. Ideas - ingenuity and 4. Environment - design. All of them have a main core that includes the training of the working ways of the inventor. This included: Looking for needs; working on solutions; using the small notebook; drawings and making models. The materials also emphasize a connection to the life of work where each unit contains a suggestion for a visit to a firm or an establishment that is relevant to that unit's theme. In these materials a learning process is created that gives the students opportunities to utilize knowledge from everyday life and knowledge that they acquire in school (Þorsteinsson & Gunnarsdóttir, 1996). These teaching materials have been a source of influence in those schools that offer innovation education, the content of the national curriculum and of the development of IE in Iceland.

The teaching materials offered within these four folders before mentioned include a large part of human activities. They include how man interacts with his environment and uses his power of thinking with the help of natural and cultural resources to make his existence safer and easier. They cover the use of technology for the same purpose and how ideas and solutions can become of worth for many others (business and society) and finally how man can use different technologies to form and adapt his environment to fulfil different needs. At the core through all of the projects in the teaching materials is an emphasis on the ethics of sustainability and responsibility to other people, nature and oneself.

Two sides of the same coin

In Iceland there has been a development towards thinking of innovation education and entrepreneurship education as two sides of the same coin. Innovation is seen as a necessary drive for the entrepreneurial spirit to thrive. Finding new solutions to the various problems of the world can be a

strong motivator to go a head and do something about it, make the idea into something of worth to the individual and to others. In entrepreneurship education the necessary tools to enhance the entrepreneurship of students are innovation and creative thinking. In entrepreneurship education the focus is on enhancing students' initiative and supporting them in realizing their ideas as useful and valuable artefacts or services (Jónsdóttir, 2007). Entrepreneurship education also emphasizes the practical use of knowledge and connection to work life. Students put to use and try out their ideas and various kinds of knowledge in reality (outside school) with the support of their teacher within entrepreneurship education. One realization of this thinking of innovation and entrepreneurship education as a continuum is the formation of a teachers union across all school levels called The Icelandic Organization of Innovation- and Entrepreneurship Education Teachers (Thorsteinsson, 2006).

The view that is reflected in the composition of the innovation and entrepreneurship curriculum for compulsory schools (age six to sixteen) up to secondary schools (usually from sixteen to twenty years old) is that innovation education is a more prominent factor in the younger classes with a strong sense of entrepreneurship that is growing as the years pass. This view is explained in picture 1 that shows how the two interacting elements (innovation and entrepreneurship) can be seen to have more or less emphasis and space in the various undertakings that can be classified as innovation education or entrepreneurship education. In the very beginning of schooling the emphasis is on creativity and innovation and towards the end of school, more on business and work life although the creativity and innovation part never ceases to be a core part.

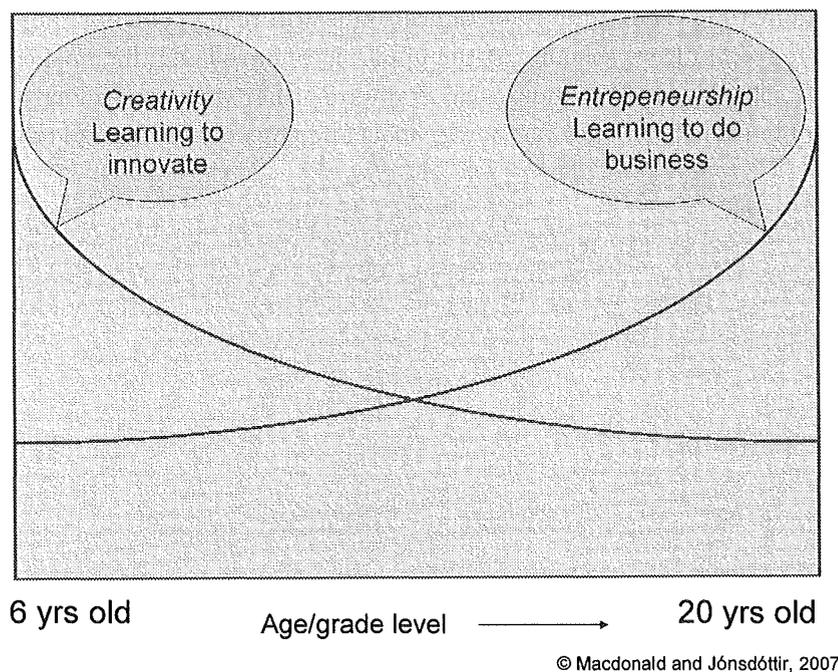


Figure 1 Relative impact of innovation education and entrepreneurship education

A typical way to offer entrepreneurship education to students in upper-secondary schools has been to give courses that are about establishing and running a small firm (mini-companies) for the time of the course. Courses of this kind have been offered in entrepreneurship education in Europe and USA (*Mini-Companies in Secondary Education. Best Procedure Project*, 2005; Nakkula, et al., 2004) and international organizations have been formed to support such projects in education such as Junior Achievement ("Junior Achievement," 2008).

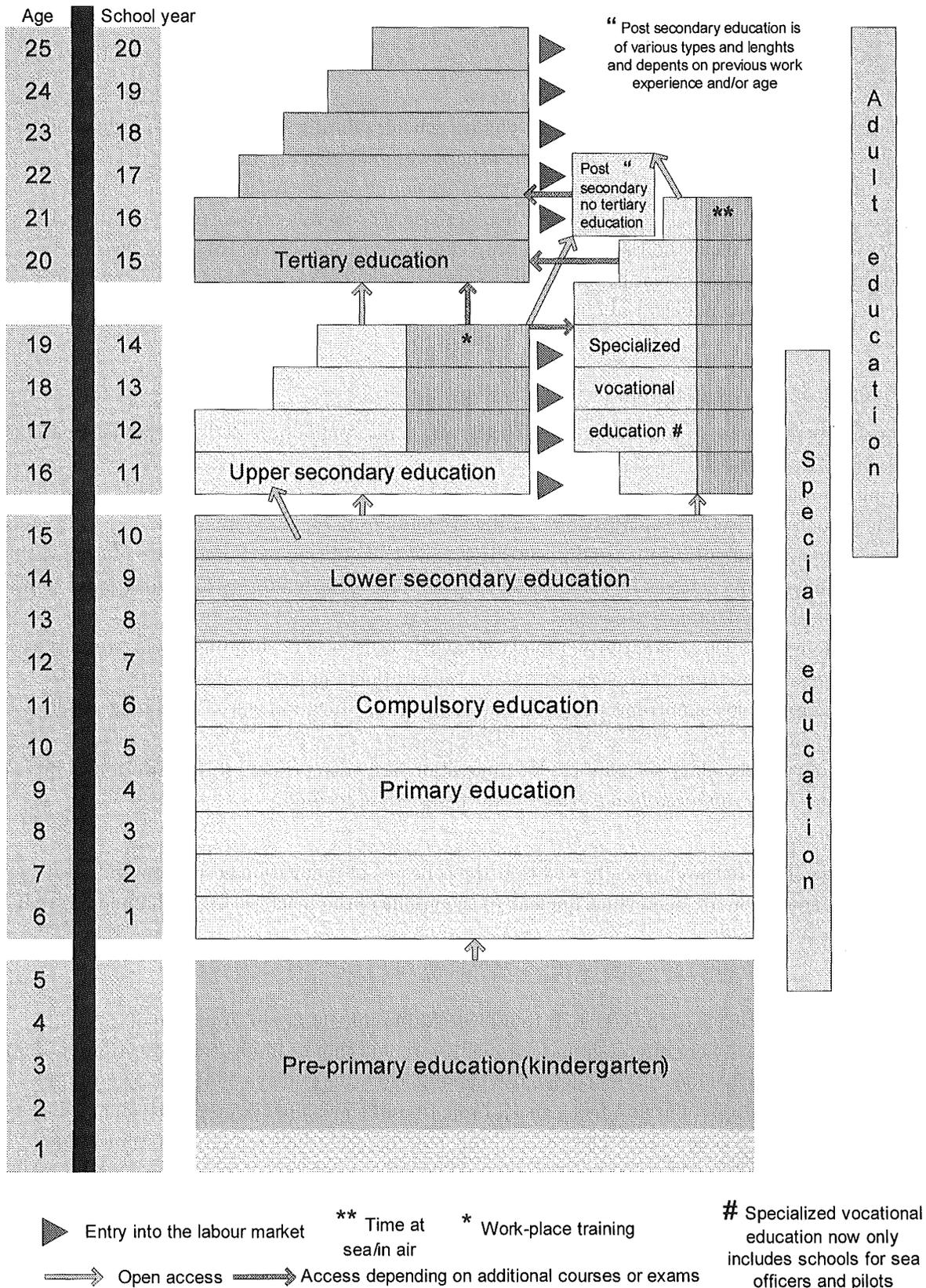
Research on entrepreneurship in vocational education and training (VET) in Iceland in 2007

Entrepreneurial attitudes and skills are considered important in European education. Many European Union reports have concluded that these skills and attitudes are not sufficiently addressed by training and education in Europe (Expert Group on Education for Entrepreneurship, 2004). The Leonardo da Vinci office in Iceland initiated a research entrepreneurship education (EE) in vocational education and training in upper-secondary schools in Iceland in autumn 2007. The research showed that formal entrepreneurship courses are not attended by many students at these levels (Jónsdóttir, 2007). Although many of the schools offer formal entrepreneurship courses, only a small number of students of the whole population of the upper secondary-schools take them. On the other hand there were many instances of training in entrepreneurial and creative skills and attitudes within different courses.

The Icelandic education and training system

In Iceland the compulsory school is from 6 years to 16 and after that students enter upper-secondary schools or vocational schools usually until 20 years of age. The municipalities took over the running of compulsory schools from the state in 1996. The Ministry of Education is still responsible for the nationally coordinated curricula for compulsory schools. At the upper-secondary level the most common type of schools are comprehensive schools, where students can graduate either with general or vocational qualifications or a combination. There are just few schools offering only vocational education.

THE ICELANDIC EDUCATION AND TRAINING SYSTEM



The research process on entrepreneurship in VET in Iceland

The research started by taking interviews with specialists in vocational education and adult education in the Ministry of Education and with a specialist in adult education at the Iceland University of Education (IUE).

Information was gathered about all the upper-secondary schools offering VET education in Iceland, a list of 23 schools was created (out of 38 schools, the others were not offering VET). That list was categorized into four groups by size, location and specialization. From each category a sample¹ of two to three schools was chosen (in all eleven schools). Each of those schools was contacted by e-mail and asked to give information about the Entrepreneurship education in the school. Interviews were requested either directly, by phone or by e-mail. In the interviews it was possible to follow and dig deeper when something was not clear and get explanations about ambiguous matters.

The main findings of the research were:

- Focused entrepreneurship training (formal courses) is not common in VET in Iceland, from 0%-30% of VET students.
- Formal courses on entrepreneurship are attended by very few students of the whole population of the schools and the VET population, mainly students from business lines.
- Several elements of entrepreneurship education can be found as a part of and are offered within various subjects and courses in VET. These courses were for example various vocational courses, arts, life skills and language courses.
 - Elements such as creativity, innovation, various aspects of running a firm, contact with work life, independent work, initiative, cooperation and leadership.
- Interesting examples of entrepreneurship and innovation education were found in several schools.
- Only one upper-secondary school includes innovation and entrepreneurship education in its school policy, *Framhaldsskólinn á Húsavík* in the North of Iceland.

One of the findings of the research also showed that the concepts of innovation education and entrepreneurship education are somewhat unclear in the minds of the teachers and headmasters that were interviewed.

In the upper-secondary schools in the research there were different sources of initiation of entrepreneurship. Teachers were often instigators of entrepreneurship or innovation education in their schools. Entrepreneurship courses often disappear when a teacher takes leave, gets sick or quits the school. The teacher of entrepreneurship has a special role that one principal pointed out, she said that the teachers have to adapt to new strategies in teaching, holding back their tendency to control and allowing independence and freedom for the students to follow their own ideas. Instances were found of very enthusiastic teachers that were able to engage other teachers in their school, from other fields of

¹ A profile of the sample schools is provided in appendix 2 and the whole report on http://lmvet.net/page/tg1_analysis.

specialization in innovative and entrepreneurial work. General knowledge about innovation education and entrepreneurship education is not common among teachers, principals and the public (Svanborg R Jónsdóttir, 2005).

The national curriculum of upper secondary schools seems to both initiate and hold back entrepreneurship education to some extent. EE is placed within the business section of the national curriculum and where that is strictly followed EE is not seen as an offer for all students. Entrepreneurship education is not just a business subject as it is meant to enhance the capacity to act and follow through on ideas, it can be useful for students of various lines of study. In the report for the European Union EDG about entrepreneurship it is emphasized that entrepreneurship should be regarded as a general attitude that can be usefully applied in all working activities and everyday life (Expert Group on Education for Entrepreneurship, 2004). According to the research the entrepreneurship courses are usually placed within the business curriculum of the upper-secondary schools but are sometimes offered to all students as a choice. Even when offered to all students the majority of the attendees are usually from the business lines and those are a small proportion of the population of VET students. The courses in entrepreneurship give credits they are often extra credits that they do not need to fulfill their required quantity of credits to graduate. The curriculum for master craftsmen includes knowledge about founding; running and managing a firm but only a small proportion of the journeyman graduates take the masters' studies.

Independent associations and institutions have been supporting and initiating entrepreneurship education in Iceland. The innovation centre *Impra*, offers courses for students and others as an extra curricular activity. *Junior Achievement Iceland* offers training for teachers, materials and assistance for schools that want to teach entrepreneurship courses. An independent organization *The Entrepreneurship Training Association* (Frumkvöðlafræðslan ses) has offered schools and teachers, teaching materials, assistance and training in entrepreneurship education. European projects and Nordic projects had in some cases initiated entrepreneurship and innovation education in schools and influences of those were still visible. Examples of such influences were the innovation and entrepreneurship policy of the upper-secondary school in Húsavík and emphasis in many of the vocational courses at Menntaskólinn in Kópavogur (Jónsdóttir, 2007).

The curriculum of upper-secondary schools in Iceland

There is no obligation to offer EE for all VET students in the national curriculum in Iceland. The law for upper-secondary schools includes aims that EE can help fulfill:

The role of upper secondary schools is to enhance the general maturity of students so they be as well prepared for taking active part in a democratic society as possible. The upper secondary schools prepare students for participation in work life and further studies. The schools should enhance responsibility, tolerance, provide training in disciplined and independent methods of

work, critical thinking, enjoy cultural treasures and encourage continuous search for knowledge²

(Chapter II, clause 2)

The chapter on the function and role in the national curriculum for upper secondary schools also has messages about the duties of the schools³ that could EE could help to fulfill:

Schools should make an effort to enhance the students autonomy. Therefore schools should emphasize interdisciplinary studies and various skills. Initiative, independency, analytical skills, cooperation and the ability to express their opinion in spoken and written language

Entrepreneurship education is not the only kind of education to attain these aims, but it can give students opportunities to use various kinds of knowledge and skills in a practical way.

Entrepreneurship education in upper-secondary schools in Iceland seems to be “locked” within the curriculum for business lines which is possibly an unnecessarily narrow interpretation of the curriculum. Some of the headmasters indicated that they were restricted by the curriculum to offer entrepreneurship education to all students.

If the will of the authorities in Iceland is to enhance entrepreneurship education it should be more clearly demanded by them for all students in the official curricula. It also needs to be made more desirable to use entrepreneurship education to fulfill the roles of VET and of education in general. To make it more desirable a clearer definition is needed and a better introduction to all stakeholders, the public, teachers, and principals – and research to show the effects of such education and to show how to get the best results. Teacher education in Iceland in this area is mostly missing (Jónsdóttir, 2005) and that is where the foundation should be constructed. The missing teacher education in entrepreneurship education can also be concluded from the facts that when some of the EE teachers have left the schools the entrepreneurship courses disappear with them.

Discussion and conclusion

Innovation and entrepreneurship education can be viewed as a continuum in education. The necessary foundation of entrepreneurship education is a versatile and constructive innovation education. The ideas of both are in nature very wide ranging, can be seen to be a part of almost every subject or to include every subject of human knowledge. This is both an advantage and a disadvantage. The disadvantage is that when a subject is unclear and its boundaries very weak it will have less power and impact according to Basil Bernstein’s theories on pedagogic practices (Bernstein, 2000). The conclusions that can be drawn from the emergence of these new subjects in the Icelandic school system are several. For the first, we need to win a general approval of the need of the kind of education that innovation and entrepreneurship education can offer. There is a need today for creative citizens that can cooperate and find solutions to problems in personal life and society and have the capabilities to

² Translation from Icelandic, SRJ

³ Translation from Icelandic, SRJ

create new ways thinking and new ways of making products and services that are sustainable. One of the growing needs in the world today is to integrate the thought of sustainability into education, society and business, to create a sustainable culture.

Looking at figure 1 we see a model that can give an understanding of how innovation education can be developed as a part of another subject in this case entrepreneurship education and see that in that model, innovation education is seen as necessarily a big part initially and condenses as the education progresses without ever disappearing. It embeds the understanding that innovation education needs to be built as a foundation that takes considerable time and training such as is needed to change thinking and behaviour permanently. It requires the establishment of a culture of innovation, the integration of a habitus of innovation and entrepreneur education.

It seems clear from the research on entrepreneurship in VET in Iceland and on innovation education in compulsory schools that the introduction of both curricula for these subjects or curricular areas is needed. The general lack of knowledge in these areas indicates that it needs to be introduced in education for teachers both in initial education and education for in-service teachers so the development of the subjects can get a necessary foundation. They also need to be introduced to important stakeholders such as students and parents so they can acknowledge their importance and understand the way in which they differ from traditional school subjects. The implementation of school innovations needs support from various systems of influence in society and within schools.

One conclusion we can draw from looking into the development in Iceland is simply that IE and EE have been slowly disseminating and are struggling for their existence in the Icelandic school system. Another conclusion may be drawn by looking at the time in history of less than twenty years, from the time innovation education started to emerge around 1990 to 2008 as not being long as such. On the other hand there are changes happening in the world that are at such a great speed that education must be able to respond quickly to changing needs. What seems to be of vital importance in light of research and Bernstein's theories is to make definitions of innovation education and entrepreneurship education more particular more concise. By claiming a defined territory in education, innovation and entrepreneurship education have a chance of getting time and space within the curriculum of the schools and contribute to the kind of education we need in the 21st century.

Adalnámskrá grunnskóla. Upplýsinga- og tæknimennt (1999). Reykjavík: Menntamálaráðuneyti.

Bernstein, B. (2000). *Pedagogy, Symbolic Control and Identity* (2. ed.). Lanham: Rowman & Littlefield Publishers, INC.

Denton, H., & Thorsteinsson, G. (2003). The Development of Innovation Education in Iceland: a Pathway to Modern Pedagogy and Potential Value in the UK. *The Journal of Design and Technology Education*, 8(3), 172-179.

Expert Group on Education for Entrepreneurship (2004). *Final Report of the Expert Group "Education for Entrepreneurship". Making progress in promoting entrepreneurial attitudes and skills through Primary and Secondary education*. Brussels.

Gunnarsdóttir, R. (2001). *Innovation Education: Defining the Phenomenon*. Unpublished Ph.D. ritgerð, The University of Leeds, Leeds.

- Haché, G. J. (2006). Developments in technology education in Canada. In M. de Vries & I. Mottier (Eds.), *International Handbook of Tehcnology Education. Reviewing the Past Twenty Years* (pp. 171-177). Rotterdam: Sense Publishers.
- Hill, A. M. (2006). Reflections on twenty years of wandering through the pathways and forest of technological education in Ontario Canada. In M. de Vries & I. Mottier (Eds.), *International Handbook of Tehcnology Education. Reviewing the Past Twenty Years* (pp. 133-159). Rotterdam: Sense Publishers.
- Hill, A. M., & Smith, H. A. (1998). Practice Meets Theory in Technology Education: A Case of Authentic Learning in the High School Setting. *Journal of Technology Education*, 9(2), 29-45.
- Junior Achievement (2008) Retrieved 12.04.2008, 2008, from http://www.ja.org/about/about_history.shtml
- Jónsdóttir, S. R. (2004). Nýsköpun í grunnskóla. Skapandi skóli í tengslum við raunveruleikann. *Netla. Vef tímarit um uppeldi og menntun*.
- Jónsdóttir, S. R. (2005). *Ný námsgrein verður til. Nýsköpunarmennt í grunnskóla (The Emergence of a new School Subject. Innovation Education in Compulsory Schools)*. Unpublished M.A., University of Iceland, Reykjavík.
- Jónsdóttir, S. R. (2005). *Ný námsgrein verður til. Nýsköpunarmennt í grunnskóla*. Unpublished M.A. , Háskóli Íslands, Reykjavík.
- Jónsdóttir, S. R. (2006). *The role of the teacher in Innovation Education*. Paper presented at the SERA Conference in Perth 25.10.2006, Perth Scotland.
- Jónsdóttir, S. R. (2007). *Analysis of entrepreneurship education in vocational education and training in Iceland*. Reykjavík: Leonardo National Agency, Iceland.
- Mini-Companies in Secondary Education. Best Procedure Project* (2005). Brussels.
- Nakkula, M., Lutyens, M., Pineda, C., Dray, A., Gaytan, F., & Huguley, J. (2004, 6.04.05). Initiating, Leading and Feeling in Control of one's Fate. Executive Summary of Findings from the 2002-2003 Study of NFTE in six Boston Public High Schools Retrieved 8.04.05, 2005, from http://www.nfte.com/downloads/research_harvardexecsummary_02-03.pdf
- Thorsteinsson, G. (2006). FÍKNF, Félag íslenskra kennara í nýsköpunar- og frumkvöðlamennt Retrieved 12.04.2008, 2008, from <http://www.inet.is/fiknf/>
- Williams, P. J. (2006). Tehcnology education in Australia: Twenty years in retrospect. In M. de Vries & I. Mottier (Eds.), *International Handbook of Tehcnology Education. Reviewing the Past Twenty Years* (pp. 183-196). Rotterdam: Sense Publishers.
- Þorsteinsson, G., & Denton, H. G. (2003). The Development of Innovation Education in Iceland: a Pathway to Modern Pedagogy and Potential Value in the UK. *The Journal of Design and Technology Education*, 8(3), 172-179.
- Þorsteinsson, G., & Gunnarsdóttir, R. (1996). *Frumkvæði - sköpun*. Reykjavík: Nýsköpun og náttúruvísindi.