

Career Preparation and Selection in High School
—A Norwegian Context—

Bjorn Magne Aakre

The focus of this paper is career preparation and selection in secondary school. In most countries today many young people struggle with their career planning and selection. Traditional school programs and subjects seem not to be designed to bridge the gap between general education, career preparation and the transition into a professional career. In this paper we discuss the challenge of implementing such programs for career preparation and selection in a time of globalization and increasing complexity on the labor market. The context of this study is the high school system in Norway, recent educational reforms and empirical data collected from surveys on vocational preparation and entrepreneurship education.

1. Introduction

Young people in most countries today seem to have a hard time to prepare for their future education and career. In Norway many fail to choose a relevant program in high school. Many also tend to drop out of school long before an examination or a certificate of completed apprenticeship, (Hernes:2010). Even after several years in college or university there are many students who are not sure about their career, and therefore change their program several times before they graduate. I have no valid statistical data available, but from my talks and discussions with foreign students, many of them from Japan, I have the impression they struggle with the same problem. This problem is not really new. John Dewey addressed the same problem almost hundred years ago, (Dewey:1916:306). However, the solution to the problem today might be different.

Work based learning experiences seem essential in order to form and develop aspirations and to make informed choices about careers. However, in most cases such experiences need to be provided during the school day, or through after-school programs, and will require collaborations with other organizations. Schools that are effective in the terms of the industrial society might not be at all effective at developing problem solving, cooperation, creativity, flexibility, and risk-taking, (Hargreaves:1996:165). For these challenges to be met, reform effort must attack the fundamental structures or “basic grammar” of schooling, rather than merely making those structures work more smoothly.

“To be or not to be” is one of many quotes by William Shakespeare. For teenagers in school today the question “what to be” seems to be a complex and existential problem difficult to answer. In Norway for instance, more than 30 % of the students change their direction or do not complete their high school education. Even many young adults in the 20’s attending a university seem to struggle with the same problem. How can schools, subjects and educational programs be changed in order to minimize this problem?

Complexity and change might be two core concepts to investigate in order to understand the problem. Most nations have faced quite comprehensive changes during the last decades, and our schools were not really designed to cope with the society of today. Since the 1980’s a new economic order, influenced by neo liberalism, has set the agenda on national affairs as well as on international relations. This is not only about using new technology and how to transform such knowledge into new business and ways of living. Knowledge, business, money and even human labor are now transferred on a global market, whether we like it or not, (Aakre:2005:237). This transformation creates new demands for knowledge and skills that also includes

cultural understanding, language and communication, as well as more specific skills in order to enter and to succeed in a certain career or profession. In the 1970's Norway became an "oil nation", and the "oil era" began but now close to the end. Business and industrial development were more and more focused on this sector. Other more traditional sectors like textile industries, consumer production in general as well as other industries were laid down because they could not compete with the costs of more knowledge based industries. That means competence and knowledge have become more and more important. In the years to come, when the oil and gas industry will decline, knowledge and competence will need to be the bases, but in other sectors not yet created. One of the few things we know for sure is that we need to create many new jobs in areas not yet discovered. This will be the biggest challenge for Norway, and probably many other nations as well. To cope with this challenge new programs and subjects on Entrepreneurship Education¹, Technology and Science² and Career Selection³ have been introduced, and will be emphasized in this context.

On the other hand, the welfare state has created a growing demand for skills in areas like health care and education. In the 1970's very few entered high school to be educated for the social and health sectors. However, today the demands for these skills are growing. In 2008 more students attended these categories of high school studies in Norway than in any other fields. Even in program for technology and industrial production, that always had many students since ww2, there are now less students⁴.

2. Theory and Method

This research is carried out using system theory and didactic as a frame of reference, (Luhmann:2000 and Klafki:2001). Historical- hermeneutic method is the main approach. However, in addition empirical data from surveys on career preferences in Norway and Finland are used as a control. Finally, critical method has been used to investigate the relation between career selection and the complexity of late modern societies compare to the typical industrial society we had some decades ago.

Table 1: Layers of competence (Aakre, 2005)

Layer	Category	Content examples
L1	Global values and direction	Authority. Self-determination, co-determination and solidarity in a democratic society
L2	General competences	Act and make moral, practical, aesthetic and intellectual judgments. Able to communicate and to take a stand
L3	Specific competences	Understand society and politics, nature, culture and technology. Practice a specific profession or a vocation
L4	Basic competences	Basic literacy, knowledge and skills related to school subjects. Methods and procedures, materials and techniques

The empirical data were collected between 2006 and 2010. The respondents were students age 10 – 19 sorted in two groups. In this case the students in high school are the most relevant, that means the group between 16 to 20 years old. In the same period we were directly involved with projects in school and training centres. From these projects we have included some experiences observation of students and the product or services they made. Most of these works were related to entrepreneurship education or technology and science.

¹ Entreprenørskap i utdanningen – fra grunnskole til høyere utdanning 2009–2014, the Ministry of Education, Ministry of Commerce and Ministry of Labor. This is a program for all levels of Education in Norway.

² An elective subject in general course of upper secondary school in Norwegian from 2008.

³ An elective subject in lower secondary school in Norway from 2009.

⁴ Based on statistics from the National Census of Norway, Statistisk sentralbyrå

System theory and the problem of career selection

Most of us have heard or read the old quote “knowledge is power”, (Bacon:1597). However, what knowledge do we talk about, and where is the centre of power in the complex society we see today? We tend to look at our society as a rather homogeneous and hierarchical structure where everything is put into a well organized system, and where decisions are made and executed in a rational way from one level in the hierarchy to another level in the hierarchy. However, may be our society has changes and become more complex? May be we need to look for other theoretical perspectives on education, business, politics and others? In this paper I like to introduce system theory as a possible approach.

The hierarchical way of thinking seems quite old and influential, though the concept in itself may not be very old. The patriarchy for instance has been described by scientists since Ancient times and the hierarchy was adopted by the Catholic Church into a patriarchy with the Pope as the head and the ruler of politics as well as religious beliefs until. Protestantism reformulated the same theses into two separate regiments: religion and politics. In Japan Shogun Tokugawa introduced a hierarchy of 5 classes from about 1600 AC, (Aakre:2009). Many other systems are arranged hierarchically. Most nations have a government, and governments are often hierarchical. Socioeconomic systems are stratified into a social hierarchy, and all systematic classification schemes (taxonomies) are hierarchical. Even families are viewed as a hierarchical structure in terms of cousinship and inheritance, and Abraham Maslow formulated the hierarchy of human needs. Hierarchies are so infused into daily life that they are viewed as trivial. However, could there be alternative ways of thinking?

Niklas Luhmann has introduced a new way of understanding and analyzing modern societies as social systems in loose interaction with each other. The key points in his theory of social systems are complexity, differentiation and interaction. Change can not be explained as linear functions between two factors, but as a result of a complex number of factors interacting. There are similarities between the theory of systems and critical constructive didactic that explains learning as interaction between individuals and their culture through different kinds of medias or cultural tools, (Klafki:2001). Though there is some structural coupling between systems, functionally differentiated systems tend to operate and maintain their own existence by acting upon “irritations” that are introduced into the system. Such irritation could be a new student coming into the class, or some new device like mobile phone or play getting popular among the students. The System of Education is one of the many distinct social systems Luhmann has identified and analyzed, (Luhmann:2000).

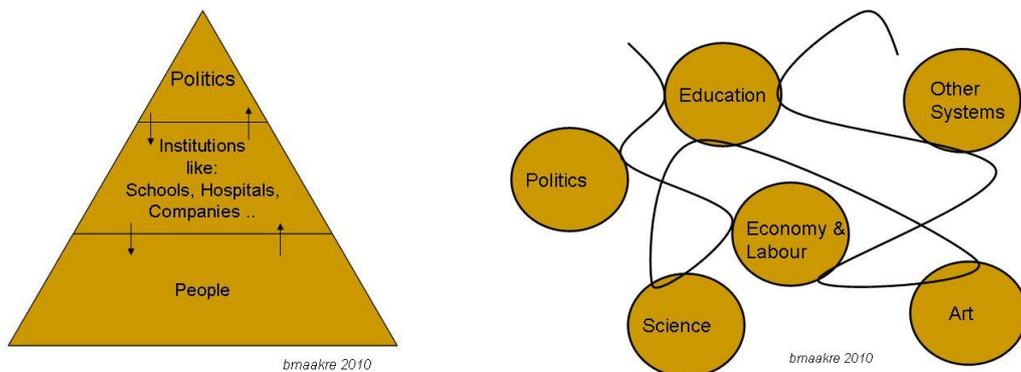


Figure 1: Traditional vs. New model of Society (Aakre 2010)

From this point of view we see one problem related to career preparation and career selection: the system of education is differentiated and separated from the system of economics and labor with only loose structural coupling in between. Both systems are self referential and tend to operate independent of each other. How can a person growing up most of the time in the system of educate prepare for and develop and identity towards a career or profession in the system of economics and labor he or she very seldom experience? The best way to bridge the gap seems to be a kind of apprentice system, but for most students such systems are not available in the ordinary schools. The alternative could be some kind of “semi apprentice” system, or on the job training for a period of time.

Another problem is related to the function of the system of education which can be explained in different ways: as education⁵, as training and as career preparation and selection. Education may also be called cultivation into being a whole person, which is broader and has no specific skill or career in mind. Training is learning certain skills, whether theoretical or practical, also may have any specific careers as a goal. In fact, there is often a contradiction between education and career selection, which may explain the fact that schools, especially general programs, hesitate do involve with students specific career selection. The purpose of general education is to education for a variety of chances and opportunities in future life. On the contrary, career selection is to prepare for a certain direction when it comes to future occupation, which also may involve what kind of culture or social class you are going to take part in the future. John Dewey discussed the same problem, (Dewey:1916).

The code of education is “marks” in some form. Though primary education is compulsory it soon introduce some kind of evaluation and marks to make distinction between good or bad, between better or worse. Marks are the main code for selecting further education, whether it is a high school course or a university program. Marks also play an important role in the selection of jobs and careers. Marks are therefore a key variable to study in Education. However, even more important: What is the relation between using marks and adapting educational programs to contemporary change that fit the actual career opportunities?

3. Career selection and the late modern society

Over the last decades young people and even young adults spend more and more of their lives on schools and education. The concept life long learning also indicates that few or any will be educated for one and the same career for the rest of their life. Most people today will face several careers, and need to educate themselves throughout their life cycle. These uncertainties make career preparation and career selection complex and difficult, and many students have hard to prepare for a career of their choice.

The first problem is related to the aspirations of the students. In Norway the educational system, especially on high school level, is adapted to the interests of the students, and less to the needs and career opportunities in the society, which was the normal some decades ago. In several surveys we have asked young students about their career preferences. Unfortunately we do not have any national survey with a representative population, but how they choose programs from lower secondary school to upper secondary school gives an indication. In recent years a little less than 50 % of the students choose a general program, and a little over 50 % choose a vocational program. The main problem is that almost 30 % of the students in vocational programs do not finish their graduation within five years. Several reasons could be mentioned. Firstly, many of these students were not able to make a reasonable choice in the beginning. Secondly, many of them chose a vocational program because they thought it would be easier and more practical. However, to complete a vocational program is quite difficult as the criteria for a certificate is set quite high to fit the

⁵ Luhmann use the German concept “Bildung” which is not really the same as Education.

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demands from the industry. Many of these students are not able to get an apprentice contract, partly because of low marks and partly because of attendance problem. The only alternative left for the third year is a finish a general program, which is even harder now than if they chose a general program from the beginning.

The second problem is related to the lack of match between the aspirations of the students and demands from the society. In recent years many students choose to study “soft programs” like sports, arts and media. A survey we did in Kongsberg in 2007 and 2010 confirmed this trend. The highest score among girls were artist, film and media. Among boys the highest score was on sports. However, not very many of them will have the chance to become a professional soccer player, a dancer or a TV star, in fact quite few. The third problem is that important sectors have hard to recruit the number of professionals needed. Sectors like engineers, scientists and some skilled crafts should be mentioned. Some national programs have been implemented to compensate for this, and it seems possible to change student career aspirations if they have some experience and guidance from early grades in elementary school, (Aakre 2008).

The complexity of change and career opportunities

Career selection need to be studies in relation to the trends on the labor market. If we go back to the 1960 and early 70’s it was still quite easy to get a well paid job in Norway without any further education beyond basic school. The industrial society was on its highest level when it comes to employment, but based on simple technology compare to what is used today. Manual work dominated most industries, and quite many people were still employed in primary industries like agriculture and fisheries. Since then the situation has changed dramatically and steadily until today. Figure 2 shows some main trends⁶.

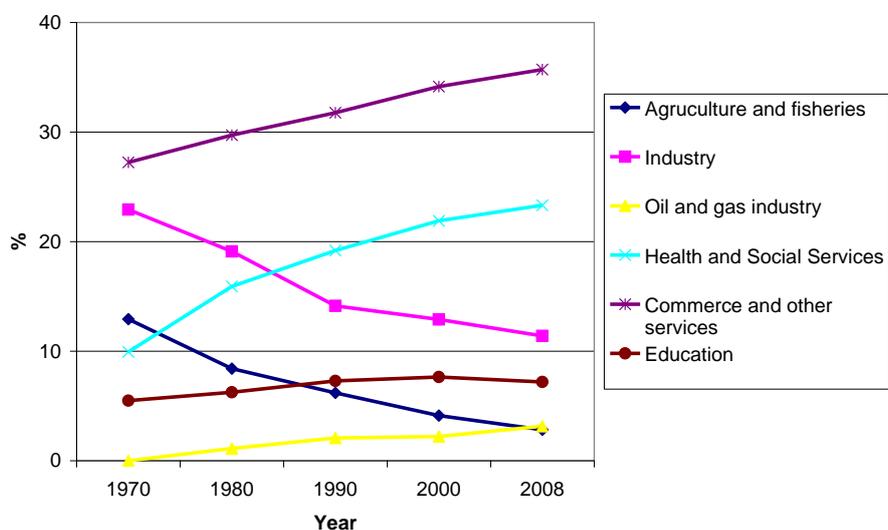


Figure 2: Employment in Norway 1970 - 2008, main sectors, (Aakre 2010)

Five main trends should be emphasized that influence career preparation and career selection today: Firstly the number of jobs in agriculture and fisheries are reduced dramatically. Secondly the number of jobs in traditional industry is also reduced to the half of what it was in 1970. The concept “Industrial society” may therefore not be relevant to use any more. However, in Norway this is to some degree

⁶ Based on data from Statistics Norway, 2009 table 211.

compensated by the development of the oil and gas industries. On the other hand Health and Social services has increased from 6 % to almost 20 % in the same period. Commerce and other services in both private and government sectors have increased and today they are the dominant sectors. Education has also increased, but relatively not in the same rate as Health and Social services.

Some other trends should also be emphasized: Firstly the total number of employees has increased with about 60% since 1970, mostly because women have entered the labor market. Secondly, career selection is still quite traditional in most branches. Women are in the majority in the Service Sector, especially in Health and Social services. On the other hand, almost 90 % of the students in educational programs aiming at industries are still boys.

The Peak-Oil

In Norway the oil and gas industry has played an important role in the economy since the early 1970's. However, the oil and gas era already reached its peak and led to a lot of discussions on how new industries will need to be developed in the years to come.

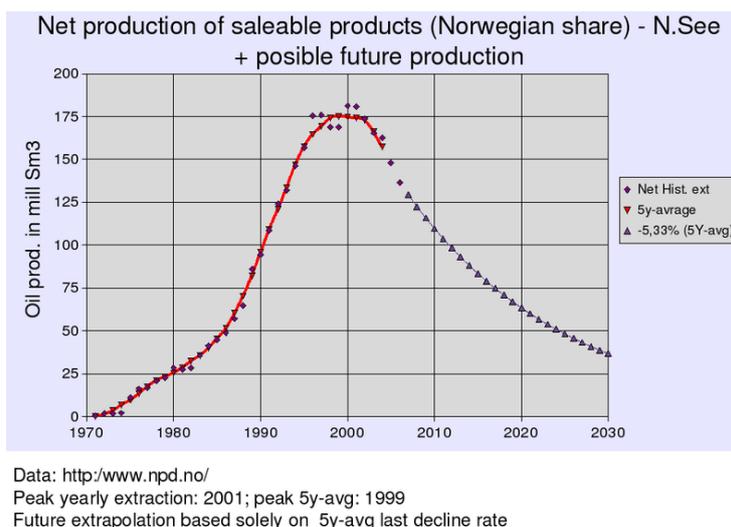


Figure 3: Peak oil⁷

The “peak oil” phenomenon is also a global problem that will have great impact on most countries. Not only because we need to look for alternative sources of energy. We also need to invent new forms of energy production and a variety of tools and equipment as well as ways of organizing our society. Household articles and automobiles are typical areas that need to be redesigned. Traditional jobs will fade away and new demands for competence will be required. All this has to be taken into consideration when we start to discuss the demands for vocational preparation in the future.

⁷ http://no.wikipedia.org/wiki/Peak_oil

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4. Career preparation through basic skills

During the 1970's comprehensive structural rationalization took place in the Norwegian industry. The number of jobs that required only physical strength and skills decreased rapidly. More and more companies required written application and even interviews before hiring a new employee. Most companies also preferred to hire people older than 15-16 years old. Literacy became more important and there was a growing demand for more education and skilled workers. Consequently the number of years in basic school increased. More and more students also continued into secondary education in order to prepare for a job⁸. In 1994 three years of upper secondary education for all was introduced by law. However, in order to enter such programs and to succeed well, basic skills in communication, reading, writing and calculation became necessary⁹. Basic skills became a top issue during the next twenty years and integrated in the national curriculum as compulsory activity in 2006¹⁰. However, more theory and less practice became a problem. More and more students felt unhappy in school and the dropout rate increased year by year¹¹. Attempts were made to integrated theoretical subjects, for instance English, in the vocational subjects when reading an instruction or writing an order. However, most teachers of classical school subjects like English, Social Science and Mathematics had different opinions. They more or less continued to teach their subject as a "micro version" of a scientific field in university, and to students as if they were all preparing for an academic career. Therefore, integration between theoretical and practical subjects never became the successful strategy it could have been.

The demand for more basic skills training in schools is also related to growing number of immigrants and refugees to Norway that started in the 1970's. Their background are different languages and cultures, and some of them may have very little or no education. Due to lack of basic skills, many of them could not adapt well to the Norwegian society, many had hard to get a job and many of their kids drop out of school with few or no alternatives on the labor market.

In the early 1990's unemployment became a big problem. Many companies also realized that to cope with mobility and change, basic skills as well as digital literacy is a key factor. When loosing a job and trying to find a new one, it was discovered that many employees were not able to read simple instructions or make a report. Basic skills everybody thought was take care of by ten years in elementary school simply failed to be true. Some companies had to introduce such programs by their own as the schools failed to solve the problem. In recent years we also realize that many young adults who do not have basic skills have hard to get a job, and many of them tend to end on some kind of life long compensation program.

In a complex global world reading for instance is not only about decoding and understanding the words in a text. In few decades we got media like film, TV, video and Internet. Reading is also about understanding complex messages from mediated through modern media from all around the world, with a complexity of cultural traditions and settings. If you are making tea or coffee you have to adapt to different kinds of taste and tradition. If you are going to work in the tourist industry you will need to communicate in a different language and to deal with people from other cultures. There are simply not many jobs left where you can use your arms and body and with only little communication or collaboration with others.

The demand for digital competence is another factor that changed the opportunities for a job during the

⁸ Comprehensive school reforms were implemented for 9 year compulsory basic school in 1969, and a 3 year secondary school open for all by law in 1974, put into practice from 1976.

⁹ KUD:1985:11

¹⁰ LK06:2006:39

¹¹ Hernes:2010

1990's. Computer courses were introduced as special courses in both elementary and secondary schools in Norway early in the early 1980's for students with special interests.. However, in a few years it became clear that digital competence is needed by everybody to cope with modern society and to manage modern media. In a few years digital competence developed from some general knowledge about computers to basic programming via using specific application programs, and finally more complex cultural skills, (Aakre 1997). After many years of trials the conclusion was that digital competence need to be a basic skill integrated in all school subjects on all levels. This strategy was implemented in the national curriculum in Norway from 2006, (LK06:39).

There seems to be no clear understanding of the content of digital competence, it seems to vary from subject to subject and the type of project the students are involved with. However, if we study how digital competence is integrated in the different curriculums, we may able to organize the skills into six categories:

Firstly we can talk about “basic digital skills”, which mean to use a common operating system and some general application programs for text and visual processing, calculation and data bases. Secondly we can use the concept “digital navigating competence”, which means to access Internet for information about jobs and career, make simple searches and to make an order. The next we may call “critical reflection and evaluation” which mean to search for relevant information and critically evaluate the quality of both tools and the content of information available. As a fourth criteria would be “digital processing competence”, which means to combine different forms of information, for instance text and pictures and films, into a new integrated document or form of information. The possibility for interaction through digital media has improved significantly over the last years, both for commercial users and also as special program for collaboration via wireless means. This category we may call “digital collaboration competence”. Finally we realize that digital media also involves culture, manners and ways of dealing with each other. That means we also need to discuss and deal with digital cultures and manners, and how to communicate with one another in a positive way.

Process and evaluation

As already explained, basic skills are not separate subjects or activities, but integrated in all subjects from grade 1 in elementary school to grade 13 in upper secondary school. However, in the curriculum for all the subjects there is an explanation of how basic skills shall be taken care of and to be evaluated.

Basic skills are not evaluated separately as such, but evaluated through subjects and projects the students are doing. For instance: a class in social science may include reading text, making an oral presentation, collecting information critically via internet, using a program for statistical analyses and writing a report. In interdisciplinary projects like entrepreneurship the same strategy is utilized.

5. Career preparation as a new school subject

Career preparation was introduced in Norway as a new elective school subject in lower secondary school, 8th to10th from 2009¹². Actually it is not a compulsory subject yet, but operated as a pilot project in some schools in 81 municipalities from 2009. The subject is elective with 227 lesson hours, and the students have to choose it as an alternative to a second foreign language.

The purpose of this subject is to be practical and to fill the gap between elementary education and upper secondary education, and to help students make a career selection that fits their interests and aspirations.

¹² KD (2009). Utdanningslinja – kap. 2.3.2: Et mer variert og praktisk ungdomstrinn.

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Figure 4: Minister of Education visiting a class in a career preparation workshop

The subject also intends to establish a positive attitude to the role as an employee, competence for entrepreneurship and to create new jobs. The content is similar to entrepreneurship education and technology and design, except that Career preparation is a school subject with dedicated time frame.

In addition Career preparation includes emphasis on basic skills which may give an idea of purpose and role of career preparation as a subject: Oral communication in this subject involves making a conversation about own skills and competences, interests and to express own choices. It also involves presenting and sharing own experience with others. Writing skills may include such as

writing a log and make a document about different educational programs and state the reasons for own career selection. Writing a job application is also relevant. Reading skills may include the study of curriculum documents, use information about educational programs and information about vocations and vacant jobs. Reading tables and understanding graphs related to education and the labor market are also examples of relevant reading skill. Calculation skills may involve processing statistical data from vocational programs and the labor market. Finally, digital competence may involve collecting information about education and job requirements analyze different types of jobs and sending an inquiry to a company or the employment agency.

Table 2: Career preparation grade 8-10. (Lesson hours based on units of 60 minutes)

Subject	Main areas	
Career preparation 227 hours	Services and products	Work ethics, Work, And Environmental studies

Process and evaluation

Career preparation as a subject may be organized in many and different ways in the school. In many cases it is located in the same workshop as the subject Arts and Crafts where tools and materials are available. That means the schools stress problem based learning in a practical setting where the students have to plan, do and evaluate jobs according to some quality criteria. They also need to give good reason for their design, the selection of materials, and techniques and how the service or product can be made available and sold in a market.

The schools are encouraged to make contract with local companies and many schools have such contracts. In that way students can spend some of the time in a company, both to learn about the labor market and to learn about professions and their work environment. The introduction period may be organized as “shadowing”, which means the students will follow a skilled worker or senior of some kind, give a hand when needed and make notes and logs about what they do and why they do their work in certain ways. Such notes may be collected in a file for evaluation.

Through practice in a company or workshop the students also learn norms, values and environmental

standards as well as laws and regulations. They also meet with the labor union and learn about their role in a modern company. The students are evaluated both formative and summative based on their work performance and quality of products and services. Their own file and log may play an important role in the setting the average mark. In addition the students can be picked out for a final exam that is made practical. That means the student may have to do a certain job he or she experienced before followed by an oral and or written to explanation.

6. Career preparation through entrepreneurship education

In 1997 the Norwegian government decided to implement a national strategic plan on entrepreneurship in education, not only for trade and industry but also for the system of education. As a consequence Young Entrepreneurship was established as a national organization with local units in all counties. However, the roots of entrepreneurship education in Norway can be traced back to the 1970's, and may be even longer depending on the definition we use. Through the school reform of 2006, Knowledge promotion, entrepreneurship education was integrated in the national curriculum in two ways:

1. As a compulsory and interdisciplinary activity on all grades from 1- 13
2. As an elective subject in upper secondary school no grade 12-13

The elective subject in upper secondary school is organized in two modules that can be selected independently, or together. Each module has 140 lesson hours and the content is explained in table 3.

Table 3: Subject: Entrepreneurship (Lesson hours based on 60 minutes)

Program	Main areas		
Entrepreneurship and business development 1 140 hours	Entrepreneurship	Establishing	Operation and service
Entrepreneurship and business development 2 140 hours	Business development	Innovation	Internationalization



Figure 5: Young entrepreneurs on their stand

Over the years there were discussions and different opinions on what entrepreneurship is and what it should be in an educational setting. In the beginning the main focus was on learning how to run a business, very much influenced by the idea from Joseph Schumpeter who probably was the first to introduce the concept entrepreneur, (Schumpeter:1942). However, gradually the concept entrepreneur was defined more broadly about any creative and innovative activity from idea to final service or product, also cultural. In Norway the government adopted the following definition in 2003:

“Entrepreneurship is a dynamic and social process where individuals, alone or in collaboration with others, identify opportunities for innovation and act upon these by transforming ideas in to

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*practical and targeted activities, whether in a social, cultural or financial context*¹³.

To promote entrepreneurship education the association Young Entrepreneurship Norway¹⁴ was established in 1997 as partnership between trade and industry, the Norwegian government and private organizations. The purpose is to provide young people in primary and secondary schools and early university with high-quality education programs to teach them about enterprise, entrepreneurship, business and economics in a practical way¹⁵. Young Entrepreneurship Norway is also member of Junior Achievement Young Entrepreneur Europe, JA-YE¹⁶, and collaborates with them on activities like developing programs, competitions and research activity.

Process and evaluation

Today all students attend some kind of entrepreneurship education in upper secondary school. The program intends to prepare young people for the real world by showing them how to generate wealth and effectively manage it, how to create jobs which make their communities more robust, and how to apply entrepreneurial thinking to the workplace. Students put these lessons into action and learn the value of contributing to their communities. Entrepreneurship education also includes focus on work readiness, entrepreneurship, and financial literacy, and to teach young people important skills to help them become economically empowered. They also learn how to start and grow a business, how to successfully contribute in the workplace, and how to effectively manage the money they earn.

In entrepreneurship education there are less traditional lectures than in traditional schools subjects. Most of the time it is based on problem based learning (PBL) solving real problems and developing a product or service from the idea to a final product or service in use by a customer or user. That means the learning activity is more problem and user oriented than subject or content oriented. The purpose is to foster creativity and innovation. As the content is not very specifically outlined in the national curriculum and in text books, national survey have been carried out to study what schools emphasize in their programs, (Johansen et al. 2006). From these surveys some we can get an idea of the focus:

First of all there are focus on general entrepreneurial abilities like creativity, curiosity, cooperation skills, capabilities for problem solving and decision-making.

Secondly there is focus on entrepreneurial abilities. That is knowledge and skills on what needs to be done to establish and run an enterprise, to see opportunities in the market, make use of resources, skills in production, know some economy, and knowledge of rules and regulations.

We also find emphasize on a attitudes like being aware of and plan for a career as self-employed. Some of the indicators are: abilities for team-work, problem solving capabilities, decision-making abilities, knowledge about how to set up and run a company, economical abilities and attitudes towards starting a company.

Creativity is often refer to and supposed to be important in entrepreneurship. Therefore I will evaluate this phenomenon briefly and how it is, and could be fostered in the schools. Creativity can be evaluated from different positions like “what is typical for a creative person”, “what is typical about parents of creative

¹³ Quoted from "Entrepreneurship – Progression model", The Norwegian Board of Education 2002

¹⁴ <http://www.ue.no/>

¹⁵ Storsteigen videregående skole, Alvdal. <http://www.storsteigen.vgs.no/>

¹⁶ <http://www.ja-ye.org/>

children”, “what is typical for schools that foster creativity” and what are there in our culture and our environment that foster creativity? We could also ask the opposite question: “What factors seem to hinder the development of creativity”? Finally creativity has to be evaluated from perspectives as process, context and products and services. However, we see two main approaches to the phenomenon:

- Personal traits
- Environmental traits
- Factors related to entrepreneurship processes

Seen from the perspective of person and individuals, creative children, and adults as well, seem to have a broad field of interests and they tend to be attracted by complex problems. They also seem to have a strong will to deal with such problems over a long period of time. Creative people also seem to be more independent and less conformed with conventional social and cultural norms, (Wallach:1985).

The typical creative person seems to have a special way of thinking, or “cognitive style”, often expressed through a special ability to take risks and come up with many unconventional associations or extraordinary solutions to situations and problems. In difficult situation creative persons are often willing to take chances and make intellectual guesses where others see no solutions to the problems, or tend to give up.

Seen from a contextual perspective, family and other cultural factors like education seem to be important factors related to the development of creativity. Parents of creative children seem to treat their children as an important individual and intellectual person. These parents tend to admire and support their children’s own way of thinking and to express freely own ideas and opinions, (Getzels & Jacson:1962). Such parents also seem to emphasize non-conformity, to accept individuality and curiosity and not stressing logic so very much. Parents also seem to be tolerant to “playful” activities and even regressive and none-logic behavior from the child.

Behavior from family or other that seems to hinder development of creativity is associated with factor like strict and detailed planning and controlling children behavior. Parents that value unusual and non-conform behavior as something childish seems to hinder children to become creative. Research on creativity and school culture seem to indicate schools that prefer to emphasize mostly facts and memorizing, tend to hinder the students ability for divergent ways of thinking and behaving.

On the other hand, especially in the lower classes, an open climate that gives the students freedom and the chance to choose different learning activities, seem to foster creativity. Studies of creative teaching seems to emphasize factors like: to support and value creative thinking, promoting manipulation with rare ideas as well as objects, openness to new ideas and positions and ton be careful not to force students into strict frames and procedures of thinking and acting. It is also important to encourage the students to study many different areas and support them to develop ability for constructive critics.

When we work with children and students we need to emphasize *content, expression and context* - both what the learner work with and how to help them express their own ideas. As teachers and mentors we need to:

- Respect even what we think is “childish” expressions and not force the learner into some “adult norms”, but start with the learners own ability and capacity
- Build on the direct and immediate experience of the learner and help them expand and improve

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their way of experience, acting and reflection.

- Provide the learner with a variety of forms and expressions and help the learner to process and transform what they experience into their own images and models.
- Work thematic, expose different perspectives and opinions, help the learner to develop a critical mind and to see distorted images of reality.
- Help the learner to express themselves in different ways, through different types of media and through fantasy, imagination and observation.
- Develop a sensibility for aesthetic communication and evaluation .
- Support and help the learner to master different kinds of technologies, materials and means according to the individual need and ability.

There also seem to be a relation between creativity and problem solving, though I think they need to be understood and valued separately. For instance: You can solve a problem by following a certain procedure or method without being very creative. On the other hand, we may also talk about creative problem solving, which brings us closer to creativity.

In creative problem solving students should be encouraged to suspend judgment, to consider all possibilities before trying out a solution. This method is often called brainstorming, but its also know from the great educator John Dewey and his project method. This kind of problem solving is enhanced by a relaxed, even playful environment similar to that of fostering creativity, (Slavin:2003). Even more important, students who are engaged in creative problem solving must feel that their ideas will be accepted. People who do well on tests of creative problem solving seem to be less afraid of making mistakes and appearing foolish. Successful problem solvers also seem to treat problem solving situations more playfully. Learners should certainly be encouraged to try different solutions and not be criticized for taking a wrong turn. The main steps and categories to deal with in creative problem solving are well known:

- Identify and analyze problem
- Generate possible solutions and analyze their suitability
- Selecting the best solution(s) and make a plan
- Implement and study the effect of the selected solution
- Analyze and evaluate the results
- Make improvements and plan the next course of action

In addition a variety of tools and techniques are applied, like the Deming wheel, SWOT analyses, Ishikawa diagram, Pareto analyses, Check lists and other.

Evaluation is carried out in many different ways, but mainly on practical projects. Through Young Entrepreneurship Norway the students may also take the Cambridge exam. To provide an idea of the evaluation I present the criteria used by Young Entrepreneurship Norway. Their criteria are divided into two main categories: one group of criteria used in the nomination process, and one set of criteria used in the final Norwegian Championship.

Projects in the nomination process are nominated according to criteria like logo, website, business plan, commercial film, brochure, environmental and or energy innovation and similar categories.

Projects in the national competition are evaluated according to criteria like best innovative product or service, the gastronomy price, the master certificate price, best cultural business price, best exhibition, the

best salesman, best potential for added value, best human relation company, best accounting and finally the best company. Other criteria could also be included.

7. Career preparation through technology and research

Technology and Research¹⁷ was introduced as a new school subject in upper secondary school with the school reform of 2006. It is an elective subject, primarily for students who specialize in scientific subjects. However, the new subject also has elements of design and social science. The idea seems to originate from the 1980's when subjects like computer science and natural science were implemented as separate combined programs¹⁸. During the years that followed there was along discussion on how technology and science should be take care of and implemented in secondary school, (Aakre:2005:361).

Technology and Research is based on many and different traditions and seems not yet to have its own identity. Therefore it is yet to see what the final content will be, and how popular the subject will be among the students. The subject is not yet in any program for teacher education, and there are no university program that fit the subject for those who want to become a teacher specialized in it. However, it seems the teachers who teach it are well qualified, though they seem to fall into two different categories: the researcher and the engineer, (Bungum:2009).

Table 4: Technology and Research (Lessons based on units of 60 minutes)

Program subject	Main areas			
Technology and research X (84 hrs)		The young engineer	The young researcher	Technology, natural science and society
Technology and research 1 (140 hrs)	Design and product development			
Technology and research 2 (140 hrs)	Research methods	Research, technology and science	The young researcher	Philosophy of science

The new subject is divided into 3 modules as elaborated in table 4. The young engineer is about technology in a creative and practical context. That means the students will plan and build and test technological products. The students shall experience how to use engineering tools, materials and relevant means of design and construction. Sensors and control systems are also included.

The young scientist is about investigating problems related to health and environment, learn how to plan, carry out and publish the results from such research. In addition it is about systematic measurements and analyses of results.

Technology, natural science and society are about to study and understand the role of science in a historical context, and to evaluate environmental, cultural and ethical problems related to the implementation of new technology. To study and understanding the principles and functions of technological systems are also included.

Design and product development is about development of new products. It involves experiments with electronic circuits and how they can be used in the development of products based on own ideas. Testing, simulation and quality assurance of form, function, aesthetic and environmental functionality is emphasized.

¹⁷ In Norwegian: Teknologi og forskningslære

¹⁸ Edb med allmenne fag (teknisk gymnas) og naturbruk (grønt gymnas)



Figur 6: Teacher students testing robot (Aakre:2008)

Research methods are about method and methodology in natural science. It is also about the relation between empirical data and theory, and how knowledge is developed and published in scientific communities.

Philosophy of science is about ideas and the reasoning behind science as well as the role of technology in its development. In addition it is about to understand the basis of argumentation within science and science discourse.

8. Career preparation through vocational education and higher education

In Norway more than 50 % of the students choose to enter one of 10 vocational programs from grade 11. They are 3-4 years integrated programs. Normally it is 2 years in school and 1-2 on a special contract with a company or workshop. In the final year they have a special exam to take an advanced craft certificate, similar to city and guild certificate. However, only few are able to have such a contract after the second year in school and left to two alternatives: either to take one of the few such programs offered in a school, or to take a third year in a general course. Unfortunately that is not a good alternative for these students, and many tend to drop out. However, the first 2 years in school is a combined program with general subjects and vocational subjects. In that way they can have some career preparation and at least learn about some skills in one branch of trade and industry.

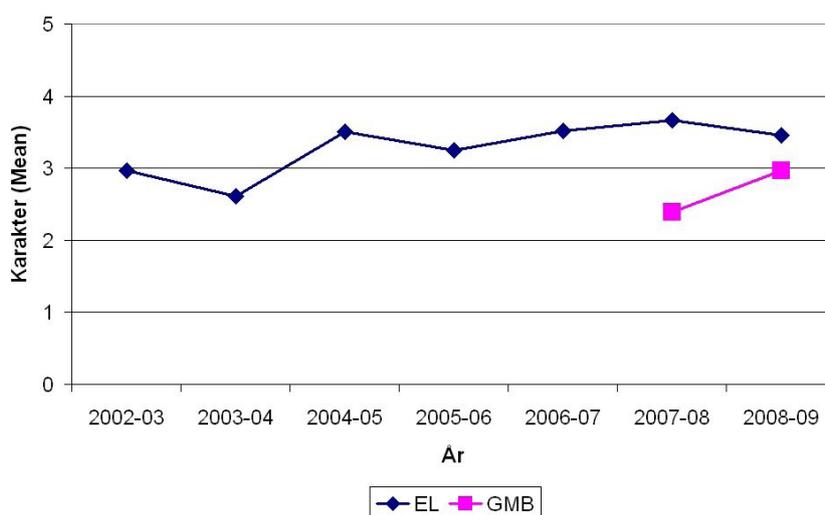
The high drop out rate from vocational programs in Norway has caused a lot of discussions and debate in recent years. There are different opinions. Some claim that the whole structure of vocational programs in Norway has failed and should be changed to give all students a better chance. On the other hand others point out that the vocational programs are the only programs that keep and has proved an international standard of quality when it comes to standard of skills. They refer to achievements in both national and international events like the World skills where Norwegian apprentices did very well over many years. Gold medals were achieved in many different crafts like florist, cooking, hair dressing, graphic design, electrical and mechanical skills.



Figur 7: Two Norwegian winners of World Skills

Inclusion of all in vocational education is not an easy goal to achieve. What Norway needs is probably a system for vocational education that both maintain the high level of international standard on craftsmanship as well as vocational preparation on a lower moderate or lower level. Many young students may just need to start with some form of vocational preparation and then gradually at a later stage complete their training for a final certificate. This is also probably the core idea of life long learning.

Career preparation and education need to be understood in relation to the concept Life long learning. It is also about how skilled workers can have a chance to continue their education into higher education. This problem has also been discussed over many years. In 2008 Telemark University College was awarded a national price for its program Y-veien for engineers. This is a program where candidates from a vocational program in high school and with an advance craft certificate can enter the university and take a bachelor and later on if they like, a master of engineering on the same level as ordinary students. Figure 8 show the marks they achieved since the beginning in 2002, (Aakre and Hagen: 2010)



Figur 8: Average marks Y-veien Telemark University College

The program has proved that Y-veien, vocational education as a base for higher education had been quite successful. Over 95 % of the students complete their program in time, their results are well above average, they are very attractive on the job market and they do an outstanding job from the first day. And finally: we think it is a good example of Life long learning.

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Conclusion

In this article career preparation through general programs in high school has been explored and discussed in relation to a social and cultural context characterized by complexity, rapid change and globalization of economy and labor. The question is not really new as it was raised before by educators like Dewey and others (1916:306). However, today globalization seems more intense, and the rate of change is increasing. Dewey tried to solve the dilemma through less focus on a fixed curriculum and by introducing a more pragmatic approach with focus on experiential learning and problem solving. However, is this still the best and only way to prepare and maintain a state of readiness in a time of globalization, a mix of cultural interaction and shifting language barriers? More likely we are in a situation where we need to get a step further from this progressive strategy to a new paradigm on how to arrange for good education and career preparation.

This article concludes that system theory can provide a better understanding of late modernity and how our society is constantly changing through a dynamic process of functional differentiation and integration. Functional differentiation is a way to reduce and manage complexity. However, at the same time functional differentiation creates a problem, for instance in education: separation between the system of education and other social systems like the system of economy and labor. The only solution to this problem seems to be to prepare for some kind of interaction between them, and to situate some of the educational process in other systems, for instance the system of economy and labor. How can this problem be managed?

Firstly, it is a fact that there are few well paid jobs today that require only physical labor. Most jobs today require a high degree of literacy, communication skills, digital literacy and problem solving. Therefore basic skills need to be a priority on all levels of education in order to prepare a good foundation for career. When it comes to digital literacy, is not only about pure skills in using computers and computer programs, but to navigate through global networks with a critical and ethical mind, and to solve problems that initially have no obvious solution.

A second problem is separation between school based learning and learning in practice. Some decades ago basic school in many countries was 5-7 years. However, over the years the number of years in school has increased dramatically offering few opportunities to experience how it is to have a job and to learn about the job market. Today basic education in Norway is 13 years in Norway, including upper secondary school. We do not yet have much experience on it, but Norway has been implementing a special subject with focus on Work and Career in lower secondary school, grade 8-10, since 2007. Though this is not yet an alternative to all students in all schools, it seems very popular and quite successful so far.

Entrepreneurship education based on experimental learning has become the major approach to career preparation in general education over the last 10-15 years. Today all schools in Norway provide some form of entrepreneurship education, either as a general approach or through a special program with focus on operating a student company. The concept student company involves the skills of establishing and run a business over a certain period of time, in most cases for one year. Entrepreneurship education was also implemented as an elective subject for students attending general program in 2006. Quite some research has been done on entrepreneurship education in Norway, but mostly on the implementation process. However, research indicates there is a correlation between attending entrepreneurship programs in school to make a future career as an entrepreneur and establishing own private company. Finally, it has to be pointed out that entrepreneurship education is also a program in higher education in Norway.

Entrepreneurship education is not aiming at any specific type of business or technology. However, we live

in a society where science and technology plays an important role in the formation of our society and welfare. Therefore career preparation related to technology and science needs to be a priority. In Norway an elective subject called Technology and Research was implemented in general program from 2006. The main focus is on natural science, but also philosophy of science and social science are integrated in this subject. In addition it has to be pointed out that Technology and Design is an interdisciplinary subject on all grades 1 to 10, integrating knowledge from three subjects: natural science, arts and crafts and mathematics. There is few or any research about the results of these reforms. However, a study of the activity at devotek lab in Kongsberg indicates that involving children in technology and science at early ages and through experiential learning, tend to improve interests and career preferences towards technology and science, (Aakre:2008). There is also an indication that such activities lead to higher attendance in science classes on higher levels, both in secondary and tertiary education.

Finally, there is a problem related to a long tradition of strict separation between vocational programs and general programs. This system should be changed. Some countries have a system for higher vocational education. However, in most countries that is not the normal. Therefore many students get stuck in the system, and can't easily advance into higher education. This situation is not satisfactory in a time when life long learning is a requirement on all areas of society. In spite of resistance from the academic world, the law of higher education in Norway has included some exceptions few years ago. The most well known program in Norway so far is the engineering program "Y-veien" that was implemented at Telemark University College in 2002, and now offered as a permanent option. In this program students who hold a relevant certificate of completed apprenticeship can enter a bachelor program in engineering. The program has been studied carefully, and the results have been quite optimistic. The throughput as well as the academic results proved to be well above the ordinary bachelor program in engineering, (Aakre and Hagen:2010). The main reason seems to be their experience and familiarity with practice.

The conclusion may be summarized in four main points:

1. We live in a time of complexity and change with far less predictability than before. Therefore the system of education need to foster flexibility combined with a selective and critical mind.
2. The strict separation between school and work, between general education and vocational education that was typical for the industrial society seems not to be suitable for a late modern knowledge based society. Therefore ways to bridge the gap will be needed.
3. The job market has changed over the last decades. Many jobs have disappeared and are replaced by new professions. New jobs will also be created in the future that requires new kinds of competences. For example: The peak oil theory indicates that new jobs need to be based on sustainable energy production.
4. There is a growing demand for competences related to innovation and entrepreneurship, technology and science as well as cultural understanding beyond national borders.

The overall conclusion from this research is that the complexity of late modern society requires a better integration between the system of education and other social systems. Students need to be more familiar with practice, and the classical separation between vocational and general programs should be replaced by an integrated system well adapted to system life long learning that allows for easy alternation between education and work.

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Literature

- Bungum, Berit (2009): Teknologi og forskningslære i videregående skole: Hvem er lærerne og hvordan former det faget?, In Acta Dicata Norge, Vol 3 Nr. 1, Oslo
- Dewey, John (1916): Democracy and Education, The Free Press, New York
- Dobinson, C.H (1970): Comenius and Contemporary Education, UNESCO, Hamburg
- EU (2003): Education and Training for Entrepreneurship, European Union, Brussels
- Forsøksrådet (1981): Større elevengasjement for aldersgruppen 13-17 år. Nr. 95, Forsøksrådet for skoleverket, Oslo
- Goodson, Ivor and Hargreaves, Andy (1996): Teachers Professional lives, Falmer Press, London – Washington DC
- Hargreaves, Andy (1996): Schooling for Change, Falmer Press, London – Washington DC
- Hernes, Gudmund (2010): Gull av gråstein. Tiltak for å redusere frafall i videregående, opplæring. Fafo-rapport 2010:03, Oslo
- Høgmo A, Solstad K J og Tiller: Skolen og den lokale utfordring. En sluttrapport fra Lofotenprosjektet. Univ. i Tromsø: Inst. f. samf. vit 1981.
- Nordlandsforskning (2002): Opplæring i entreprenørskap, Nordisk ministerråd, København
- Nord-Trøndelagsforskning (2003): Hva hendte siden? Ungdomsbedrifter i den videregående skolen Nord-Trøndelagsforskning, Levanger
- NOU 18:2008 – Fagopplæring for framtida., Ministry of Education, Norway
- KD (2008): St.meld.nr.31 (2007-2008): Kvalitet i skolen (“Quality in the schools”), Ministry of Education, Oslo
- KD (2009): St.meld. nr. 44 (2008-2009) – Utdanningslinja., Ministry of Education, Oslo
- KUD (1985): St. meld. Nr. 15 (1984-85) Om videregående opplæring, Kirke og undervisningsdepartementet, Oslo
- LK06 (2006): Læreplanverket for kunnskapsløftet, Kunnskapsdepartementet, Oslo
- Luhmann, Niklas and Karl-Eberhard Schorr (2000): Problems of Reflection in the System of Education. Waxman, New York
- Shumpeter, Joseph (1942): Capitalism, Socialism and Democracy, Harper and Brothers, London
- Slavin, R.E (2003): Educational Psychology, Allyn and Bacon, Boston
- Solstad, Karl Jan (1978): Riksskole i utkantstrøk, Universitetsforlaget, Oslo
- UFD (2003): Se mulighetene og gjør noe med dem!, Ministry of Education, Oslo
- Wallach, M. A. (1985): Creative thinking, testing and giftedness., In: Harowitz, F and O'Brian M: The gifted and talented: Developmental perspective., American Psychological Association, Washington DC.
- Aakre, Bjorn M and Hagen, Svein T (2010): Fra fagbrev til Ingeniør, In print: Uniped, Oslo
- Aakre, Bjørn Magne (2008): Technology and Design Education. From play to profession., Bulletin of Vocational and Technology Education. Volum 5 2008, p1-17. ISSN 1348-4893, Nagoya University