

MAKING THE ENTREPRENEURIAL MINDSET VISIBLE



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Johanna Nikkola

Author Johanna Nikkola

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Supervisor Helena Turunen

The objective of this thesis was to make the entrepreneurial mindset visible in the Degree Programme of Traffic and Transport Management, which is part of the Häme University of Applied Sciences, HAMK. The purpose was to find out what entrepreneurial skills and competences teachers recognize in their implementations, and if there are skills and competences they don't recognize yet. The purpose was also to find out, if the entrepreneurial mindset can be seen in the degree programme. And finally, the last purpose was to find out points to be developed in entrepreneurial education in order to maintain or strengthen the entrepreneurial mindset.

Entrepreneurship and entrepreneurial mindset are seen important maintainers of competitiveness and balancer of economy, but above all as an individual's ability to develop on a personal level and as an active citizen.

In the theoretical part, through the basic concept of entrepreneurship, one proceeds to entrepreneurship education and to entrepreneurial education. Skills and competences related to entrepreneurial education are described as the basis for a broader thinking, the entrepreneurial mindset. Finally, the frame of reference for the skills and competences, The Entrepreneurial Competence Framework, is presented.

The skills and competences related to entrepreneurial education are well identified in the degree programme. There is a wide understanding of what the common features concerning entrepreneurial skills and competences in the degree programme are. The characteristic way of thinking constitutes a certain kind of entrepreneurial mindset.

Keywords Entrepreneurial mindset, Entrepreneurial education, Entrepreneurship Competence Framework EntreComp

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1 Introduction

“What is this entrepreneurial nonsense?” The comment was heard in the conference room when the entrepreneurship came to the fore in the engineering degree programme teachers’ meeting. Many years entrepreneurship, as any other business-related issues like marketing or sales, have been “nonsense from marketing people” or something obligatory that someone else should be teaching detached from the professional context, in engineering degree programmes. But entrepreneurial-related issues can be seen in education, and in daily action, also in engineering programmes from the guidance counsellor’s point of view. They just need to be made visible.

1.1 Background

Entrepreneurship is seen as important maintainer of competitiveness and a balancer of the economy. There are fears that society’s service level will weaken due to labour shortages, and there are aims to support the conditions for growth by, among other things, encouraging the creation of new businesses. One of the biggest solutions to support entrepreneurship is seen as the diversification and expansion of entrepreneurship education at all school levels. The EU Green Paper about entrepreneurship (2003, p. 25) guides the Member States to create a society that values entrepreneurship for example by taking entrepreneurship training as a part of a school’s curriculum, creating more co-operation between entrepreneurs and schools and universities, in order to foster entrepreneurial drive more effectively.

European Union has funded and coordinated several projects concerning entrepreneurship over the last twenty years. In 2013, European Commission published an ‘Entrepreneurship 2020 Action Plan’, which commented on entrepreneurship education as part of growth and business creation as one of the three key areas in the EU. The aim has been to create a plan for joint action to revolutionize the culture of entrepreneurship and create an environment that supports entrepreneurs. The ‘Entrepreneurship 2020 Action Plan’ represents three action pillars, which in line with the Europe 2020 Strategy pursue smart, sustainable and inclusive solutions and which would address EU’s principal societal challenges. The pillar 1

emphasizes entrepreneurial education and training to support growth and business creation. The pillar 2 encourages for creating an environment where entrepreneurs can flourish and grow. Finally, the third pillar pursues entrepreneurs to be lifted role models to encourage more people to become entrepreneurs. (European Commission, 2013a; see also European Commission, 2013b)

Also, the Finnish government sees entrepreneurship as important in maintaining competitiveness and balancing the economy. Ministry of Education and Culture has aligned entrepreneurship education policies in 2017 and the work towards entrepreneurship has continued with the governments of Rinne and Marin. (Finnish Government, 2017; see also Finnish Government, 2020a).

In the education sector, the Finnish Government is also promoting entrepreneurship by directing funding in a direction, where the experience of strengthening entrepreneurial skills and the number of graduates who become entrepreneurs determine the amount of money to be awarded to universities of applied sciences. 6% of the funding from 2021 will be distributed according to employment and the quality of employment, with an emphasis on entrepreneurship. Half of this is determined by career questionnaire after one year of graduation, which asks, among other things, how well studies in university of applied sciences developed entrepreneurial skills.

In Häme University of Applied Sciences (from now on also HAMK) the entrepreneurship is an essential part of education. In “HAMK Vision 2030”, which is part of the strategy, entrepreneurship and cooperation form one of the four key themes. One of the visions is to achieve 7% degree of entrepreneurship among graduates by the end of 2025. (Häme University of Applied Sciences, 2019b)

As HAMK sees entrepreneurship important, HAMK offers entrepreneurship education for students. Among graduates from 2014, HAMK was rated 3,3 out of 5 in question about how well the university offered basis for becoming an entrepreneur. Average in this question was 3 out of 5 among all universities of applied sciences. (Häme University of Applied Sciences, 2020a)

The last few decades the political agenda has been to include entrepreneurship into education in order to achieve “job creation, economic growth, competence development, increased student engagement and societal change” (Lackéus, Lundqvist & Middleton, 2015, p. 3). Most commonly, the need to include entrepreneurship into curricula leads to creating separate courses or programs, which involve only students who already have some form of desire to become entrepreneurs. The content of courses and programs also most often focuses specifically on the perspective of how to become an entrepreneur. (Matlay, Pittaway & Edwards, 2012, p. 6)

1.2 Looking to the future

Gradually, in addition to setting up and running a business, entrepreneurship has begun to be seen as entrepreneurial skills and competences for all citizens and individuals, implemented entirely in personal life in addition to work. This thesis examines those skills and competences related to entrepreneurship from the perspective that by strengthening these skills and competences, entrepreneurship itself is also possible.

Entrepreneurship is more than just creating business. It is seeking opportunities, taking risks, and converting ideas into reality. Those characteristics are actually an innovative way to see the world, and that is why researchers have started to talk about entrepreneurial mindset, an entrepreneurial potential in every individual, as Kuratko (2016, p. 3) does.

In order to compete successfully in the new economy on the 21st century around knowledge, service and information-based activities, companies need to hire experts with higher level skills. The shortage of highly skilled workers prevents also the growth and development of new entrepreneurial firms. (Boyles, 2012, p. 42)

The 20th century skills needed in working life, citizenship and self-actualization, were quite different than they are now in the 21st century. Constant transformation and change of working life require new kind of skills. Existing businesses are changing their organizational structures to self-directed teams, self-management and flatter management structures emphasizing the importance of individual initiative and accountability for the employee.

Those features have been associated with entrepreneurial actions and success. (Boyles, 2012, p. 48)

Globalization and economic inequity are changing the demand of skills, digitalization is changing the nature of work and recruitment, and the liberalization of the labour market and the reorganization of work are increasing the competition for jobs and thus changing the nature of qualifications and skills needed (Mann & Huddleston, 2017, p. 210). The skills needed in the 21st century include capabilities in analytical problem solving, innovation and creativity, self-direction and initiative, flexibility and adaptability, critical thinking, and communication and collaboration skills (Boyles, 2012, p. 42). These skills are not new, but they appear in a new context. As Rotherham & Willingham (2010, p.17) state, for example critical thinking and problem solving have been much-needed skills from an early age, when, for example, agriculture started developing.

Entrepreneurial attitudes are not only required for entrepreneurs, but there is also a high demand for entrepreneurial attitudes in ordinary employment relationships. With the combination of entrepreneurship and education, entrepreneurship has begun to be viewed more as an activity from different perspectives. For example, when the company's employees create new business opportunities, we talk about internal entrepreneurship. Internal entrepreneurship can be seen as an entrepreneurial work and work attitude in the service of another, as an entrepreneurial mindset. (Tapani, 2008, p. 51; see also Lackéus, 2014, p. 890, based on Korunka, Kessler, Frank & Lueger, 2010)

Entrepreneurship education enables to transcend the common civil servant or labour force position thinking and create entrepreneurial-minded employees (Fayolle & Gailly, 2012). In Häme University of Applied Sciences and in HAMK degree programmes, as an education producer all the degree programmes should ensure the achievement of these skills regarding all the students. As a result of educating effective employees, the degree programmes also educate the necessary skills for entrepreneurship.

However, in the field of traffic and transport management and among graduates from Degree Programme of Traffic and Transport Management entrepreneurship is not a very likely option. This is because most graduates are employed by large consultancy firms, state

actors and municipalities and there is virtually no opportunity for a small entrepreneur to compete with large companies for projects. According to Boyles (2012, p. 42), most entrepreneurial activity is performed by 35-54-year old, so in general entrepreneurship is a conditional option after long experience and professionalism. Since entrepreneurship itself is not the primary option for a recent graduate from the Degree Programme of Traffic and Transport Management, but the entrepreneurial skills are very needed, the ways to demonstrate the accumulation of entrepreneurial skills during studies and to make entrepreneurship visible at the curriculum level are essential.

Theoretical framework of the thesis focuses on entrepreneurial education and more broadly to an entrepreneurial mindset. Because the methods of teaching entrepreneurship vary as the content and the context of entrepreneurship courses, the theoretical framework of my thesis will not consider them, only the skills and qualities which are attached to entrepreneurship and the entrepreneurial mindset. (Piperopoulos & Dimov, 2015, p. 3)

1.3 Key concepts

The key concept in this thesis is **entrepreneurial mindset**. Entrepreneurial mindset is, for short, skills and competences like assessment, decision making, opportunity evaluation, venture creation and growth. Entrepreneurial mindset can be strengthened by **entrepreneurial education**, which is another key concept in this thesis. As one key concept the thesis deals with **Entrepreneurship Competence Framework, EntreComp**, which is a comprehensive description of the knowledge, skills and attitudes that people need to be entrepreneurial and foster entrepreneurial mindset.

The skills and attributes associated with entrepreneurship, the skills associated with the 21st century, are even seen as almost more important than entrepreneurship itself, as they affect all people. These skills not only enable different forms of entrepreneurship, but also the individual's ability to develop and create something new, and to create better value for the employer, society and the individual herself or himself. Education producers need to understand the skills and competencies that will be highlighted in their studies to develop entrepreneurship and entrepreneurial skills and competences, entrepreneurial mindset.

1.4 Objective of the research

The objective of this research is to identify and make visible the skills and competences related to entrepreneurship in the Degree Programme of Traffic and Transport Management. The research aims to find out what skills and competences teachers already recognize and what are the skills and competences that need to be strengthened. By identifying skills and competences linked to studies it would be taken into consideration how these skills and competences can be made more visible and better articulated so that both teachers and students can better identify the accumulating entrepreneurial professionalism.

The review is specifically about making entrepreneurship visible, but as a mindset, not as precise skills to set up a company (Komulainen, Naskali, Korhonen & Keskitalo-Foley, 2011, p. 347). These objectives are approached by the following research questions:

- **Research question 1:** What kind of skills, competencies and entrepreneurial mindset teachers already recognize in the curriculum and their implementations, and are there skills and competencies that teachers don't recognize?
- **Research question 2:** How can entrepreneurial skills, competencies and entrepreneurial mindset be made visible in the curriculum and implementation plans in the Degree Programme of the Traffic and Transport Management?
- **Research question 3:** What are the points to be developed in the entrepreneurial education in the Degree Programme of Traffic and Transport Management in order to maintain or strengthen entrepreneurial mindset among students and personnel?

The search for answers to these research questions began in a workshop, held for teachers in the degree programme, in June 2020. The research method and the research as well as the workshop are described in more detail in chapter 4. The results of the workshop are presented in the chapter 5. The workshop revealed that teachers widely recognized entrepreneurial skills and competences. Many ideas for strengthening entrepreneurship in curriculum emerged, and above all, an outline what entrepreneurship means, what is an entrepreneurial mindset in the Degree Programme of Traffic and Transport Management, emerged.

Three measures based on the research were developed in this thesis to ensure that the entrepreneurial mindset in the studies will be secured and further developed. First, the Entrepreneurial Competence Checklist was created for everyday use for teachers to facilitate the integration of entrepreneurial skills into the implementation level. Second, descriptions of entrepreneurial aspects were added to the curriculum level for better visibility. And third, the Model of Entrepreneurial Education in the Degree programme of Traffic and Transport Management was created to make entrepreneurial activities better visible. Several proposals for action in the future were made. They are presented in chapter 7.

2 FROM ENTREPRENEURIAL EDUCATION TO ENTREPRENEURIAL MINDSET

This chapter takes to an overview from entrepreneurial education to an entrepreneurial mindset. After a brief introduction to entrepreneurship, there is a review of entrepreneurship education, and how entrepreneurship education is currently viewed more as entrepreneurial education. Entrepreneurial education leads to the skills and competences to which entrepreneurial education relates. Skills and competences form a broader way of thinking, an entrepreneurial mindset. Entrepreneurial mindset is strengthened with Entrepreneurial Competence Framework, which is described more broadly as a foundation for the research part.

Entrepreneurship can be defined in different ways depending on the context. At its narrowest, the definition of entrepreneurship refers to the profession, i.e. the way of earning a living. Its broadest, the definition covers the way a person thinks, acts and attends to life and work in general. According to European Parliament and the Commission (2005, p.18), entrepreneurship is defined as follows:

“Entrepreneurship refers to an individual’s ability to turn ideas into action. It includes creativity, innovation and risk taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports everyone in day to day life at home and in society, employees in being aware of the context of their work and being able to seize opportunities, and is a foundation for more specific skills and knowledge needed by entrepreneurs establishing social or commercial activity.”

2.1 Entrepreneurship education

Entrepreneurship has been taught since 1947, when the Harvard Business School started their first entrepreneurship course. At the beginning, the topics covered in the teaching were very economic, concentrating on economic theory and entrepreneurship. Since those days, entrepreneurship education has grown in importance and has become an important academic and educational subject. (Tittel & Terzidis, 2020, p. 1; see also Fredona & Reinert, 2017).

In Finland, entrepreneurship education has been included in school curricula in basic education since 1994 and for upper secondary education since 2003. Finland has been promoting entrepreneurship education in curricula reforms at all educational levels and the work continues. (Seikkula-Leino, Ruskovaara, Ikävalko, Mattila & Rytölä, 2010, p. 117)

Entrepreneurship education in universities has included the management of small businesses, project management, creation of a business plan and creation of new business. Based on a report published by the European Commission in 1992 describing the state of entrepreneurship education in the member states, Finland was the only country that was committed to entrepreneurship education in all basic education and vocational secondary education curricula. In the academic year 1996-1997, entrepreneurship-related education was provided in eighteen universities in Finland. Back then teaching focused on either financial management, human resource management or middle management roles, or teaching basic knowledge to start one's own business (Kyrö, 2005).

Entrepreneurship education should concentrate on entrepreneurial competencies, so called umbrella term for skills, abilities and traits, which can be affected by learning. Usually the entrepreneurship courses are short-term and unlikely to affect the deep motives and traits associated with entrepreneurial skills. (Kakouris, 2019, p. 54) Especially in the field of engineering education the entrepreneurship education has mostly concentrated on business-creation. In many cases the assessment methods used in engineering education divide students to 'entrepreneurial engineers' and even kind of 'non-entrepreneurial engineers' as 'just engineers'. However, there is still space for students who are something between, and that the entrepreneurial mindset varies depending on context and motivation. (Miranda, Goñi, Berhane & Carberry, 2020, p. 4)

Over the years, entrepreneurship education has changed its form at the same time as the perception of entrepreneurship. There is still controversy as to whether entrepreneurial activities can be taught and learned, or whether entrepreneurial activities are more innate. Fortunately, many researchers have begun to think about what should be taught and how it should be taught in relation to entrepreneurialism. (Kuratko, 2016, p. 28)

Unfortunately, there is still no consensus in the research community on what entrepreneurship education is and what it should aim for. At least three kinds of objectives concerning entrepreneurship education has been recognised: learning to understand entrepreneurship, learning to become entrepreneurial, and learning to become an entrepreneur (Heinonen & Poikkijoki, 2006, p. 83). The definition of entrepreneurship education was proposed in the joint work of a European group of experts representing all EU Member States. The consensus reached led to two distinct parts: "A broader concept of entrepreneurship education, which should include the development of entrepreneurial attitudes and skills as well as personal qualities, and which should not focus directly on the creation of new projects, and a more specific concept for new business-oriented training." (Fayolle & Gailly, 2012)

However, despite the EU's definition of entrepreneurship education, the term 'entrepreneurship education' is still unnecessarily loosely defined. Terms 'enterprise education', 'entrepreneurship education' and 'entrepreneurial education' are often used synonymously. Erkkilä (2000) has proposed term 'entrepreneurial education' to cover both enterprise and entrepreneurship education. Entrepreneurial education is seen to be "the process of providing individuals with the ability to recognise commercial opportunities and the insight, self-esteem, knowledge and skills to act on them". Entrepreneurship education on the other hand is seen "to prepare students for entrepreneurial practice and develop their knowledge, skills and attitudes". (Tittel & Terzidis, 2020, p. 2)

There is still, in addition to terms, ambiguity about what should be taught, what is the content of the issues taught, and how content should be taught. It still needs to be identified what are the qualifications goals and learning objectives for entrepreneurship or entrepreneurial education. And above all, attention to if the entrepreneurship education includes extra-curricular or curricular offerings, integrated entrepreneurial subjects or separate subjects and courses. (Vasilache & Rînciog, 2017, p. 303; Pittaway, 2009, p. 3; see also Walter & Block, 2016, p. 218)

Both the terms entrepreneurship education and entrepreneurial education are used in the literature and among researchers in the field. However, in many cases the literature on entrepreneurship education is clearly focused on skills and competencies concerning

entrepreneurial education. In this thesis, the term entrepreneurial education is used: to describe more strongly education, which aims at more diverse entrepreneurial skills instead of strengthening only the company founding skills.

2.2 Entrepreneurial education

Many entrepreneurial education programs approach the topic from the perspective of what a business owner needs to know to be able to become an entrepreneur. This kind of perspective is very narrow, because it focuses only on knowledge and skills, and there are still a lot of things to embrace. On the other hand, in many cases the emphasis is also on idea that the entrepreneur is a full-time entrepreneur – different forms of light entrepreneurship remain secondary. Entrepreneurship is also holistic – the entrepreneur is a multidisciplinary, responsible actor interacting with the environment. (Ruohotie & Koiranen, 2001, p.109)

Entrepreneurial education prepares people to face the challenges of the world by increasing the necessary skills not only to create their own jobs entirely but to pursue a better income and better career opportunities (Vasilache & Rînciog, 2017, p. 304). Erkkilä (2000, p. 2) sees the value of entrepreneurial education essential to an individual's point of view as well as organizations'. Changing economic demands and labour markets require skills and competencies that can be taught in means of entrepreneurial education. In general, it can be said that entrepreneurial education is divided into two main lines. A narrower concept includes training for setting up a business (entrepreneurship education). The broader concept covers education towards entrepreneurial skills and attitudes, i.e. the development of personal entrepreneurial qualities (entrepreneurial education).

The broader perspective, the entrepreneurial education, aims to prepare people to be responsible, enterprising individuals who have the attitudes, skills and knowledge necessary to achieve the goals they set for themselves to live a fulfilled life. The goal is to achieve entrepreneurial key competence; composition of an entrepreneurial attitude, entrepreneurial skills, and also the knowledge about entrepreneurship. (Gibcus et al., 2012, p.8; see also Liening, Geiger, Kriedel & Wagner, 2016, p.6)

Gibcus et al. (2012, p. 44) state that entrepreneurial education includes at least one or more of the following elements:

- Foster the personal attitudes and skills that form the basis of an entrepreneurial mindset and behaviour; creativity, risk-taking capacity, self-confidence, independence, etc.
- Raise awareness about self-employment and entrepreneurship as possible career options
- Use practise-based methods, project works and/or activities outside the classroom, linking students with the business world or with the local community
- Provide basic business skills for self-employment or self-management, also knowledge of how to start and develop a commercial or social venture successfully.

As the perspective in entrepreneurial education has shifted from business-related issues to entrepreneurial qualities, more attention has also been paid to entrepreneurial skills and competences. It has been recognised that further developing these skills can also increase the value that employees generate for the companies in which they work. Also, the ability of individuals to grasp things and develop them forward in life in general, grows to the benefit of society. These skills and competences are also nowadays referred to as 21st century skills or active citizenship.

At its best entrepreneurial education promotes creativity, innovation and self-employment. It emphasizes creative thinking, problem-solving, communication, networking and managerial skills. It is not just a course or a topic, it can be a different way of teaching and helping students to fully develop their potential leading to an active citizenship, more adaptable work force, and also more potential entrepreneurs. (Gibcus et al., 2012, p. 44)

According to Vasilache & Rînciog (2017, p. 304), European Commission has compiled a plan for organizing the entrepreneurial knowledge throughout the educational system. In the primary education, creativity, curiosity and responsibility should be taught by projects, case studies, role plays, competitions and visits top small and medium enterprises. In the secondary education the entrepreneurship curriculum should consist of practical projects and learn by doing methods. Teamwork and gaining self-confidence play a strong role. And

finally, in higher education, students should develop an entrepreneurial mindset, so the curriculum should consist of entrepreneurial courses. Also, the case studies, interdisciplinary teams that allow the sharing of knowledge, and business plan competitions are important. Thinking about higher education, it is important to maintain all the aspects of the entrepreneurial education and implement and maintain all the best achieved and earlier learned forms of work and skills.

Von Graevenitz, Harhoff and Weber (2010, p. 93) discuss that entrepreneurial education might have different effects. It is likely to influence knowledge and skills but also the attitudes and perceptions of students, and that way may affect on entrepreneurial intentions and actions. It also may allow students to engage in entrepreneurial activity and to help students to adjust and refine their assessment of their own entrepreneurial aptitude. An important aspect of entrepreneurial education is also the consequence that the students can find if the entrepreneurial careers are suitable for them or not and this way increases their self-awareness.

In entrepreneurial teaching and learning, it is important that learners themselves are responsible for their own learning, and as HAMK University of Applied Sciences sees it in the strategy, students are owners of their own learning. However, teachers have a very important role to play in guiding the learning. If there is no pedagogical basis, entrepreneurial-oriented learning will not work. Entrepreneurial learning presupposes increasing uncertainty in the learning process and therefore the teachers' own entrepreneurial skills, such as the ability to inspire learners, create open and creative learning environment, rise to a higher value. (Tapani, 2008, p. 52).

Remes (2003, p. 165) researched entrepreneurial education and discovered that it is important to outline learning as a way of doing things. Adopting an entrepreneurial behaviour in different social and material situations would seem to increase the number of entrepreneurs in society. Or like Seikkula-Leino, Satuvuori, Ruskovaara & Hannula (2015, p. 394) say it shorter: entrepreneurial education can, and should be seen, as a method and as a content of learning. Seikkula-Leino et al. are dividing entrepreneurial education into three categories: learning **for**, **about** and **through** entrepreneurship.

- Learning for entrepreneurship means pedagogical models used by educators, like experimental learning and problem-based learning. Taking responsibility and risks are skills attached to learning for entrepreneurship; as well as encouraging students to be self-directed and goal oriented.
- Learning about entrepreneurship is seeking information on entrepreneurial operation and entrepreneurship, and it concerns among other things the cooperation between educators and business life, and organisations supporting entrepreneurship. Students learn about business life, organisations and enterprises, and learn skills to networking.
- Learning through entrepreneurship means the learning environments and activities linked to entrepreneurship, like Diili development challenge in Häme University of Applied Sciences. The utilisation of organisations as learning environments is in the centre of the educator's work. This requires that the educators are familiar with entrepreneurship, so that won't necessarily be possible throughout the modules in degree programme.

As a part of her dissertation, Peltonen (2014, p. 14) states clearly that the aim of the entrepreneurial education shouldn't only be education about entrepreneurship and for entrepreneurship, but above all learning entrepreneurially and in entrepreneurial environment. The key is to develop that kind of knowledge, skills and attitudes in entrepreneurial education, that are useful in working life and business, whether the student is employed or working as an actual entrepreneur.

According to Suomalainen & Laalo (2015, p. 298), the breakthrough of entrepreneurial education requires a change in the culture of teaching and learning as well as familiar habits and ways of thinking. What is happening at the operational level is crucial for teaching methods and entrepreneurial attitudes; the attitude of the actors is crucial for the implementation of change. Also, the teachers' commitment, knowledge and understanding of entrepreneurship are also important. Entrepreneurial education challenges traditional lecturing as a teaching method and seeks to create an atmosphere that encourages active and experimental learning. This is already being implemented at the universities of applied sciences in many levels, but there is still room for improvement.

Many policy makers and teachers themselves still think that entrepreneurial education should aim to create new ventures and jobs. Similarly, it is still thought that genuine entrepreneurs are the only real people to talk about entrepreneurship and that entrepreneurship cannot, in fact, even be taught, because one should be born an entrepreneur (Fayolle & Gailly, 2012). Fortunately, this thinking is gradually leading to broader entrepreneurial thinking and its strengthening being a part of the lives of all individuals.

The Rectors' Conference of Finnish Universities of Applied Sciences, Arene (2018), has created recommendations for universities of applied sciences how to promote entrepreneurial education. The cornerstones of fostering entrepreneurial attitudes and readiness are:

- Strengthening the ownership of learning
- Establishing the conditions for entrepreneurial learning
- Building entrepreneurial teams
- Establishing an experimental culture

All these recommendations assume that such activity already exists. Thus, universities of applied sciences are seen to have an already established, entrepreneurial culture, and entrepreneurial education is not limited to individual entrepreneurship courses.

2.3 Entrepreneurial skills and competences

Terms 'skill' and 'competence' are also been discussed a lot and there is no consensus about them as there is not about 'entrepreneurship education' or 'entrepreneurial education'. Institute for the Languages of Finland defines 'skill' as "innate (practical) ability achieved through practise or learning, management of an activity." 'Competence' is defined as "know-how". (Institute for the Languages of Finland, n.d).

Mitchelmore & Rowley (2010, p.95) describe competences to be "not the task of the job, but rather that which enables people to do the task", as personal traits, skills, knowledge, and motives. Another definition from Mitchelmore & Rowley is that "competence is the

evaluation of performance in a specific domain of activity”. In this thesis, both terms are used, but more in a way that ‘skill’ is an ability, and ‘competence’ is a skill used in a certain way, i.e. the ability to use a skill applied to certain context. For example, ‘creativity’ is a skill, and the level of proficiency using that skill defines the competence – developing new ideas is a competence and transforming ideas into solutions is another competence.

Entrepreneurial skills and competences have been studied a lot from different perspectives. One of the most recent descriptions of entrepreneurial skills and competences is a framework created by Tittel and Terzidis in 2020, compiled on the basis of previous research material, in which 57 entrepreneurial skills have been collected in three categories (personal competence, domain competences, relationship competence). The extensive description of the competencies is very comprehensive, but the focus is more about entrepreneurship expertise combined with entrepreneurial skills. Almost ten of the competences are directly business-oriented like ‘prepare a business plan’ or ‘prepare a competitive analysis’. (Tittel & Terzidis, 2020, p. 33)

Thomas S. Lyons and John S. Lyons have extensively studied entrepreneurial skills. In their study (together with G. Jason Jolley) about levels of entrepreneurial skills (2019) they name 30 individual entrepreneurial skills. The skills are divided into four groups as Table 1 shows:

Table 1. Entrepreneurial skills (Lyons, Lyons & Jolley, 2019).

Domain	Individual Skills
Business Management Skills	<ol style="list-style-type: none"> 1. Knowledge of field/industry 2. Knowledge of laws/regulations 3. Accounting/bookkeeping 4. Finance 5. Marketing/communication 6. Operations management 7. Technology-enabled business management
Relationship Management Skills	<ol style="list-style-type: none"> 8. Networking capacity 9. Leveraging existing partnerships 10. Resource leveraging 11. Building and maintaining reputation 12. Community involvement and influence 13. Accountability 14. Teaming
Organizational Process Management	<ol style="list-style-type: none"> 15. Internal communication 16. Process design 17. Decision making 18. Conflict management 19. Performance and disciplined action
Transformational Management Skills	<ol style="list-style-type: none"> 20. Problem solving 21. Persistence/relentlessness 22. Passion/charisma 23. Flexibility and adaptation 24. Knowledge as a resource 25. Creativity 26. Innovation 27. Leadership 28. Resilience 29. Resourcefulness 30. Self-awareness

More narrowly, entrepreneurial skills are presented by Elmuti, Khoury & Omran (2012). They divide the entrepreneurial skills in three categories containing altogether 10 skills. The skills are, by category:

- Technical skills; written and oral communication, technical management, organizing skills
- Business management skills (managerial skills); planning, decision making, marketing, accounting
- Personal skills; innovation, risk taking, persistence

Broader descriptions about entrepreneurial skills include more personal and humane skills and competences than the narrow ones, which focus on the skills associated with starting and running a business, like accounting. Gradually, instead of just skills and competences, some researchers have started talking about an entrepreneurial mindset.

2.4 Entrepreneurial mindset

Term 'mindset' can be defined in several ways. Zappe (2018, p.4) has put together several definitions, Retrieved March 2017:

- “person’s way of thinking and their opinions” (The Cambridge Dictionary)
- “a mental attitude or inclination” (Merriam-Webster)
- “habits of mind formed by previous experience” (Online Etymology Dictionary).

More broadly, mindset is the sum of person’s knowledge, beliefs and thoughts in relation to the world around the person. It can also be described as a filter; how the person collects, processes and produces information and reacts to it, or even inspires others. The mindset can develop, and it can be changed by self-reflection and willingness to progress. (Bosman & Fernhaber, 2018, p. 8)

2.4.1 Entrepreneurial mindset in education context

Entrepreneurial mindset is often described as “the ability to rapidly sense, act, and mobilize, even under uncertain conditions” like Haynie, Shepherd, Mosakowski & Earley (2010, p. 218), Ireland, Hitt & Sirmon (2003, p.967) and Shepherd, Patzelt & Haynie (2010, p. 62) do. Zappe (2018, p.5) brings up the definition of The Network for Teaching Entrepreneurship, which describes entrepreneurial mindset as “a set of skills that enable people to identify and make the most of opportunities, overcome and learn from setbacks, and succeed in a variety of settings”.

McMullen & Kier (2016, p. 664) present the definition equally briefly: entrepreneurial mindset is the “ability to identify and exploit opportunities without regard to the resources currently under their control”, and in turn Davis, Hall & Myer (2016, p. 2) that

entrepreneurial mindset is “constellation of motives, skills, and thought processes that distinguish entrepreneurs from non-entrepreneurs.”

Kuratko (2016, p. 31) identifies nine characteristics that are associated with an entrepreneurial mindset:

- Determination and perseverance
- Drive to achieve
- Opportunity orientation
- Persistent problem solving
- Seeking feedback
- Internal focus of control
- Tolerance for ambiguity
- Calculated risk taking
- High energy level

Kuratko also states (2016, p. 28), that an entrepreneurial mindset means that ones have mindsets that allow them to gather and combine information that helps them identify and invent new products or services. Entrepreneurial mindset in that way is assessment, decision making, opportunity evaluation, venture creation and growth.

Barba-Sánchez & Atienza-Sahuquillo (2018) underline that an entrepreneurial mindset is formed from any innovative action through an organised system of human relationships and the combination of resources, coupled with innovative action, creativity. Entrepreneurial mindset is about drawing conclusions from reality, identifying problems and creating solutions, innovating and inventing. Entrepreneurial mindset has a cognitive origin in an individual's motivation. It is a factor that evokes behaviour and causes energy to support and guide the individuals towards their goals. There are thus two levels of the entrepreneurial mindset; reasonable level and level of motivation.

Some researchers on the other hand associate entrepreneurial mindset more strongly with skills. They state that it is “a set of abilities” and compound it with venture creation and skills that for example an engineer needs in succeeding in any career path. There is not much

difference in definitions, but eventually the basic idea is whether to speak about attitudes or skills in this definition.

Only the entrepreneurial mindset itself doesn't affect on student's behaviour or decision-making capabilities. In their research, Mathisen & Arnulf (2013) found that the developing entrepreneurial mindset differs depending on whether the student is in the elaborative or implemental state. These mindsets lead to different decision-making abilities; the developing mindset leads to weighing the pros and cons of the outcome, while the implementing mindset leads to a more straightforward thinking about 'how, where and when' and that way in action. This implementing mindset can be an innate, automatic way of tackling challenges effortlessly and naturally. It is more likely that students with implementing mindset are more likely to become entrepreneurs from all students with entrepreneurial mindset. Still, students with elaborative and entrepreneurial mindset can provide added value for their employees, in their personal life and in society.

Miranda et al. (2020, p. 5) extend the concept of entrepreneurial mindset to contextual thinking by stating that entrepreneurial learning includes interactivity between the individuals and the local environment, and that entrepreneurial learning can happen "everywhere and nowhere".

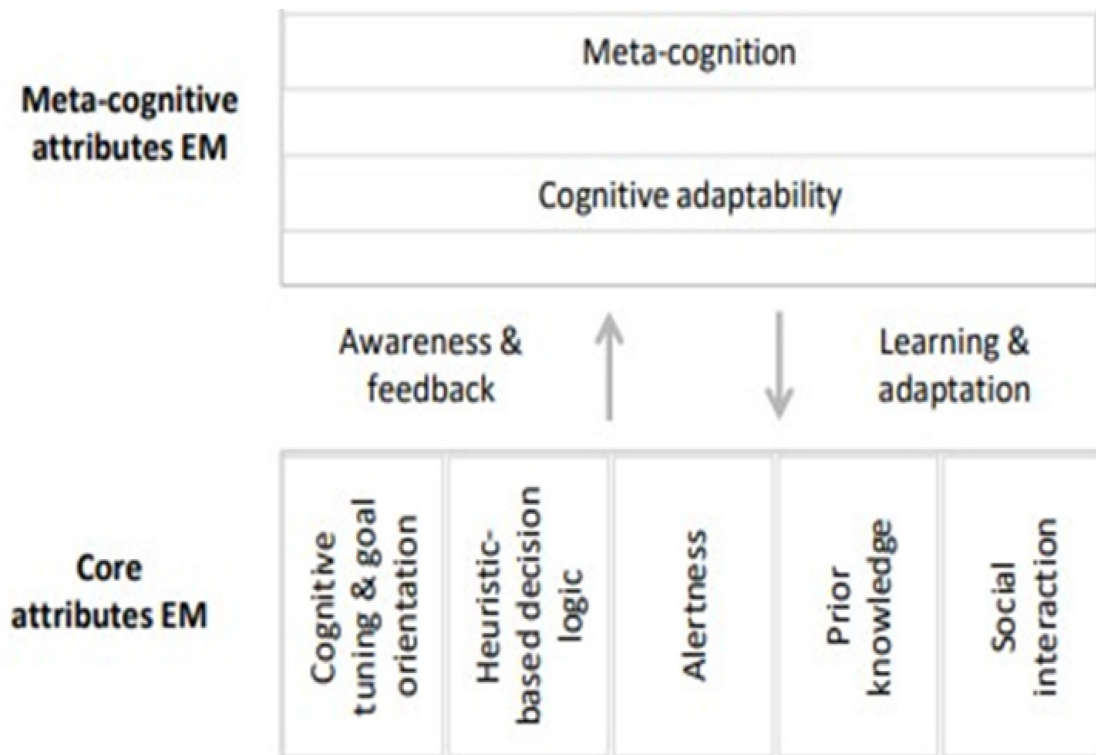
One of the most important aspects of entrepreneurial mindset is that on the contrary to what one might imagine, empathy and prosocial behaviour has been considered fundamental to the entrepreneurial mindset. Though the value-creation is one of the most important skills related to entrepreneurial mindset, creating value most commonly means creating value through sustainable solutions, services and products and specifically cultural, social (or commercial) value. (Miranda et al., 2020, p. 4; Bacigalupo et al., 2016)

Naumann (2017, p.161) sees entrepreneurial mindset consisting of seven attributes and associated qualities. They divide into five attributes that refer to cognitive processes, and two meta-cognitive ones, which are more hidden and require higher-level self-awareness. Naumann describes the attributes as follows:

- **Cognitive tuning and goal orientation.** This is the characteristic that ensures that a task at hand is done most effectively. It varies over time depending on the task or activity, and the difference between individual's elaborative or implementing mindset determines the way individual approaches the task or activity, as Mathisen & Arnulf (2013) describe.
- **Heuristic-based decision-logic.** The use of common sense and open-minded decision-making is particularly effective in situations where there is a great deal of complexity and uncertainty. An entrepreneurial mindset includes the ability to make decisions quickly, even in uncertain situations, to ensure that any opportunity is seized. Often used heuristic for entrepreneurial-minded individuals is representativeness. Small samples and few observations about people or a situation are enough to draw conclusions and perceive the overall situation.
- **Alertness.** Attentiveness to new opportunities, capacity to recognize opportunities, ability to identify value unexpectedly. With time, experience and entrepreneurial learning processes it is possible to reach higher levels of awareness and alertness.
- **Prior knowledge.** Combination of work experience, education, personal events and social networks. All of these create knowledge, which sometimes can be described as intuition or tacit knowledge.
- **Social interaction or social capital.** Formed by relationships and experience.
- **Metacognition.** "Thinking about thinking", reflecting one's own thinking processes and actions, applying different strategies depending on the context and task.
- **Cognitive capability.** Ability to be dynamic, flexible, and adapt decision-making correctly and more effectively.

All of these attributes are linked together, and the more meta-cognitive attributes are evolved, the more core attributes are evolved. Naumann (2017, p.164) describes the linkage in Figure 1:

Figure 1. Linkage of the entrepreneurial mindset attributes based on the literature review (Naumann, 2017, p.164).



2.4.2 Entrepreneurial mindset in engineering context

Kriewall & Mekemson (2010, p. 4) are considering “entrepreneurially minded engineer, i.e. an engineer instilled with the entrepreneurial mindset”. The entrepreneurially minded engineer is for example placing the customer needs before design features and designs value-added products and processes generating positive cash flow and benefits for the company. The entrepreneurially minded engineer is associated with skills and competencies like creativity, intuition, lifelong learning, perseverance, the ability to see things in a wider context, the ability to communicate and to understand people as users of products or services. In addition to technical basics and technical characteristics of one’s field, it is

important that the engineer is custom-aware, understands business principles, and societal needs and values including sustainable development.

Bosman (2019, p. 106) expands the description of an entrepreneurial minded engineer to cover collaboration and leadership as well. Engineers are addressing problems and creating solutions that are new and innovative, and in that role, they need technical skills but also curiosity, an ability to combine a solution from small pieces of information and a focus on value creation – tendency to find, evaluate and exploit opportunities. Bosman bundles these as well characteristics of entrepreneurial mindset.

Bosman also describes entrepreneurial mindset within well-established organisations, government and education, in other words in working life: passion to seek new opportunities, pursuing opportunities with discipline, pursuing only the best opportunities avoiding risky opportunities, focusing on adaptive execution and engaging energy and resources within own network.

Shekhar & Huang-Saad (2019, p.4) have compared the current usage of the term entrepreneurial mindset in engineering education literature. Many researchers referred to attitudes and differentiated entrepreneurial mindset from skills or knowledge. They compounded the skills and knowledge in traditional business courses and the entrepreneurial mindset, according to them, is attitudes. For example, according to Shekhar & Huang-Saad, entrepreneurial mindset is more “orientation towards entrepreneurial activities” than acting entrepreneurially. Also, the importance of entrepreneurial mindset in future working life, was highlighted.

Technical qualification is no longer enough in organizations where engineers work; to succeed, they have to provide added value and help the organization to succeed (Bosman & Fernhaber, 2018, p. 16). Bosman & Fernhaber bring up the list made by Brown (2016), according to which experts on engineering recruitment emphasize five skillsets in recruiting graduate engineers:

- Technical skills
- Communication skills
- Interpersonal skills
- Problem solving and critical thinking
- Enthusiasm, commitment and motivation

Except for technical skills, other four are characterized as soft skills and are combined with an entrepreneurial mindset. This same thing came to the fore at the Ramboll recruit event online in 1st December 2020: Ramboll's actors emphasized communication skills, interpersonal skills, motivation and identification of sustainable alternatives. Ramboll is a major transport consultancy and have hired many graduates from the Degree Programme of Traffic and Transport Management.

In the Degree Programme of Traffic and Transport Management, the movement of people is the key, not goods. The graduated engineer from the degree programme should understand the people as movers, and as users of products or services. In the traffic and transport field for example "Mobility as a Service, MaaS" thinking has shown that there is an emerging need for engineers who understand customer needs and choices (European Union, 2020) like Kriewall and Mekemson (2010, p. 4) described "the entrepreneurially minded engineer, i.e. an engineer instilled with the entrepreneurial mindset".

Entrepreneurial knowledge, entrepreneurial skills and entrepreneurial mindset are bundled together concerning specifically entrepreneurship in context of engineering learning in the research of Miranda et al. (2020, p. 2). They recognize among others the ability to lead, address real world issues, communicate effectively, cope with uncertainty by reacting or adapting, and dealing with risk and failure as a sign of entrepreneurial mindset. Also "going beyond minimum expectations" and "exhibiting incredulity towards existing solutions" come

to the fore specifically when talking about engineering studies. They also bring up the idea about entrepreneurial attitudes in the research.

Miranda et al. (2020, p. 4) reflect on the challenges of the visibility of entrepreneurial mindset in the engineering education. Miranda et al. claim that the motives, skills and thought processes of being entrepreneurial are culture-shared, social activities, and can be different in the form and intensity in which they appear, and the entrepreneurial mindset varies as possible only for the individual. So the first challenge is the full-time nature of the entrepreneurial mindset; for example an engineering student can implement entrepreneurial minded behaviours by solving homework problem with various ways creating some new approaches, but is unable to solve a math problem in which he/she is stuck thinking in one way.

Korte (2018) brings out the theory of social identity when looking at the entrepreneurial mindset of engineers and its reinforcement. Korte recalls that people tend to act in accordance with the social norms of the groups to which they identify themselves. Because an engineering student identifies himself or herself as an engineer, it is important to strongly highlight what an engineer is assumed to be, so that the student can begin to shape one's own understanding of the role of an engineer. In the old-fashioned way, it can be mere technique and mathematics. Strengthening the entrepreneurial mindset as part of an engineer's skills is important so that the student can also take the strengthening of softer skills and an entrepreneurial mindset seriously.

The benefit of instilling an entrepreneurial mindset into teaching in engineering education are obvious. First of all, educators are responsible to prepare students for lifelong learning and using their full potential to make most for their employer, society and social networks. Secondly, introducing entrepreneurial practices into education makes students more excited about things and perform better. Thirdly, entrepreneurially minded engineering students are great assistants in the degree programme. They add value to projects made for partners. And above all, degree programme teaching entrepreneurial mindset will naturally increase its own entrepreneurial mindset. That leads to better identification, assessment, seizure and development of opportunities. (Bosman & Fernhaber, 2018, p. 19)

2.4.3 Entrepreneurial mindset in curriculum context

Entrepreneurial processes should be instilled into curricula. Through this, entrepreneurial qualities and skills can be more widely incorporated into everyone's ownership. (Lackéus, 2016, p. 1)

An entrepreneurial mindset is not something that can be achieved in one or two lectures. It takes practise in order to become a habit and something that doesn't need to be thought. Since a mindset develops over time and requires practise, it is necessary that education producers include opportunities to strengthen it through the studies and through the curricula. (Bosman, 2019, p. 106)

Some researchers even claim that entrepreneurial mindset refers to characteristics and those characteristics, like creativity, cannot be changed. However, the distinction between change, development and evolution through learning is not under consideration in this thesis. In this thesis, the entrepreneurial mindset is viewed as something that can be influenced and can be made visible or even strengthened through learning.

Evolving entrepreneurial mindset already on the education system is very important. Entrepreneurial mindset can be developed through effective entrepreneurial education already at school and that could enhance the adaptability of individual's mindset in the fast-changing world later, regardless of whether an individual is an entrepreneur or not. The entrepreneurial mindset in the Degree Programme of Traffic and Transport Management should be a way of thinking in an entrepreneurial way, and implementing and developing entrepreneurial skills and competences that not only lay the foundations for entrepreneurship, but also help the student to implement entrepreneurship in their work and life holistically.

Slavtchev, Laspita & Patzelt (2012, p. 2) even claim that entrepreneurship education might have stimulating effect on intentions to become entrepreneurs in the long-term but has a discouraging effect in the short-term. That is why if not distinguishing between short-term and long-term intentions may lead to misleading conclusions regarding the economic and social impact of entrepreneurship education. And that is why this thesis sees the importance

of entrepreneurial mindset even more important than the entrepreneurship education as influencer to start a company.

And how to make the entrepreneurial mindset visible in the curriculum level? Heinonen & Poikkijoki (2006, p. 86) have simply used as teaching methods group work, guest lectures and summary writing in the studies of entrepreneurship. They have processed what entrepreneurship and entrepreneurial skills are in order to encourage the students to ask themselves what entrepreneurship could offer them. Learning diaries, self-reflection and atmosphere that creates creativity have also been part of their approach.

Bosman (2019, p. 106) relies on familiar methods of service design; systems thinking, design thinking, the value proposition canvas and the business model canvas. Bosman integrates the doing and the thinking, enhancing and grounding the learning experience, and enables the continuous reflection encouraging the students “to think about learning in a holistic manner”.

Broader teaching methods have been used in the research of Täks, Tynjälä, Toding, Kukemelk & Venesaar (2014, p. 6). All kinds of forms of activation, working together and negotiating, sharing meanings, problem solving and different learning environments, and the teacher as facilitator not only reinforce the student’s potential entrepreneurial career, but reinforce the entrepreneurial mindset and skills needed in working life.

Still, there are also problems in making the entrepreneurial mindset visible in curricula. One problem in the educational environment currently bringing 21st century skills into curricula is that it is not still obvious how to teach these skills. Rotherham & Willingham (2010, p. 19) raise teamwork skills as an example. It is a different matter to use teamwork skills, that is, to work in a team, than to implement teamwork skills in an attempt to improve performance, to form better strategies for better work.

Another problem is assessment. Assessment and testing concentrate on measuring knowledge and skills in substance expertise and in routine skills, but not expertise decision making and application of skills. Essays are only one kind of solution to present one’s knowledge and doesn’t develop the ability to present things with condensed descriptions, telling alongside the issue more deeply, as professionals do. And the usage of different kinds

of applications and media effectively is still often more forbidden than encouraged. (Dede, 2010, p. 3)

All kinds of 'industrial-era operating practices' like forty-five-minute lessons and strict subject boundaries do not help to develop a more holistic creative thinking (Dede, 2010, p. 4). Fortunately, in HAMK this has been noticed and attention has been paid to more holistic learning e.g. by strengthening phenomenal learning and wider learning entities, and by creating more informal learning environments.

Despite the problems, all these methods bringing out the entrepreneurial mindset are already used in the Degree Programme of Traffic and Transport Management. Still the entrepreneurial mindset and the entrepreneurial education cannot clearly be seen. In order to clarify what kind of skills, competencies and entrepreneurial mindset teachers already recognize in the curriculum and their implementations, in this thesis the basis of entrepreneurial mindset is studied.

Concretely entrepreneurial mindset should be seen as learning objectives on entrepreneurship and entrepreneurial education in curricula and implementation plans, and all the way to the evaluation criteria (Hannula, 2014, p.28). First step would still be opening the discussion about meanings and objectives within teachers, and then review the visibility of entrepreneurship in degree programme. After that it would be possible to develop the curricula and the implementation plans further towards clear learning objectives and assessment criteria.

Liening et al. (2016, p. 6) assume that without consciousness it is not possible to change the mindset; in other words, students need to be aware that education seeks to increase the entrepreneurial mindset for it to increase. Therefore, the entrepreneurial mindset must be clear first among the teachers of the degree programme before it can be made a targeted learning area for students as well.

In 2016 European Union launched as a part of the 'New Skills Agenda for Europe' a frame of reference to describe what is meant by an entrepreneurial mindset in every aspect of life, not only in education context. That frame was nominated as **EntreComp: The European Entrepreneurship Competence Framework**. Entrepreneurial mindset and its strengthening

are seen important in European Commission so that in a rapidly changing society, everyone's opportunities to grasp new ideas, work together, plan their careers successfully and shape the future for the common good will come true. (Publications Office of the EU, 2019) The EntreComp Framework will be presented in more detail in Chapter 2.5.

2.5 Entrepreneurship Competence Framework

In this thesis, Entrepreneurship Competence Framework has been used as a frame of reference for entrepreneurial skills. EntreComp Framework was created as a tool to improve the entrepreneurial capacity of European citizens and organizations as a part of the 'A New Skills Agenda for Europe: Working together to strengthen human capital, employability and competitiveness' competence program that was published in 2016 (European Commission, 2016).

In 2016, European Commission decided to launch a revision of the Key Competences Framework (which were created in 2006) to be done in 2017; "To help more people acquire a core set of skills, the Commission intends to launch a revision of the Key Competences Framework in 2017. The goal is to develop a shared understanding of key competences and to further foster their introduction in education and training curricula. The revision will also provide support for better developing and assessing these skills. Special attention will be paid to promoting entrepreneurial and innovation-oriented mindsets, including by encouraging practical entrepreneurial experiences."

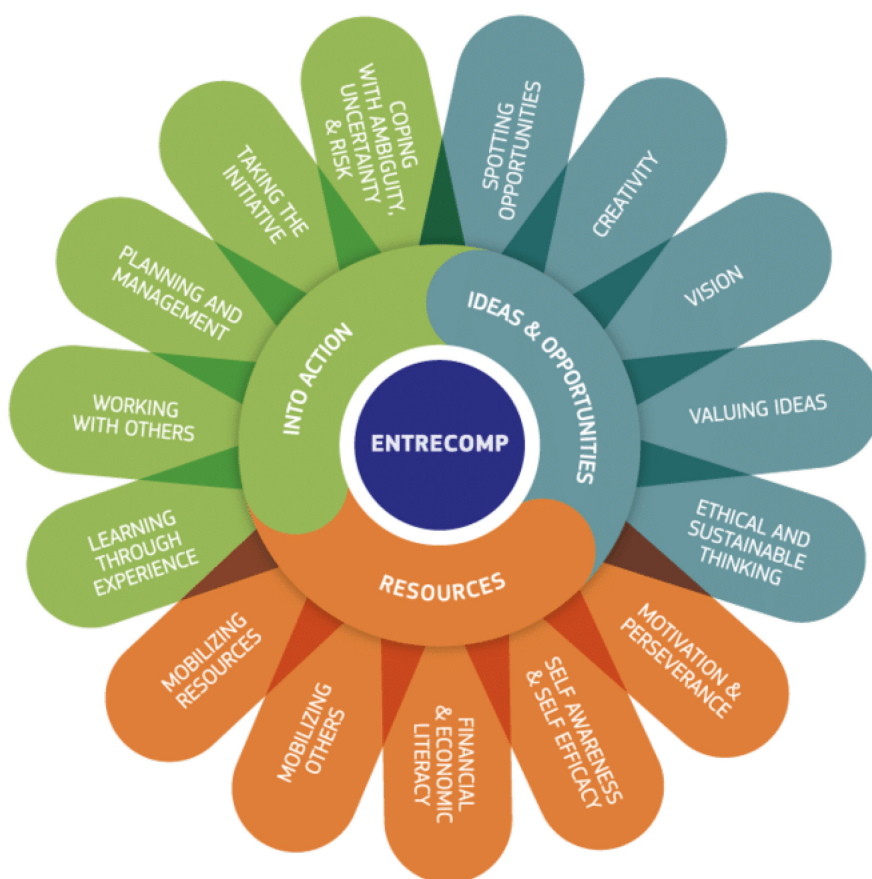
The Entrepreneurship Competence Framework, EntreComp, was developed by the Joint research Centre of the European Commission on behalf of the Directorate General for Employment, Social Affairs and Inclusion to unify the spectrum of skills and competences associated with entrepreneurship. (Bacigalupo, Kampylis, Punie & Van den Brande, 2016, p. 5)

Competences are the combination of skills and knowledge that a person achieves, affected by education and experience. Competences are personal attributes, and they affect on the decisions to be made, the way the decisions are made into action and foster or decrease the intentions to do something. Competences linked to entrepreneurship are commonly

accepted to be a wider range beyond the management and business. (Armuña, Ramos, Juan, Feijóo Arenal, 2020, p. 4)

The EntreComp Framework consists of three competence areas and 15 competencies describing entrepreneurship as skills that all citizens can apply in all areas of life: to develop on a personal level, to participate as active citizens in society, to influence their employability or to show initiative (cultural, social or commercial). The entrepreneurial competence can be seen as an individual and collective capacity. (McCallum, Weicht, McMullan & Price, 2018, p. 13). The EntreComp Framework can be found in the Figure 2:

Figure 2. EntreComp - Entrepreneurship Competence Framework. (Publications Office of the EU, 2019).



EntreComp is a framework of 15 entrepreneurial competences divided into 3 competence areas: 'Ideas & opportunities', 'Resources' and 'Into action'. Each competence area consists of five competences as followed:

Competence area 'Ideas & opportunities';

- Spotting opportunities: using imagination and abilities to identify opportunities for creating value
- Creativity: developing creative and purposeful ideas
- Vision: working towards your vision of the future
- Valuing ideas: making the most of ideas and opportunities
- Ethical and sustainable thinking: assessing the consequences and impact of ideas, opportunities and actions

Competence area 'Resources';

- Self-awareness & self-efficacy: believing in yourself and keeping developing
- Motivation and perseverance: staying focused and not giving up
- Mobilizing resources: gathering and managing the resources you need
- Financial and economic literacy: developing financial and economic know-how
- Mobilizing others: inspiring enthusing and getting others on board

Competence area 'Into action';

- Taking the initiative: going for it
- Planning and managing, prioritizing, organizing and following up
- Coping with uncertainty, ambiguity and risk: making decisions dealing with uncertainty, ambiguity and risk
- Working with others: teaming up, collaborating and networking
- Learning through experience: learning by doing

These three competence areas are formed according to where the competences are classified in terms of the process of bringing ideas into reality: from **identification of ideas** to **resources management** all the way to **into action**. The first competence area "Ideas and

opportunities’ reflects the ability to identify opportunities and evaluate the impact of ideas on challenges. The second competence area ‘Resources’ is about abilities to follow-up an opportunity that has been identified. The third competence area ‘Into action’ describes, as its name implies, competences related to transforming ideas into reality. (Armuña et al., 2020, p. 73).

Levels of learning from beginner to intermediate, advanced and expert are included in each competence. These levels, in turn, are divided into two levels of progression. There has been a desire to map the levels of learning so that the learner can follow their development over time, so that the different starting levels of learners can be taken into account or so that a consistent path of entrepreneurial skills can be created, for example at different school levels. With EntreComp levels one can also see how entrepreneurial a student is, for example. (Publications Office of the EU, 2019, p. 9; see also McCallum, Weicht, McMullan & Price, 2018, p. 13) The EntreComp Progression model is presented more detailed in Appendix 1.

The EntreComp Overview was developed to assemble EntreComp Framework “to provide the general readership with a bird’s eye view of the EntreComp Framework”. It presents the three areas and all 15 competences in three levels of proficiency: the foundation, intermediate and advanced levels. These levels are considered to cover all citizens. The expert level is above average and context dependent, so it is left out above. The EntreComp Overview is a comprehensive description of skill levels and their development. (Bacigalupo, Kampylis, Punie & Van den Brande, 2016, p. 19).

Figure 3. Part of The EntreComp Overview (Bacigalupo et al., 2016).

Area	Competence	Levels of proficiency		
		Foundation	Intermediate	Advanced
Ideas and opportunities	Spotting opportunities	Learners can find opportunities to generate value for others.	Learners can recognize opportunities to address needs that have not been met.	Learners can seize and shape opportunities to respond to challenges and create value for others.
	Creativity	Learners can develop multiple ideas that create value for others.	Learners can test and refine ideas that create value for others.	Learners can transform ideas into solutions that create value for others.
	Vision	Learners can imagine a desirable future.	Learners can build inspiring vision that engages others.	Learners can use their vision to guide strategic decision-making.
	Valuing ideas	Learners can understand and appreciate the value of ideas.	Learners understand that ideas can have different types of value, which can be used in different ways.	Learners can develop strategies to make the most value generated by ideas.
	Ethical and sustainable thinking	Learners can recognize the impact of their choices and behaviors, both within the community and the	Learners are driven by ethics and sustainability when making decisions.	Learners act to make sure that their ethical and sustainability goals are met.

The EntreComp Overview will be the frame of reference in my research. The research will be described in Chapter 4. The EntreComp Overview in its entirety can be seen in Appendix 2. The EntreComp Overview instead of the EntreComp Progression Model was chosen as the frame of reference because it is clear for first timers and, on the other hand, omits the profession level, which is not necessarily appropriate for students yet. As the conversation of the entrepreneurial mindset goes further with the teachers of the degree programme, a more detailed EntreComp Progression Model can also be brought for review.

EntreComp has been used in multiple projects and researches as a frame and a tool. For example, in Fondazione Golinelli organization it has been used to create a course for teachers to develop entrepreneurial skills with their students. EntreComp was used firstly to present entrepreneurship and as a summary of 21st century skills for teachers and secondly to structure the teacher reflections and self-evaluation discussions about entrepreneurial learning outcomes – and also to reflect how to build EntreComp-based entrepreneurial learning activities for students. (McCallum, Weicht, McMullan & Price, 2018, p. 66).

In 2018, The Council of European Union published the Council Recommendation on key competences for lifelong learning, and ordered the member states to support the development of key competences by paying special attention to increasing the awareness of educational staff and learners of the importance of the acquisition of key competences and their relation to society. The Council of European Union also stated that the assessment and validation of key competences should be supported and further developed. (Council of European Union, 2018)

3 ENTREPRENEURIAL EDUCATION IN HAMK AND IN FINLAND

This thesis focuses on looking at the entrepreneurial mindset in Häme University of Applied Sciences, HAMK, and more specifically in the Degree Programme in Traffic and Transport Management. The Degree Programme of Traffic and Transport Management was established in 2008, and it is only degree programme entirely concentrated in traffic and transport management area in Finland. There are over 300 students in the degree programme. The Degree Programme of Traffic and Transport Management has also a master's degree programme, but this thesis concentrates on bachelor-level studies.

The requirements and expectations for entrepreneurial education set by the co-operation bodies of universities of applied sciences, the Finnish Government and the EU, guide the direction of entrepreneurial education in each university of applied sciences and degree programmes.

3.1 Entrepreneurial education in HAMK

Häme University of Applied Sciences (HAMK) is “a multidisciplinary higher education institution” in southern Finland. HAMK has over 7200 students and 37 degree programmes. HAMK operates closely with businesses and industries creating benefits to both students and enterprises. The employment rate of HAMK's graduates is among the highest in Finland, as the number of graduates who start their own business (Häme University of Applied Sciences, 2019a)

“HAMK is a university of applied sciences that offers competences and talents to renew the world of work”; HAMK sees an important role as an influencer in its own area of operation, in society and as a leader of development in its region. The graduates from HAMK are experts in the labour market and they are creative problem-solvers with a progressive approach. The planning and implementation of teaching will be made together with partners from businesses, public sector and third sector. HAMK supports and creates knowledge-intensive business activities and offers entrepreneurship as genuine option for each student. (Häme University of Applied Sciences, 2019b)

In 2016 90,8% of graduates found employment. In 2017 HAMK had business finance almost 576 000 euros. In research and development HAMK had 1 730 partners in 2017. Regional influence as a promoter of employment and development is high and HAMK wants to further increase its importance. (Häme University of Applied Sciences, 2018)

Until 2014 HAMK had similar curriculums in all degree programmes concerning professional growth, altogether 15 credits. Those 15 credits included three credits of 'entrepreneurial activity'; aiming the student to recognize the process of entrepreneurship, exploit and produce the business opportunities and ideas as well as knowing how to alter ideas into action and understand the meaning of entrepreneurship for the economy. The aim was also that the student should be able to develop and commercialize a business idea to take advantage of a business opportunity, and identify the core skills of entrepreneurship and entrepreneurial activity such as decision making, risk taking, creative problem solving, business planning and interaction skills. Utilization of information from various sources including future information, and purposeful work as a part of group were also among the study's competence objectives.

In 2019-2022 HAMK was supposed to take forward the strategic program 'Enterprising University, Yritteliäs korkeakoulu', which according to Head of Degree Programmes in Business Administration and Business Management and Entrepreneurship Sari Hanka, is implemented by Degree Programme in Business Administration. In 'Yritteliäs korkeakoulu' program HAMK is exploiting the 'Yrittäjyyden pelikirja, Entrepreneurship Game Book', which is a reference frame made by The Federation of Finnish Enterprises, Universities of Finland (UNIFI registered association) and The Rectors' Conference of Finnish Universities of Applied Sciences (Arene). (Hanka, 2020)

Nowadays the degree programmes are planning their entrepreneurship and entrepreneurial education largely themselves. HAMK also provides common contents, notes Senior Lecturer in Degree Programme in Business Administration, Vesa Tuomela. To mention a few, HAMK Startup Business School offers guidance and practical skills for business development with concrete tools, i.e. helps to refine business ideas. Amazing Business Train offers a few days intensive trip in a train where students create, develop and experiment variety of business development challenges through business design. Design Factory combines students,

teachers, researchers and businesses and offers learning by doing in real business projects, and that way supports entrepreneurial skills. (Tuomela, 2020)

The common contents in Häme University of Applied Sciences, productized learning platforms related to entrepreneurship, are illustrated in Figure 4.

Figure 4. Productized learning platforms related to entrepreneurship in Häme University of Applied Sciences, 2020.



It is noteworthy that in Häme University of applied Sciences, sustainable development is also one of the priority areas with entrepreneurship and cooperation, and HAMK has its own Sustainable Development Programme (Häme University of Applied Sciences, n.d.; see also Häme University of Applied Sciences, 2019b). However, sustainable development is emphasized as its own independent area. Instead EntreComp Framework, for example, identifies ethical and sustainable thinking as one of the areas of entrepreneurial competence; an entrepreneurial student is able to identify the impact of choices and behaviours within both the community and the environment. Two other entrepreneurial skills, mobilizing resources and financial and economical literacy, emphasize the responsible use of funds and financial sustainability. By strengthening the entrepreneurial point of view in education the sustainable thinking would strengthen, too.

3.2 Entrepreneurial activities in Degree Programme of Traffic and Transport Management

In the Degree Programme of Traffic and Transport Management students are encouraged by means of study guidance to participate and utilize all the joint supply of entrepreneurship and entrepreneurial studies in HAMK. Some students between 2014-2019 have participated joint supply studies, but mostly they have had entrepreneurial intentions already before studies. Strengthening entrepreneurial intentions has not been very far-reaching.

Currently, particularly identifiable content related to entrepreneurial activity includes, among other things, visits to companies in field, or company representatives' visits to campus, hackathons, work assignments and projects, study module 'Transportation planning process' with real-life projects and with entrepreneurial approach, and familiarization with one's own skills and attributes in the beginning of the studies.

External stakeholders are an essential part of the entrepreneurship education also in Degree Programme of Traffic and Transport Management. Networks that external stakeholders create with the educator like degree programme may include local companies, associations, national and international initiatives. The network can support the development of entrepreneurial education, give valuable information on entrepreneurship and working life in general, enrich learning environments and provide new ways to teach work-oriented projects. Entrepreneurial education also demonstrates how the degree programme values its activities locally and appears to be a way to increase its value as a member of the society. (Ruskovaara, Pihkala, Seikkula-Leino & Järvinen, 2015, p. 63)

Since entrepreneurship itself is not the primary option for a recent graduate from the Degree Programme of Traffic and Transport Management, but the entrepreneurial skills are very needed, the ways to demonstrate the accumulation of entrepreneurial skills during studies and to make entrepreneurship visible at the curriculum level are essential.

3.3 Entrepreneurial education in Finland

The Entrepreneurship Strategy, prepared by the Ministry of Employment and the Economy together with the cross-administrative entrepreneurship strategy steering group, states that entrepreneurial education is currently part of education strategies and curricula, as the understanding of entrepreneurial education has clearly strengthened in recent years. As entrepreneurial education is also broadly related to working life skills, the Strategy states that teacher training needs to be further developed from the perspective of how entrepreneurial education can be more strongly integrated to all teaching and guidance, and the operating culture of educational institutions. (Finnish Government, 2020b, p.27)

Multiple entrepreneurship-related projects have been underway in recent years in Finland concerning education sector. One of the most extensive is Yrtti project (Entrepreneurship and the evaluation of innovation activities in vocational education and higher education), which provides information on the factors that promote and hinder entrepreneurship and innovation at the level of operational culture in vocational training and universities. In addition to information, the Yrtti project provides opportunities for discussion to increase common understanding and improve interaction between different actors and operation levels. The Yrtti project was implemented by the Finnish Education Evaluation Centre in 2017-2018. (Karvi, 2018a)

According to the final report of the Yrtti project, students felt positive about entrepreneurial studies and they felt that they had learned entrepreneurial skills, but one the biggest challenges in both vocational education and higher education was the verbalization of entrepreneurial skills. Entrepreneurial experience had strengthened, but describing competence was perceived as challenging. Students also recognized that the entrepreneurial attitude of the staff had a positive effect on learning entrepreneurial qualities and entrepreneurial attitudes. (Karvi, 2018b)

According to The Youth Barometer 2019, an annual interview study made by Finnish Youth Research Network for people aged 15-29 living in Finland and in 2019 based on 1907 interviews, more than two in three of the respondents “feel that an entrepreneurial attitude is needed in all work”. Entrepreneurship is increasing in popularity, not only as an attitude

towards entrepreneurial skills but also as a willingness to become an entrepreneur. Luckily, more and more young people feel that they have gained good basic knowledge of entrepreneurship at school. Still strengthening the entrepreneurial skills and attitudes is important. (Haikkola & Myllyniemi, 2020, p. 215)

4 RESEARCH

Entrepreneurial mindset is essential in order to maintain competitiveness and economic growth as well as individual's ability to develop and assess value in one's lives. Education providers have a key role to play in strengthening entrepreneurial mindset and encouraging entrepreneurship. In order to strengthen entrepreneurial mindset, there must be knowledge of the existence and level of the entrepreneurial skills in education.

The purpose of the thesis is making the entrepreneurial mindset visible in the Degree Programme of Traffic and Transport Management. Making it visible starts with figuring out what skills and competences teachers already recognise in their implementations, and are there skills they don't recognise? And can even an entrepreneurial mindset be seen in the Degree Programme of Traffic and Transport Management? The aim is also to make these entrepreneurial skills, competences and mindset visible and find out points to be developed in entrepreneurial education in order to maintain or strengthen entrepreneurial mindset.

For this purpose, the following were selected as research questions:

- **Research question 1:** What kind of skills, competencies and entrepreneurial mindset teachers already recognize in the curriculum and their implementations, and are there skills and competencies that teachers don't recognize?
- **Research question 2:** How can entrepreneurial skills, competencies and entrepreneurial mindset be made visible in the curriculum and implementation plans in the Degree Programme of the Traffic and Transport Management?
- **Research question 3:** What are the points to be developed in the entrepreneurial education in the Degree Programme of Traffic and Transport Management in order to maintain or strengthen entrepreneurial mindset among students and personnel?

Entrepreneurship Competence Framework, published in 2016, was created as a frame of reference for nurturing entrepreneurial skills in education curricula and as a tool for developing and assessing these skills. The aim was to strengthen the entrepreneurial mindset, in all areas of life. For being so comprehensive and also for being recommended to

be used by European Commission, EntreComp was selected as the reference frame of this research.

There are both qualitative and quantitative aspects in the research. The qualitative aspects are used because qualitative research is particularly suitable for educational research. The purpose of the research questions is to explore topics in all their complexity in their own context, in curricula and in education. The aim is to understand the issue more broadly and the impact of different people (i.e. teachers) on it. Although the intention was also to quantify how much different skills and competencies are recognized by the teachers, and thereby there are few characteristics of quantitative research, the main focus of the study is still on understanding the skills and competencies and their relationship to education. (Bogdan & Biklem, 1997, p. 2; see also Routio, 2007)

4.1 Research method

From the beginning it was clear that the entrepreneurial mindset is a subject that needs to be discussed together with the teachers in the Degree Programme of Traffic and Transport Management. The author's work as a guidance counsellor in the degree programme has shown, that better than ready-made models and solutions, are ways where teachers work as participants and can think the subject through together from different perspectives and form their own conclusions and new approaches. On the other hand, the subject of entrepreneurial mindset is such that it had to be primed properly in order to avoid frustration and non-participation, and to make a common vision possible.

Workshop is the method that suites best for this kind of approach. The idea was to create a common understanding of what are the skills and competencies taught, and what skills and competencies are not taught so widely yet. The understanding about the skills and competencies and the extension how widely they are handled, and the attitude towards teaching these skills and competencies, create the basis of entrepreneurial mindset of the personnel in the Degree Programme of Traffic and Transport Management.

The workshop as a method is strongly related to action research. Action research is well suited for educational issues as a practical process because it is concerned in problem

solving and improvements within context of the study. The appropriate interventions to collect and analyse the data can be utilized by the researcher. The idea is to understand the current situation and analyse the measures to make the improvements. (Tomal, 2010, p. 9)

Action research can be defined as much as a process as a research method. Action research allows the researcher to collect data, work with the group developing the actions, to strive for the best possible outcome for the development of the matter under investigation. Action research can be seen as a practical and sensible methodology concerning specifically improvements in the education. This kind of participatory observation is conscious and systematic participation as a researcher (Tomal, 2010, p. 16; Grönfors, 2011, p. 52)

Action research is a way of looking practices to see if they work as they should, or not. Action research may show that the practice is working in itself, or that some changes are needed. (Whitehead & McNiff, 2006, p. 24)

This research was a joint review, with the aim of think about entrepreneurial activities and mindset, and entrepreneurial education among teachers. The purpose was to generate discussion and share perspectives. During the research, there was a desire to learn from others and share a common understanding.

The workshop was decided to be conducted participatory observed. In participatory observation, the researcher can actively influence the phenomenon under study, for example, to organize the activities of the research group in a certain way. On the other hand, the researcher must be able to refrain from the background to the extent that she/he does not unduly influence the course of events. (Anttila, P., n.d.; see also Grönfors, 2011, p.52)

As a guidance counsellor and researcher, it would be natural to participate, lead the workshop in the beginning and then observe, how would the common understanding start to shape. In the role of a participating observer it would also be possible to ensure that the workshop brings together at least some of the results, i.e. what competencies teachers identify, and it would be possible to decide, according to the situation, when to stop the workshop and how to proceed afterwards.

4.2 The course of the research

Over the years, there has been some talk about entrepreneurship in the degree programme. The perspective has always been a little more such that entrepreneurship is something detached. It is customary to think that because traffic and transport management students are typically employed by large consultancy firms, state actors and municipalities, and have little opportunity to start their own business, entrepreneurial education could have been a separate course to those who want it. Of course, over time, entrepreneurship has been embedded also in studies, but even then, it has been done mainly in accordance with the wishes of Häme University of Applied Sciences management.

The idea of entrepreneurial education among degree programme teachers has also been traditional business-oriented thinking. Previous discussions on the manifestation of entrepreneurship as skills and their inclusion in implementation plans have, among other things, sparked comment “What exactly is this entrepreneurial nonsense in these implementation plans and why do we have to talk about it?”

Since the previous discussions about entrepreneurship in the Degree Programme of Traffic and Transport Management haven’t been successful, the plan was to conduct the research in two workshops. The first workshop would concentrate on discussing about the necessity of the entrepreneurial activities in education in the Degree Programme and identifying the skills and competences. In the second workshop it would be possible to discuss more about the skills and competences and their reality in implementations and sketch out how they could be strongly involved in teaching.

The first workshop was designed to start by opening the backgrounds as well as explaining what is to be done. It would then proceed to review at what skills and competences teachers identify from curricula and implementations. The basis of the review was decided to be the study offer of the academic year 2019-2020. The current year’s study offer would be well remembered and relates to all students and teachers including parts of three curricula and one year’s implementation plans. The actual study offer was selected for the research, and the thesis and the trainings were excluded, because they are not actual teacher-led study offer.

For the first workshop, it was concluded that the skills and competencies to be addressed should be given as a ready list, so that the teachers don't have to invent them themselves. As stated earlier, the list was based on the European Commission's EntreComp Framework created by Bacigalupo, Kampylis, Punie & Van Den Brande (2016). The EntreComp Framework was introduced in Chapter 2.5.

4.3 The workshop

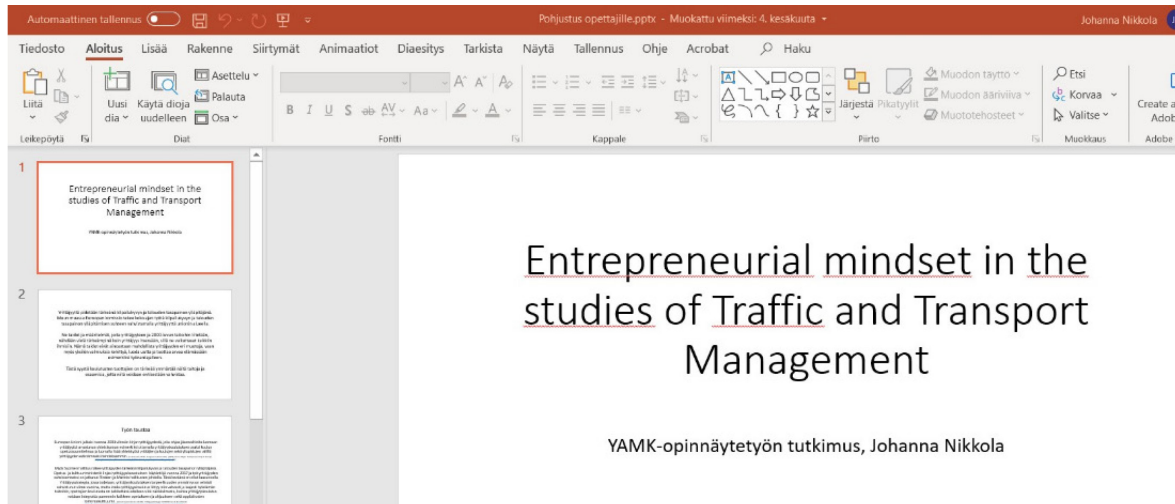
The purpose of the first workshop was to work together identifying the skills and competencies the teachers recognize and don't recognize, linking them to the curricula and implementations of the Degree Programme. The linking was decided to be made for the study offer of current academic year. The other purpose was to discuss whether the teachers recognize the thought about entrepreneurial mindset in their teaching and learning outcomes.

The workshop was carried out as a remote workshop via Teams meeting due to COVID-19 pandemic. All the full-time teachers from the Degree Programme of Traffic and Transport Management, 5 teachers altogether, were invited for the workshop. Four out of the five full-time teachers participated and the researcher herself, so in total there were five participants in the workshop.

At the beginning of the workshop the teachers were told a background on the thesis and its objectives as a basis and explained what was to be done. The background told is described in the Appendix 3. The background was told in Finnish, but the Appendix is presented in English. The idea was to prime the subject objectively, but in a way that all the participants would understand, why is it necessary to address the subject. The background was a cross-section of the theory and the reasons why this thesis originated, emphasizing that the European Commission in particular sees entrepreneurship as an important maintainer of competitiveness and economic balance, but above all, the individuals we educate, need entrepreneurial skills and competences to succeed in life. The purpose was to set a goal only to identify the skills and competences the teachers identify related to their implementations, not to put pressure on the goal of creating a common understanding. That could be pursued

in the longer term through more workshops. The background was presented by PowerPoint (see Figure 5). The full PowerPoint is shown in Appendix 3.

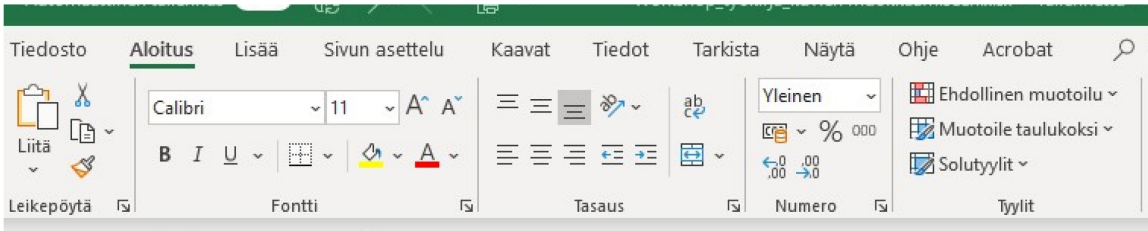
Figure 5. Part of the PowerPoint presented in the beginning of the workshop.



The teachers were sent just before the workshop the EntreComp Overview (see Appendix 2) via email. The idea was that the teachers are able to see the skills and competences which are being discussed and also the level of competence development. The level of competence development is more informative than the skill or competence itself, because it shows more aspects about the competence.

An Excel workbook had been prepared on the study offer, in which one implementation with its teachers was marked on one tab and a list of the skills described in EntreComp next to it. The teachers were given the right to update the Excel workbook and they were asked to supplement the tabs during the discussion. The contents of a single tab, with the exception of all competencies, are shown in Figure 6.

Figure 6. The content of a single tab from an Excel workbook used in the workshop.



	A	B	C	D
1				
2				
3				
4	TRAFFIC CONTROL AND MANAGEMENT			Spotting opportunities
5	Basics of Traffic Control 3cr	Teacher 1		Creativity
6	Road Traffic Control 4cr	Teacher 1		Vision
7	Planning the Basic Functions of Traffic Lights 4cr	Teacher 2		Valuing ideas
8	Track Traffic Control 4cr	Teacher 3		Ethical and sustainable thinking
9				Self-awareness and self-efficacy
10				Motivation and perseverance
11				Mobilising resources
12				Financial and economical literacy
13				Mobilising others
14				Taking the initiative

Workshop lasted two hours. At the beginning the teachers were quite confused about the skills – the descriptions were found to be a bit challenging, although the skill levels in EntreComp Overview helped to outline what the skill itself means. The teachers discussed first about the descriptions forming a common understanding about the meanings of the skills. After that the teachers started to discuss about the implementations and the skills.

Right from the start, the teachers themselves wanted to extend the view from the mere skills to what is realized in teaching and began writing broader descriptions on tabs. The example of the broader description can be seen in the Figure 7.

Figure 7. Descriptions concerning the implementation and notes on the workbook during workshop.

			Comment: for road transport, there were 4 tasks (3 personal, 1 group task). All of which were copied from working life. Business cooperation (Ramudden) took place around site-time arrangements.
	Spotting opportunities	x	
er 1	Creativity	x	
er 1	Vision	x	
er 2	Valuing ideas		
er 3	Ethical and sustainable thinking	x	particularly track traffic
	Self-awareness and self-efficacy	x	
	Motivation and perseverance	x	
	Mobilising resources		
	Financial and economical literacy		
	Mobilising others		
	Taking the initiative	x	
	Planning and management		
	Coping with uncertainty, ambiguity and risk		
	Working with others	x	
	Learning through experience	x	In road transport tasks, analysing your own doing played a big role: the obligatory answer to question "what would you do differently if you started from scratch" created understanding

At the beginning the teachers also pointed out that reviewing these entrepreneurial skills should be done as a systematic process to ensure their implementation and development in the Degree Programme. This became one of the most significant results of the workshop, it was re-highlighted during the workshop, and defined one of the follow-ups to this research.

During the workshop, it was noteworthy that in addition to considering individual skills, teachers also considered areas of competence. The areas of competence were highlighted blue ('Ideas and opportunities'), orange ('Resources') and green ('Into action'). In the discussion, it could be stated, that "with this implementation, the green area of competences is emphasized, the orange is just fine, but the blue is the most difficult". For the skill 'financial and economical literacy' teachers considered, in addition to money,

efficiency and time used, which are an essential part of the thinking in the field of traffic and transport management. It was also noteworthy, that it was found out that not every implementation needs to strengthen all the entrepreneurial skills. The implementations naturally emphasize different competence areas, so it should only be ensured that the competence areas are fully strengthened during the studies. Also, the emphasis within the implementation may be different by different teachers.

It was great to note that teachers were also able and willing to consider the impact of studies integrated into professional subjects, such as language studies, in strengthening entrepreneurial skills. For example, tolerating uncertainty plays a big role in the implementation of English language studies. Regarding tolerance of uncertainty, it was also discussed that tolerating uncertainty on a personal level or in studies are two slightly different things, both of which should be able to be reinforced. Professionally, it is important to tolerate insecurity in work-related situations, for example in various situations beyond one's control, but it is also important for an individual's development to tolerate uncertainties that affect him or her personally.

The teachers also discussed inclusion of actual entrepreneurship studies integrated into the implementations, for example in order to create business ideas within studies. As the traditional entrepreneurial activity concerning traffic planning is so tightly linked to framework agreements, strengthening the different forms of light entrepreneurship would be essential to graduates from Degree Programme of Traffic and Transport studies. In any way, different forms of entrepreneurship should be more strongly highlighted during the studies, in order to give students a more realistic picture of how entrepreneurship could be pursued in their own lives in the future, or how entrepreneurship opportunities could be seized on a small scale, too.

It was also discussed in the workshop that when assigning tasks to students, emphasis could also be placed on how doing the task in question will increase their entrepreneurial skills. It would also help student to pay more attention to entrepreneurial skills and their accumulation, and possibly to better identify the moments and points where there could be opportunities to become an entrepreneur. Also reminding that projects and assignments in

studies should be promoted to a CV or portfolio strengthens the student's understanding of accumulating one's own skills.

The work program as a concept and form of working should be more strongly emphasized in implementations and through studies. The work program is a report and form of work commonly used in traffic and transport management sector. It first identifies a plan for work with schedules, resources and budgets, and is refined as work progresses and variables emerge.

The results were so extensive that it was concluded that no second workshop would be held in near future. The results of the workshop were taken into further consideration and various proposals for measures and operating models were compiled from them. These results are discussed in more detail in chapter 5 and the outcomes from the results in chapter 6. The discussion around entrepreneurial skills and competences continues and it was agreed that a meeting between teachers concerning entrepreneurial education will be held in autumn.

5 RESULTS

The workshop proved to be very fruitful. Despite preconceived notions, the attitude towards dealing with entrepreneurship issues was very positive. Skills and competences were widely identified and could be grouped, and their emphases considered. It was noteworthy that teachers had a very common understanding of what teaching entrepreneurial skills means and what the common features concerning entrepreneurial skills and competences in the degree programme are. This peculiar way of thinking among the teachers of the degree programme clearly constitutes a certain kind of entrepreneurial mindset. The results and the measures taken based on them are presented below.

5.1 Implementations

In this Chapter, the issues covered in the workshop, in terms of implementations, are reviewed by implementation. The implementations are also reviewed for each study year, i.e. the results are bundled into entities for the first, second and third study year.

5.1.1 First study year

From the first implementation, teachers recognized 8 out of 15 competences. They were evenly distributed across competence areas. The focus in that implementation is to acquaint the student with his/her studies and his/her own learning, as well as to give an overview of the traffic and transport management field and actors in the field. Working with others and learning through experience strengthen also the competences in mobilizing resources and others. Building self-awareness and self-efficacy in relation to studies and professionalism will begin.

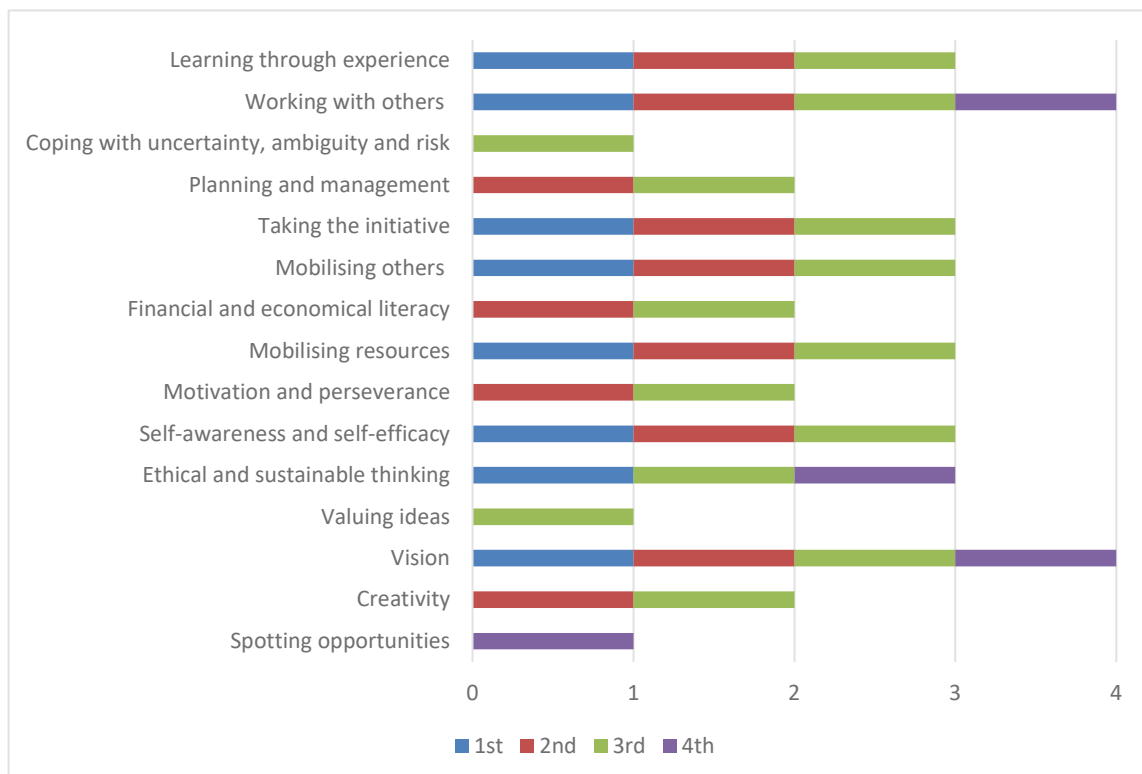
The 'Resources' area was focused on the second implementation; the teachers recognized all the competences from there. Also, other competences were recognized, overall 11 out of 15. The implementation serves an introduction to the world of traffic planning, and when completing it, the student must gain an understanding of the basic information influencing traffic planning and understand different user groups and learn to vision suggestions for improvement together with other students.

The third implementation was an implementation where all except one competence ('spotting opportunities') were recognized. The implementation combines safety, accessibility and community planning and the learning assignments are designed to challenge students' visioning skills and to develop a wide variety of entrepreneurial and working life skills. There is an opportunity to develop further the work planning in this implementation.

'Visioning' and 'ethical and sustainable thinking' are in a centre of the fourth implementation. In this implementation, actors in the field have widely presented the "hottest hotspots" in the field in relation to environmental aspects, as one teacher noted. The connection between working life is thus strong, and on the basis of it the understanding of the different roles of companies becomes very petty. Nevertheless, the actual identifiable competences remained low in this implementation, only 4 competences.

Overall, the competences identified in the first-year studies are quantified in Figure 8, where can be noticed, that 'working with others' and 'vision' are the only competences identified in each implementation:

Figure 8. Competences identified in the first study year implementations (implementations from 1st to 4th).



5.1.2 Second study year

The second study year starts with the fifth implementation and it concentrates strongly in the 'Ideas and opportunities' area. All the 5 competences in that area were recognized and also 3 (and a half) more. In this implementation the teachers recognized also areas which will be strengthened more in the future like 'planning and management' and 'motivation and perseverance'.

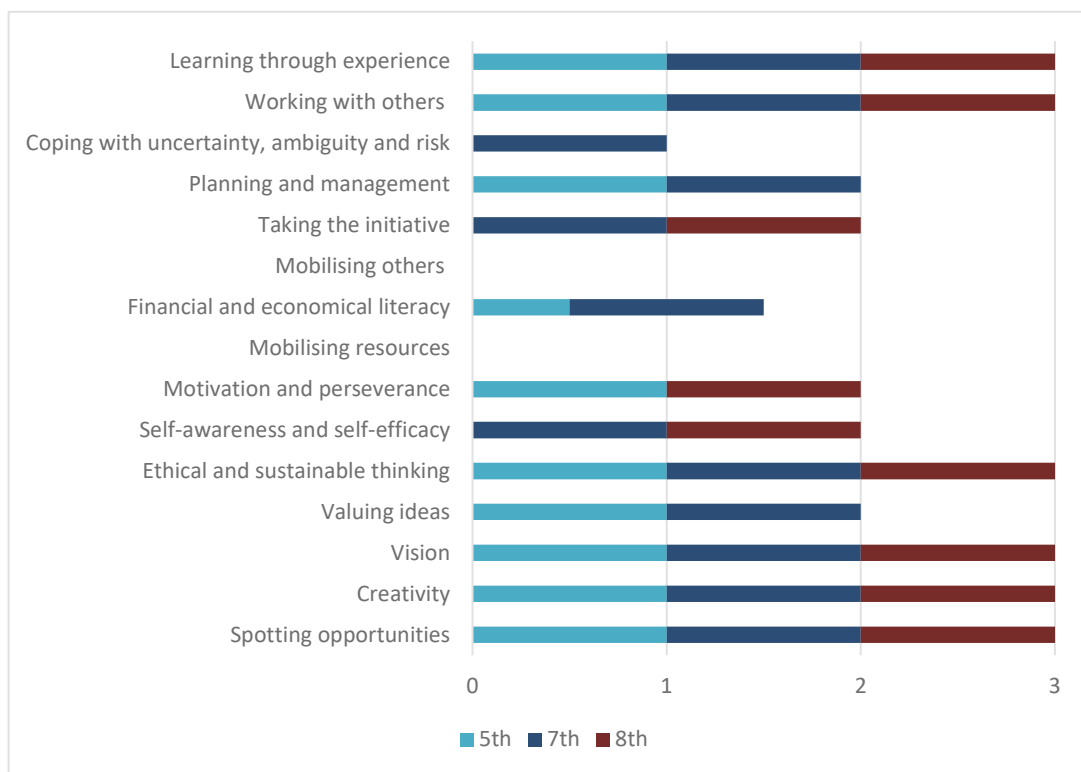
There were no markings in the sixth implementation mainly because the teachers mostly involved in this implementation are part-time teachers in the Degree Programme of Traffic and Transport Management and didn't participate the workshop. On the other hand, one teacher who was slightly involved and participated also the workshop noted that during academic year 2019-2020 the working life aspect of the implementation remained rather light, but otherwise implemented it could very well be work-oriented. It is therefore worth planning in the future to implement it differently, also taking the entrepreneurial competences into account.

Areas 'Ideas and opportunities' and 'Into action' were well covered in the seventh implementation, all the competences were strengthened. Real-life traffic planning objects and practical designing develop visioning and creativity competences and coordinating designs in groups develops the competence of working together.

The eight implementation was also covered mostly in the areas 'Ideas and opportunities' and 'Into action', but not entirely. 9 out of 15 competences were covered. The implementation consists of parts which are quite different, and they are taught by different teachers, so the approach to entrepreneurial competences is also slightly different.

The Figure 9 shows that excluding implementation 6, which wasn't discussed for the reasons as described above, up to six competencies covered all three implementations in the second-year implementations. Increasing the coverage of competencies from the first to the second study year is a good thing. Although it was noted in the workshop, not all competencies can necessarily be strengthened by all implementations, their coverage should still be pursued in order to build and strengthen competencies in the desired way, comprehensively to the advanced level.

Figure 9. Competences identified in the second study year implementations.



5.1.3 Third study year

The third study year in the Degree Programme of Traffic and Transport Management is the last study year with organised study offering from the degree programme. There are only two implementations offered. In the third study year implementations, there were no markings in the ninth implementation, because the teacher responsible on this implementation didn't participate the workshop.

The tenth implementation covered once again well the areas 'Ideas and opportunities' and 'Into action', and most of the area 'Resources'. Altogether 12,5 of 15 competences were covered – 0,5 was marked because euro-denominated financial calculations are intentionally excluded from large group works, but small-scale economic factors are discussed at a general level.

The third study year is narrower in terms of implementations and due to the undiscussed nature of the ninth implementation, the Figure 10 of the third study year is also a bit narrow. However, it shows well how, with the exception of two competences, competences were comprehensively identified.

Figure 10. Competences identified in the third study year implementation.



5.2 Summary of the skills in implementations

Overall, the skills and competences were recognized very well. Altogether 80 recognitions in 8 implementations means an average of 10 recognitions out of 15, or 66% coverage of entrepreneurial competences in implementations in the Degree Programme of Traffic and Transport Management.

However, it must be remembered that 2 out of 10 unprocessed implementations can change the result a lot, but the situation is good for the processed implementations. The recognitions can be seen in the Table 2:

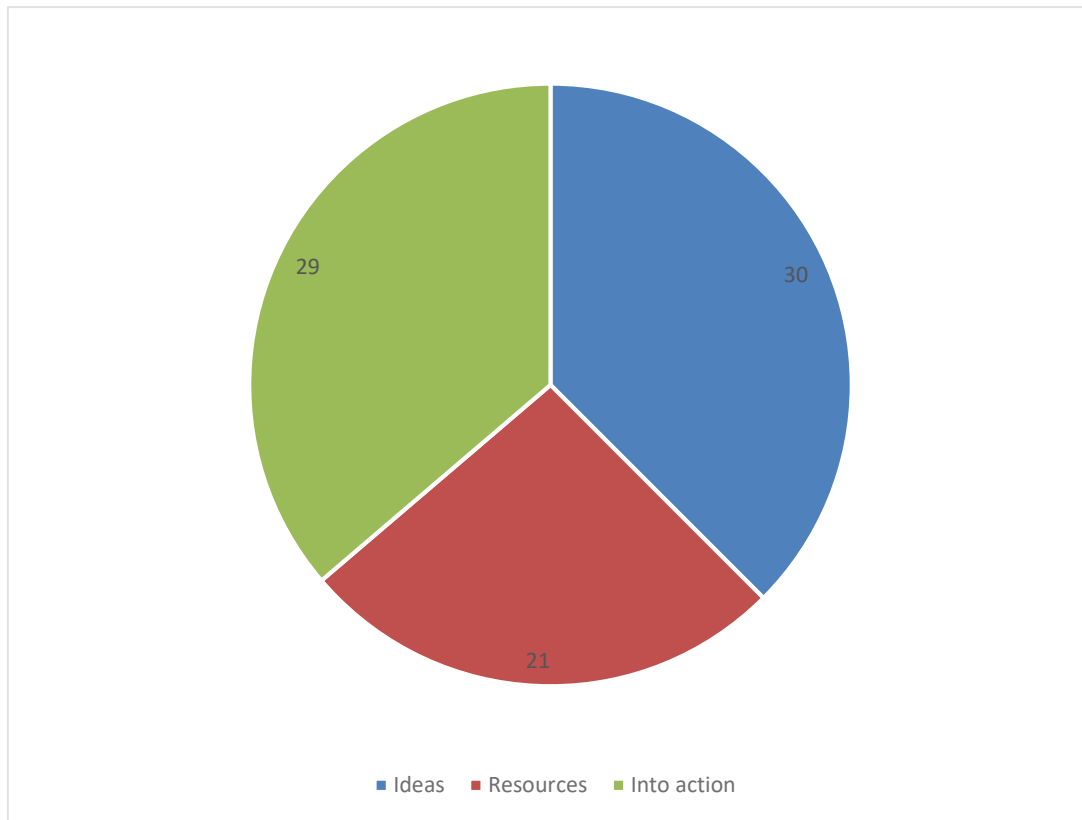
Table 2. Recognitions of the competences in the implementations.

Area	Competence	Implementations										
		1	2	3	4	5	6	7	8	9	10	
Ideas and opportunities	Spotting opportunities				1	1		1	1		1	5
	Creativity		1	1		1		1	1		1	6
	Vision	1	1	1	1	1		1	1		1	8
	Valuing ideas			1		1		1			1	4
	Ethical and sustainable thinking	1		1	1	1		1	1		1	7
Resources	Self-awareness and self-efficacy	1	1	1				1	1			5
	Motivation and perseverance		1	1		1			1			4
	Mobilising resources	1	1	1							1	4
	Financial and economical literacy		1	1		0,5		1			0,5	4
	Mobilising others	1	1	1							1	4
Into action	Taking the initiative	1	1	1				1	1		1	6
	Planning and management		1	1		1		1			1	5
	Coping with uncertainty, ambiguity and risk			1				1			1	3
	Working with others	1	1	1	1	1		1	1		1	8
	Learning through experience	1	1	1		1		1	1		1	7
		8	11	14	4	9,5	0	12	9	0	12,5	80

The best covered competences in implementations were ‘visioning’ and ‘working with others’. They appeared in a total of 8 implementations, and if 2 implementations that had no entries at all are not considered, then in all implementations. Also, ‘ethical and sustainable thinking’ and ‘learning through experience’ were appeared in 7 implementations. 6 implementations covered ‘creativity’ and ‘taking the initiative’ and 5 implementations covered ‘spotting opportunities’, ‘self-awareness and self-efficacy’ and ‘planning and management’. The worst covered competence was ‘coping with uncertainty, ambiguity and risk’ – it was mentioned only 3 times.

Overall, the coverage of the areas was quite even. Area ‘Ideas and opportunities’ was the best in terms of coverage, 30 identification of competences in 15 implementations. Area ‘Into action’ was the second in terms of coverage with 29 identifications. Area ‘Resources’ covered a little less with 21 identifications.

Figure 11. Number of competences by competence areas identified in implementations.



Looking at the results of the implementations, regarding the curriculum, it can be stated that the curriculum covers most of the entrepreneurial skills and competences well or moderately, but there are still skills and competencies which should be strengthened. The degree programme should pay attention to the fact that ‘coping with uncertainty, ambiguity and risk’ should be a skill that should be developed more and the whole ‘Resources’ area should also be covered more. ‘Valuing ideas’ is also a skill that should be strengthened. The outcomes are discussed in more detail in Chapter 6. The conclusions and proposals for action are discussed in more detail in the Chapter 7.

5.3 Entrepreneurial mindset

In the workshop, the teachers were willing and eager to discuss entrepreneurial education and entrepreneurial specificities broadly. They added extra notes creating a new table for

general comments, that were not clearly related to any particular implementation. There were notes concerning projects, like

- “ Usually at the end of studies, typical consulting projects with the student(group) making the work program themselves, also the offer and the work itself, including the reporting”
- “Good: 100% working life simulation, ‘real opportunity to show some guts’, meaningful tasks”
- “Challenges: not available to everyone, not 24/7, only according to the situation”
- “Improvable: getting this systematized would require a ‘sales cannon’ or resource.”

The discussion and notes proved that the vision of strengthening and developing an entrepreneurial mindset exists, and is linked to the specific characteristics of degree programme. The outcomes concerning entrepreneurial mindset are discussed in more detail in Chapter 6. The conclusions and proposals for action concerning entrepreneurial mindset are discussed in more detail in the Chapter 7.

5.4 Reliability and validity of the research

The research validity refers to the ability of a research method to measure what is to be measured (Anttila, P, n.d.). In this research, the objective was to identify what entrepreneurial skills and competences are taught in the Degree Programme of Traffic and Transport Management. Another objective was to find out points to be developed in the Degree Programme of Traffic and Transport Management concerning the entrepreneurial education. The third objective was to make the entrepreneurial mindset visible at the curriculum level and implementation plans.

In action research, validity is based on the reflection of the researcher’s observations and experiences on the views of other individuals with similar experience and the environment. It is a group working together. In the workshop, teachers carried the work forward very independently without the influence of the researcher and the aim was that the researcher took part in the work as little as possible. Only asking for clarifications in order to avoid misunderstanding, moving to the next implementation under discussion, and summarizing

were the researcher's contribution to the work. The workshop was also recorded to ensure the transparency and reliability of the study.

The only preliminary concerns about the results of the research were whether teachers are too eager to incorporate skills and competences into their implementations or whether the discussion succeeds at all. Neither came true. The workshop was primed to ensure that no pressure was put on the identification of skills and competences, but that the workshop goes through what is being identified and it is possible to think of ways to strengthen missing skills and competences. On the other hand, teachers themselves stated very openly if certain skills were not found in the implementation and could either justify their absence or admit that they should take a closer look if it was possible to address them with that implementation, even if they were previously lacking. The discussion was lively and brainstorming, as described earlier.

The research reliability in qualitative research means the reliability of data processing and analysis. In terms of reliability, reproducibility would be important. In action research and in workshop, it is not never possible to repeat the research exactly the same way, because the participants determine the progress and outcomes of the work. However, the working model of the workshop based on the implementations offered in a certain period and the EntreComp as a framework has been designed to be reproducible. The idea is that this workshop model for identifying entrepreneurial skills and competences could be used in other degree programmes as well.

The results showed that it was possible to identify what entrepreneurial skills and competences are taught in the Degree Programme of Traffic and Transport Management, and what skills and competences should be strengthened in the implementations. Points to be developed in the Degree Programme of Traffic and Transport Management concerning the entrepreneurial education were found; they are discussed in more detail in Chapter 7. Characteristics about entrepreneurial mindset were found, and also they are discussed in more detail in Chapter 7.

6 OUTCOMES

As stated before, the workshop was very fruitful. The teachers brought up, in entrepreneurial way, a lot of important observations and ideas, on the basis of which the author immediately took further action. There was a need to get more tools off to a good start, so that entrepreneurial issues could continue to be strongly driven by a good discussion platform. The good findings and ideas had to be made visible as soon as possible. These outcomes are made as part of this thesis and are explained in more detail in this chapter.

6.1 Entrepreneurial Competence Checklist

The teachers recognized widely the skills and competences from implementations, but as mentioned before, teachers also pointed out that reviewing these entrepreneurial skills and competences should be made a systematic process to ensure their implementation and development in the degree programme. That should be ensured by systematic processes like regular planning meetings. Since also a wish emerged in the workshop about a checklist, such was created for this thesis. It can be found in its entirety in the Appendix 6.

From the beginning it was clear to use the EntreComp Overview as basis for the checklist, because it turned out to be very useful basis also in the workshop. The idea and the model were familiar for the teachers and it was easily modified to this purpose.

EntreComp Overview and other EntreComp descriptions are presented only in English, so the EntreComp Overview was first translated into Finnish. After that the levels of proficiency were converted to supplements for the start “after completing the implementation, students will be able to...”. Also, the value-making parts were removed at this point, because at the workshop the value-making part was a little bit hard to perceive, and the simplified phrase would work better at the beginning when starting to use the checklist. For example, the original EntreComp proficiency “Learners can find opportunities to generate value for others” were changed as “[After completing the implementation, students will be able to...] observe opportunities” as shown in Figure 11:

Figure 12. Part of the 'Entrepreneurial Competence Checklist' made for teachers.

After completing the implementation students can...

		1 st year implementations	
Area	Competence	Foundation	
Ideas and opportunities	Spotting opportunities	observe opportunities	a)
	Creativity	use their creativity and develop new ideas	te
	Vision	imagine a desirable future	b)
	Valuing ideas	understand that ideas have different kinds of values	co sc

The checklist is part of the Model of the Entrepreneurial Education, which is presented in chapter 6.3, and encouraged to be used whenever new implementations are planned. The competence levels have been divided into three years, i.e. the idea is that the first year's implementations would ensure at least the original EntreComp's first 'foundation' level, the second year's implementations would ensure EntreComp's second 'intermediate' level and the third year's level would ensure EntreComp's third 'advanced' level competence.

At the end of the list there is four themes added that have no levels of proficiency, but they have been added as a reminder for the teachers about the themes that teachers themselves raised in the workshop as part of supporting entrepreneurial actions in an appropriate way in the field: work programs, tasks or projects capable to add to cv or portfolio, projects and highlighting the opportunities for entrepreneurship.

6.2 Entrepreneurship in the curriculum

The workshop as working method among teachers of the degree programme could be a good way to think together on how these competences could be further developed, how to ensure the continued existence of already evolving competences through implementations, and how to ensure an even more comprehensive focus on entrepreneurial education. In addition to Entrepreneurial competence checklist, a work tool for teachers is the curriculum. Curriculum defines the objectives and the contents for the degree programme, and the more specific descriptions about modules, that form the degree.

In the curriculum level the entrepreneurial skills and competences could be added, but not very widely, because the descriptions should be quite short, and the main emphasis should focus on professional aspects. Anyhow, after the workshop the entrepreneurial skills and competences were described for the curriculum. The descriptions in this first phase cover general texts but not module descriptions and can be seen in the appendix 4. The base for the curriculum was the curriculum of 2020 (HAMK University of Applied Sciences, 2020b) and the added or rephrased parts are marked with bold type.

In the next phase, the entrepreneurial descriptions should be expanded to the module level. That would be explained in chapter 7.

6.3 Model of the Entrepreneurial Education

As the teachers were willing to ponder ways to define entrepreneurial education and mindset in the Degree Programme further, the whole entrepreneurial education and skills and their development had to be described. As a result, a Model of the Entrepreneurial Education was created, by author, for the degree programme.

The Model of the Entrepreneurial Education combines professional aspects from the education like the work programs or the designed cv's (i.e. curriculum vitae) used in the field, actual entrepreneurial education possible for students in HAMK University of Applied Sciences and the measures to strengthen entrepreneurial skills and competences during studies. The model has been divided into four study years following the regular study time of

the degree programme. The Model of the Entrepreneurial Education can be seen in the Appendix 5.

This description and the discussion that took place in the workshop form a basis for the entrepreneurial mindset. The entrepreneurial mindset can also be seen as a form of the Model of the Entrepreneurial Education, using regularly the Entrepreneurial Competence Checklist, carrying entrepreneurial aspects in teaching and all activities, further developing entrepreneurial aspects in the degree programme, and making the entrepreneurial mindset visible as much as possible, starting from implementation plans and curricula.

7 PROPOSALS FOR ACTION AND CONCLUSIONS

It has been delightful to see how joint discussion around entrepreneurship and entrepreneurial competences continued after the workshop, and already in degree programme meetings. Entrepreneurship and entrepreneurial competencies blended into the planning of academic year and has continued as part of the curriculum planning. The workshop was very successful, both in terms of concrete results and in creating a more open atmosphere in for entrepreneurship. However, much remains to be done. This chapter represents proposals for future action and conclusions.

7.1 Implementations

Entrepreneurial mindset, entrepreneurial skills and competences should be more strongly involved in implementation descriptions, competence objectives and evaluation criteria. Entrepreneurial skills and competences should be more involved in teaching methods in order to strengthen entrepreneurial competences and mindset.

The Entrepreneurial Competence Checklist was created in order to develop and support the further designing of the implementations. It needs to be reviewed at regular intervals and, if necessary, developed to be more effective based on teacher feedback. Perhaps the internships and the thesis could also be included in the checklist, taking into account their characteristics?

In teachers' everyday work, when assigning tasks to students, emphasis could also be placed on how doing the task in question will increase their entrepreneurial skills. Entrepreneurial issues in general should be opened more and made visible. Portfolio should be incorporated into the degree and everyday work, so that the students accumulate evidence of his/her competence in it, through studies. Also, the work program as a concept and form of working should be more strongly emphasized in implementations and through studies.

Actual entrepreneurship studies should be integrated into the implementations. Not necessarily business-creation studies, but studies about entrepreneurship. Actual common contents about entrepreneurial activities offered by HAMK should be brought out more intensively, so that students interested in entrepreneurial career could start their entrepreneurial journey already during studies.

Methods to support the strengthening of entrepreneurial mindset should be used more widely, such as learning diaries, self-reflection, service design methods, all forms of activation and working together, among other things mentioned in chapter 2.4.1 (Heinonen & Poikkijoki, 2006; Bosman, 2019; Täks et al., 2014).

7.2 Curricula

As mentioned in chapter 6.2, the entrepreneurial skills and competences could be added more strongly in the curriculum level, and the entrepreneurial descriptions should be expanded to the module level also. In universities of applied sciences curriculum work, curriculum planning, is always used to be started from professional content. What kind of professional and technical skills does the graduate need? What are the professional contents? After that, "secondary" contents like languages have been added. And finally, soft skills like teamwork skills have been briefly discussed, but in most cases their implementation has depended on the enthusiasm of individual teachers. What if it were even reversed? First the fundamental skills and competences would be thought, how strengthen them with different methods, and then how professional skills could be gone through along them?

Strengthening the competence areas should also be developed. As the results from the workshop showed, specially the area 'Resources', i.e. mobilizing resources and others, financial and economic literacy, self-awareness and self-efficacy, and motivation and perseverance should be strengthened. The last two can also be emphasized by means of guidance counselling. But still some through the curriculum intersected measures could be helpful, like encouragement for updating portfolio regularly.

In any case, as stated in chapter 2.4, it is necessary that education producers include opportunities to strengthen entrepreneurial mindset through the studies and through the curricula (Bosman, 2019, p. 106).

7.3 Entrepreneurial Competence Checklist for Students

In order to strengthen students' entrepreneurial skills, competences and mindset, students should be consciousness about them (Liening et al., 2016, p. 6) and they should have the aim to strengthen them. Students need to be aware and understand the accumulation of one's own skills. Objectives must be set for development and they must be reviewed systematically during studies.

CV and portfolio work would help the systematic review, but also an idea about Entrepreneurial Competence Checklist for Students emerged. Its creation and deployment must be promoted. The goal could be that, starting next academic year, students would also have their own competence checklist systematically in use as teachers do, and the development of competences would be monitored regularly.

7.4 Model of the Entrepreneurial Education

The Model of the Entrepreneurial Education combines professional aspects from the field of traffic and transport management, like the work programs or the designed cv's (i.e. curriculum vitae), actual entrepreneurial education possible for students in HAMK University of Applied Sciences, and the measures to strengthen entrepreneurial skills and competences during studies. It should be regularly updated, and maybe next step would be expanding it

with descriptions and links so that it also serves as a tool for the students, for example, and a kind of map of entrepreneurial education in the degree programme.

Strengthening the different forms of light entrepreneurship should also be made visible more effectively. Cooperation with entrepreneurship organizations should be strengthened maybe with a joint study offer or information sessions, concerning for example the engineering programmes in Riihimäki campus, or virtually all engineering programmes.

7.5 Entrepreneurial mindset

Entrepreneurial mindset has its shape in the Degree Programme of Traffic and Transport Management. In order to strengthen it, systematic processes like regular planning meetings should be cherished. Through joint discussion and planning, as well as brainstorming, it can be developed.

All of these previous proposals for action are part of developing and strengthening the entrepreneurial mindset in the degree programme. A list of proposed measures will be drawn up from these proposals with timetables and responsible persons and will be submitted to the Head of Degree Programme and to the Dean of the School of Technology. These thoughts about entrepreneurial mindset should be made known and visible in other engineering programmes as well.

7.6 Future research proposals

The entrepreneurial mindset, the entrepreneurial skills and competences, as discussed in the engineering context in this thesis, applies to the Degree Programme of Traffic and Transport Management, and, in fact, the whole School of Technology in Häme University of Applied Sciences. In this thesis, the approach angle has been more general, and teacher focused. In the future, entrepreneurial mindset, skills and competences could be researched more from a student perspective; how do students experience the accumulation of entrepreneurial competences and how could their visibility be strengthened from the students' perspective?

The reverse curriculum work would also be an interesting research topic. Since the entrepreneurial mindset is seen so important in every aspect of life for everyone (Publications Office of the EU, 2019), that could be an interesting base for curriculum and creating the professional competence on its foundations.

7.7 Conclusions

The basis of this thesis was the view that entrepreneurial education should be strengthened both to ensure economic balance and competitiveness, but above all, the development of individuals and active citizenship. The skills and competences needed in the 21st century, the entrepreneurial mindset, are part of the goals of education alongside professional competences.

In the research of this thesis, the objective was to identify what entrepreneurial skills and competences are taught in the Degree Programme of Traffic and Transport Management. Another objective was to find out points to be developed in the Degree Programme of Traffic and Transport Management concerning the entrepreneurial education. The third objective was to make the entrepreneurial mindset visible at the curriculum level and implementation plans.

The teachers of the degree programme widely recognized the skills and competences created and reinforced in the implementations based on the EntreComp Framework, which was created as a frame of reference for nurturing entrepreneurial skills in education curricula and as a tool for developing and assessing these skills (European Commission, 2016). Teachers also recognized the competence areas and their emphases in different implementations. Also, the skills and competences that should be given more weight, emerged.

Several points to develop were identified. In addition to strengthening certain skills and competences in implementations, reviewing these skills and competences should be made as a systematic process. This was the most significant result of the workshop and a key idea of strengthening the entrepreneurial mindset in the degree programme.

Actual entrepreneurship studies or innovative working methods should be integrated more strongly into the implementations in order to create business ideas within studies, and emphasis should be on a small-scale opportunities and business ideas, too. The work program should be more strongly involved in studies. In teaching and in assigning the tasks, the emphasis on how entrepreneurial skills and competences accumulate during each task or project, should be strengthened.

In general, entrepreneurial aspects must continue to be considered and strengthened – and to be made more visible in implementation plans and curricula, written open. Making the entrepreneurial mindset visible at the curriculum level and implementation plans progresses while the outcomes of this thesis become more strongly used. Still, already now teachers in a degree programme have a very common understanding of what teaching entrepreneurial skills means and what the common features concerning entrepreneurial skills and competences in the degree programme are. This peculiar way of thinking among the teachers of the degree programme clearly constitutes a certain kind of entrepreneurial mindset.

In the future, in the Degree Programme of Traffic and Transport Management, the entrepreneurial skills and competences and overall, the entrepreneurial aspects will be more prominent. Based on the research results, several concrete tools and functions related to entrepreneurship were developed in this thesis. The Entrepreneurial Competence Checklist for teachers was developed as a tool for implementation and curriculum planning. The Entrepreneurial Competence Checklist will be found in the Appendix 6. Emphasis was added to the curriculum in relation to entrepreneurial skills and competences, entrepreneurial education and entrepreneurial activities. The entrepreneurial activities have been brought together in the Model of entrepreneurial education, which can be found in Appendix 5. Many proposals for further action were set out in this chapter 7. And above all, the entrepreneurial mindset emerged and took shape in the workshop work. The way of thinking about the entrepreneurship, the entrepreneurial mindset, will certainly be further strengthened as the review of entrepreneurial skills and competences have been taken as a systematic process according to the wishes of teachers in the Degree Programme of Traffic and Transport Management.

7.8 Final words

As an author, I am very pleased and happy that my presuppositions turned out to be wrong. The workshop was a success, and a lot of great insights and clarifications were achieved. The work with entrepreneurial mindset in the degree programme of Traffic and Transport Management has continued and entrepreneurship has entrenched into planning and education naturally. The work started in this thesis continues by deepening the entrepreneurial education in the degree programme. And the plans for making the entrepreneurial competences visible, self-reflected and self-evaluated for the students have already started.

I hope that the conversation about entrepreneurial mindset continues within engineering programmes, where the mindset towards entrepreneurship is still a bit old-fashioned in many places. I believe that the workshop method developed for this thesis will open the discussion in other engineering degree programmes in as fruitful way as it has in the Degree Programme of Traffic and Transport Management. In fact, the entrepreneurial mindset has already been discussed with some other degree programmes, and the idea about the workshop and strengthening the entrepreneurial mindset as a whole has been considered very good and there is a desire for benchmarking.

And I hope, that in the teachers' meetings will be heard in future: **“Hey, we have an entrepreneurial mindset!”**

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Appendix 1: EntreComp Progression Model

Foundation		Intermediate		Advanced		Expert	
Relying on support ⁶ from others		Building independence		Taking responsibility		Driving transformation, innovation and growth	
Under direct supervision.	With reduced support from others, some autonomy and together with my peers.	On my own and together with my peers.	Taking and sharing some responsibilities.	With some guidance and together with others.	Taking responsibility for making decisions and working with others.	Taking responsibility for contributing to complex developments in a specific field.	Contributing substantially to the development of a specific field.
Discover	Explore	Experiment	Dare	Improve	Reinforce	Expand	Transform
Level 1 focuses mainly on discovering your qualities, potential, interests and wishes. It also focuses on recognising different types of problems and needs that can be solved creatively, and on developing individual skills and attitudes.	Level 2 focuses on exploring different approaches to problems, concentrating on diversity and developing social skills and attitudes.	Level 3 focuses on critical thinking and on experimenting with creating value, for instance through practical entrepreneurial experiences.	Level 4 focuses on turning ideas into action in 'real life' and on taking responsibility for this.	Level 5 focuses on improving your skills for turning ideas into action, taking increasing responsibility for creating value, and developing knowledge about entrepreneurship.	Level 6 focuses on working with others, using the knowledge you have to generate value, dealing with increasingly complex challenges.	Level 7 focuses on the competences needed to deal with complex challenges, handling a constantly changing environment where the degree of uncertainty is high.	Level 8 focuses on emerging challenges by developing new knowledge, through research and development and innovation capabilities to achieve excellence and transform the ways things are done.

Appendix 2: EntreComp Overview

Area	Competence	Levels of proficiency		
		Foundation	Intermediate	Advanced
Ideas and opportunities	Spotting opportunities	Learners can find opportunities to generate value for others.	Learners can recognize opportunities to address needs that have not been met.	Learners can seize and shape opportunities to respond to challenges and create value for others.
	Creativity	Learners can develop multiple ideas that create value for others.	Learners can test and refine ideas that create value for others.	Learners can transform ideas into solutions that create value for others.
	Vision	Learners can imagine a desirable future.	Learners can build inspiring vision that engages others.	Learners can use their vision to guide strategic decision-making.
	Valuing ideas	Learners can understand and appreciate the value of ideas.	Learners understand that ideas can have different types of value, which can be used in different ways.	Learners can develop strategies to make the most value generated by ideas.
	Ethical and sustainable thinking	Learners can recognize the impact of their choices and behaviors, both within the community and the environment.	Learners are driven by ethics and sustainability when making decisions.	Learners act to make sure that their ethical and sustainability goals are met.
Resources	Self-awareness and self-efficacy	Learners trust their own ability to generate value to others.	Learners can make the most of their strengths and weaknesses.	Learners can compensate for their weaknesses by teaming up with others and by further developing their strengths.
	Motivation and perseverance	Learners want to follow their passion and create value for others.	Learners are willing to put effort and resources into following their passion and create value for others.	Learners can stay focused on their passion and keep creating value despite setbacks.
	Mobilizing resources	Learners can find and use resources responsibly.	Learners can gather and manage different types of resources to create value for others.	Learners can define strategies to mobilize the resources they need to generate value for others.
	Financial and economical literacy	Learners can draw up the budget for a simple activity.	Learners can find funding options and manage a budget for their value-creating activity.	Learners can make a plan for the financial sustainability of a value-creating activity.
	Mobilizing others	Learners can communicate their ideas clearly and with enthusiasm.	Learners can persuade, involve and inspire others in value-creating activities.	Learners can inspire others and get them on board for value-creating activities.
Into action	Taking the initiative	Learners are willing to have a go at solving problems that affect their communities.	Learners can initiate value-creating activities.	Learners can look for opportunities to take the initiative to add or create value.
	Planning and management	Learners can define the goals for a simple value-creating activity.	Learners can create an action plan, which identifies the priorities and milestones to achieve their goals.	Learners can refine priorities and plans to adjust to changing circumstances.
	Coping with uncertainty, ambiguity and risk	Learners are not afraid of making mistakes while trying new things.	Learners can evaluate the benefits and risks of alternative options and make choices that reflect their preferences.	Learners can weigh up risks and make decisions despite uncertainty and ambiguity.
	Working with others	Learners can work in a team to create value.	Learners can work together with a wide range of individuals and groups to create value.	Learners can build a team and networks based on the needs of their value-creating activity.
	Learning through experience	Learners can recognize what they have learnt through taking part in value-creating activities.	Learners can reflect and judge their achievements and failures and learn from these.	Learners can improve their abilities to create value by building on their previous experiences and interactions with others.

Appendix 2: Background for teachers, PowerPoint slideshow in the workshop 4 June 2020

Slide 1.

Entrepreneurial mindset in the studies of Traffic and Transport Management

The research of the Master's Thesis, Johanna Nikkola

Slide 2.

Entrepreneurship is seen as important maintainer of competitiveness and a balancer of the economy. Among other things, the European Commission is constantly working to maintain competitiveness and economic balance by strengthening entrepreneurship in the Union.

The skills and definitions associated with entrepreneurship and 21st century skills are seen as even more important than entrepreneurship itself, as they affect all people.

These skills not only enable different forms of entrepreneurship, but also the individual's ability to develop, create something new and produce value in his or her own life, for example his or her employer.

For this reason, it is important for education providers to understand these skills and competences in order to further strengthen them.

Slide 3.

Background

In 2003 The European Union published a Green Paper about entrepreneurship, that guides the Member States to create a society that values entrepreneurship for example by taking entrepreneurship training as a part of a school's curriculum, creating more co-operation between entrepreneurs and schools and universities in order to foster entrepreneurial drive more effectively.

(Commission of European Communities, (2003). Green Paper: Entrepreneurship in Europe. https://ec.europa.eu/invest-in-research/pdf/download_en/entrepreneurship_europe.pdf

Also, the Finnish government sees entrepreneurship as important in maintaining competitiveness and balancing the economy. Ministry of Education and Culture has aligned entrepreneurship education policies in 2017 and the work towards entrepreneurship has continued with the governments of Rinne and Marin. This spring, an Entrepreneurship Strategy, has been under statement. It emphasizes that entrepreneurship education is currently part of education strategies and curricula, as the understanding of entrepreneurship education has clearly strengthened in recent years. As entrepreneurship education is also broadly related to working life skills, the Strategy states that teacher training needs to be further developed from the perspective of how entrepreneurship education can be more strongly integrated to all teaching and guidance, and the operating culture of educational institutions.

Finnish Government. (2020b). Yrittäjyysstrategia LUONNOS versio 9.3.2020 03.

<https://www.lausuntopalvelu.fi/Fi/Proposal/Participation?proposalId=ed112373-aa33-40cd-acd4-124c208d0711>

Slide 4.

HAMK operates closely with businesses and industries creating benefits to both students and enterprises. HAMK's "graduate employment rate is one of the highest in Finland as is also the rate of graduate who start their own business".

Häme University of Applied Sciences (HAMK). (2019a). About Häme University of Applied Sciences.

<https://www.hamk.fi/hame-university-of-applied-sciences/?lang=en>

In "HAMK Vision 2030", which is part of the strategy, entrepreneurship and cooperation is one of the four key themes. One of the visions is to achieve 7% degree of entrepreneurship among graduates by the end of 2025.

Häme University of Applied Sciences (HAMK). (2019b). HAMK Strategia. <https://www.hamk.fi/tietoa-hamkista/strategia/>

Slide 5.

The 20th century skills needed in working life, citizenship and self-actualization, were quite different than they are now in the 21st century. Constant transformation and change of working life require new kind of skills. Existing businesses are changing their organizational structures to self-directed teams, self-management and flatter management structures emphasizing the importance of individual initiative and accountability for the employee. Those features have been associated with entrepreneurial actions and success. (Boyles, T. (2012). 21st century knowledge, skills, and abilities and entrepreneurial competencies: A model for undergraduate entrepreneurship education. *Journal of Entrepreneurship Education*, 15, 41.)

Globalization and economic inequity are changing the demand of skills, digitalization is changing the nature of work and recruitment, and the liberalization of the labor market and the reorganization of work are increasing the competition for jobs and thus changing the nature of qualifications and skills needed.

(Mann, A., & Huddleston, P. (2017). Schools and the twenty-first century labour market: perspectives on structural change. *British Journal of Guidance & Counselling*, 45(2), 208-218.)

The skills needed in the 21st century include capabilities in analytical problem solving, innovation and creativity, self-direction and initiative, flexibility and adaptability, critical thinking, and communication and collaboration skills. These skills are not new, but they appear in a new context. For example, critical thinking and problem solving have been much-needed skills from an early age, when, for example, agriculture started developing.

(Boyles, 2012, s. 42; Rotherham, A. J., & Willingham, D. T. (2010). 21st-Century" skills. *American Educator*, 17(1), 17-20

Slide 6.

Independent motivation, action and decision-making are required both entrepreneurs and effective employees in today's economy. Those skills consist of planning skills, the ability to monitor progress and adapt or alter plans. (Boyles, 2012, p. 49). By developing entrepreneurial mindset through education, entrepreneurship itself can also be fostered. Entrepreneurship education means it possible to transcend the common alternative civil servant versus employee position thinking and create entrepreneurial-minded employees. As an education producer Degree Programme of Traffic and Transport Management should ensure the achievement of these skills regarding all the students. As a result of educating effective employees, the degree programme also educates the necessary skills for entrepreneurship.

(Boyles, 2012; Vasilache, S., & Rînciog, J. (2017, July). Curricular improvements for entrepreneurial education. In *Proceedings of the International Conference on Business Excellence* (Vol. 11, No. 1, pp. 302-311). De Gruyter Open.; Fayolle, A., & Gailly, B. (2012). From craft to science: Teaching models and learning processes in entrepreneurship education. <https://www-emerald-com.ezproxy.hamk.fi/insight/content/doi/10.1108/03090590810899838/full/html>)

Slide 7.

Entrepreneurial mindset is often described as “the ability to rapidly sense, act, and mobilize, even under uncertain conditions” like Haynie, Shepherd, Mosakowski & Earley (2010, p. 218), Ireland, Hitt & Sirmon (2003, p.967) and Shepherd, Patzelt & Haynie (2010, p. 62) do. In this thesis, entrepreneurial mindset is considered the same way as Kriewall and Mekemson (2010, p. 4) are considering “entrepreneurially minded engineer, i.e. an engineer instilled with the entrepreneurial mindset”. The entrepreneurially minded engineer is for example placing the customer needs before design features and designs value-added products and processes generating positive cash flow and benefits for the company. The entrepreneurially minded engineer is associated with skills and competencies like creativity, intuition, lifelong learning, perseverance, the ability to see things in a wider context, the ability to communicate and to understand people as users of products or services.

(Haynie, J. M., Shepherd, D., Mosakowski, E., & Earley, P. C. (2010). A situated metacognitive model of the entrepreneurial mindset. *Journal of business venturing*, 25(2), 217-229.; Ireland, R. D., Hitt, M. A., & Sirmon, D. G. (2003). A model of strategic entrepreneurship: The construct and its dimensions. *Journal of management*, 29(6), 963-989.; Shepherd, D. A., Patzelt, H., & Haynie, J. M. (2010). Entrepreneurial spirals: Deviation–amplifying loops of an entrepreneurial mindset and organizational culture. *Entrepreneurship theory and practice*, 34(1), 59-82.; Kriewall, T. J., & Mekemson, K. (2010). Instilling the entrepreneurial mindset into engineering undergraduates. *The journal of engineering entrepreneurship*, 1(1), 5-19.)

Slide 8.

In 2016 as a part of European Union “New Skills Agenda for Europe” program European Commission’s “EntreComp Framework” was published. EntreComp Framework consists of three competence areas and 15 competencies describing entrepreneurship as skills that citizens can apply in all areas of life: to develop on a personal level, to participate as active citizens in society, to influence their employability or to show initiative (cultural, social or commercial). The entrepreneurial competence can be seen as an individual and collective capacity.

The Entrepreneurship Competence Framework, EntreComp, was developed to unify the spectrum of skills and competences associated with entrepreneurship.

It is a description of knowledge, skills and attitudes. Entrepreneurial thinking and its strengthening are considered important in the European Commission, so that in a rapidly changing society, everyone’s opportunities to grasp new ideas, work together, plan their careers successfully and shape the future for the common good will come true.

(Bacigalupo, M., Kampylis, P., Punie, Y., & Van den Brande, G. (2016). EntreComp: The entrepreneurship competence framework. *Luxembourg: Publication Office of the European Union*, 10, 593884.;

McCallum, E., Weicht, R., McMullan, L., & Price, A. (2018). EntreComp into action - Get inspired, make it happen: A user guide to the European Entrepreneurship Competence Framework (No. JRC109128). Joint Research Centre (Seville site).;

Publications Office of the EU. (2019). EntreComp: The European Entrepreneurship Competence Framework.

<https://op.europa.eu/en/publication-detail/-/publication/31e2ee8a-d8fa-11e9-9c4e-01aa75ed71a1>)

Slide 9.

The object of my thesis is to identify what competencies related to entrepreneurship, and more precisely, the entrepreneurial competencies and skills, are taught in the Degree Programme of Traffic and Transport Management. The review is specifically about making entrepreneurship visible, but more as a mindset, not as precise skills to set up a company.

The purpose of this workshop is to find out **what skills and competences you identify related to your teaching and implementations**. After that, I can flatter how we could make it visible at the implementation plans and possibly curriculum level. Reflection on strengthening the teaching of these skills is also possible.

Appendix 4: New curriculum text

OSAAMISTAVOITTEET JA SISÄLTÖ

Hämeen Ammattikorkeakoulun Liikenneala tarjoaa ainoana Suomessa liikenteeseen, liikkumiseen ja liikennesuunnitteluun keskittyvää insinöörin tutkintoon johtavaa korkeakouluopetusta. Liikenne on merkittävä osa yhteiskuntaa, ja liikennealan insinööri työskentelee koko yhteiskuntaa sekä jokaisen ihmisen arkea koskettavan monitieteisen ja kansainvälistyvän alan parissa.

Liikenne ja liikkuminen ovat parhaillaan suuren murroksen äärellä: ilmastonmuutos, kaupungistuminen ja väestön ikääntyminen tulevat vaikuttamaan vahvasti liikennealan toimintaympäristöön. Samalla nopeasti kehittyvä uusi teknologia ja älykkäät ratkaisut sekä uudet liikenteen palvelut luovat uusia mahdollisuuksia kehittää taloudellista, kestävä ja eri väestöryhmien tarpeet huomioon ottavaa liikennesuunnittelua. Liikenteen suunnittelun tärkeys korostuu jatkossakin. Alalla on tarve kehittää uusia ajatuksia, toimintamalleja **ja lisäarvoa** muuttuvan maailman **sekä liikkujien tarpeisiin**.

HAMKin liikennealan koulutuksessa korostuu monialaisuus ja laajakatseisuus: kyky ymmärtää eri toimijoiden näkökulmia ja taito tehdä yhteistyötä eri alojen edustajien kanssa on tärkeä osa liikennealan insinöörin osaamista. **Elinikäisen oppimisen teemat henkilökohtainen kehittyminen, sosiaalinen osallisuus, aktiivinen kansalaisuus ja työllisyys painottuvat opinnoissa ammatillisen osaamisen ohella.**

Koulutuksen tavoitteena on antaa valmistuvalle liikennealan insinöörille laaja-alainen ymmärrys liikkumistarpeen synnystä ja erilaisista liikkujaryhmistä, matkaketjuista ja liikenteen palveluista, liikenteen ja maankäytön vuorovaikutteisesta suunnittelusta, kestävä liikkumisen keinoista sekä fyysisen liikenneympäristön suunnitteluratkaisuista. Hyvät viestintä- ja vuorovaikutustaidot ovat tärkeitä, ja liikennealan insinöörin tulee osata käyttää sujuvasti eri tyyppisiä viestintävälineitä sekä hallita vuorovaikutukseen liittyviä käytäntöjä. Liikennealan insinööri omaa myös hyvät valmiudet toimia kansainvälisissä yhteyksissä.

Liikennealan koulutuksessa liikennejärjestelmiin, -ympäristöihin, liikkujiin ja uusiin älykkäisiin ratkaisuihin ja liikenteen palveluihin tutustutaan ilmiöinä sekä kotimaassa että kansainvälisissä ympäristöissä. Opetus on monipuolista ja käytännönläheistä **sekä työelämäpainotteista**: opinnoissa harjoitellaan niin liikennejärjestelmien suunnittelua ja strategista ohjausta kuin yksityiskohtaista liikenneympäristön suunnittelua. Myös liikkumisen ohjauksen ratkaisut ja älykkään liikenteen palvelut tulevat opintojen aikana tutuiksi. Liikenneturvallisuuden parantaminen on keskeinen tavoite, jota korostetaan opetuksessa. Liikenneturvallisuuden huomioimista suunnittelun eri tasoilla strategisesta suunnittelusta liikenneympäristön konkreettisten parantamistoimenpiteiden määrittelyyn harjoitellaan käytännössä havainnoimalla esimerkiksi liikkumista ja liikenneympäristöä.

KIELET JA VIESTINTÄ

Tekniikan alan ammattilainen tarvitsee kielitaitoa ja viestintäosaamista. Kieli- ja viestintäopinnoissa opiskelija kehittää raportointi- ja esiintymistaitojaan **sekä digitaalisten viestintävälineiden käyttöä**. Tavoitteena on sujuvuus erilaisissa työelämän vuorovaikutustilanteissa. Englannin, ruotsin ja viestinnän opinnot liittyvät kiinteästi muihin ammattiopintoihin.

Englannin kielessä tavoitteena on saavuttaa eurooppalaisen kielitaidon viitekehyksen mukainen taitotaso B2. Ruotsin kielessä tavoitteena ovat B1-tasoa vastaavat taidot.

MATEMATIIKKA

Matemaattiset valmiudet ovat olennainen osa insinöörin ammattitaitoa. Matemaattis-luonnontieteellistä osaamista tarvitaan ammatillisen ymmärryksen saavuttamiseen, **ongelmanratkaisutaitojen kehittymiseen** sekä teknisten ongelmien ratkaisemiseen.

Matematiikkaa sovelletaan eri ammateissa eri tavoin, mutta kaikille insinöörialoille keskeisiä osa-alueita ovat algebra, geometria, lineaarialgebra ja tilastomatematiikka.

YRITTÄJYYS

Yrittäjyys on asennetta, valmiuksia ja toimintaa mahdollisuuksien etsimiseksi ja hyödyntämiseksi. **Liikennealan koulutuksessa valmius toimia sekä aktiivisena kansalaisena ja työntekijänä että yrittäjänä vahvistuu.**

Yrittäjämäisten taitojen 3 osaamisaluetta ja 15 taitoa vahvistuvat ja kehittyvät opintojen myötä. Tavoitteena on:

- yrittäjyysasenteiden ja -valmiuksien vahvistaminen
- korkeakoulupohjaisen yrittäjyyden synnyttäminen ja
- olemassa olevan yritystoiminnan uudistaminen ja kehittäminen.

Hämeen ammattikorkeakoulu tarjoaa mahdollisuuksia myös konkreettisesti testata ja kehittää omaa yritystoimintaa jo opintojen kuluessa. Kannustamme sekä yrittäjämäiseen toimintaan että konkreettiseen yritystoiminnan perustamiseen.

OPINTOJEN RAKENNE

Ydiosaaminen ja profiloiva osaaminen

Moduuli on 15 opintopisteen osaamiskokonaisuus, joka on rakennettu jonkin työelämän ilmiön ympärille. Moduulille on laadittu osaamistavoitteet ja arviointikriteerit, jotka määrittävät moduulin suorituksessa arvioitavat osaamiset.

Ydiosaamisen opinnot ja opinnäytetyö ovat tutkinnon suorittajalle pakollisia moduuleja. Harjoittelu kuuluu ydiosaamiseen. Profileivat opinnot ovat valinnaisia tai vaihtoehtoisia moduuleja, joilla opiskelija voi suunnata omaa

osaamistaan omien uratavoitteittensa mukaisesti. Vaihtoehtoisia opintoja voi valita myös koko HAMKin tarjonnasta, muista kotimaisista tai kansainvälisistä korkeakouluista.

Opiskelija voi painottaa opintojaan haluamaansa suuntaan esimerkiksi liikenneympäristön suunnitteluun, viisaan liikkumisen edistämiseen tai älykkään liikenteen palveluiden kehittämiseen

Liikennesuunnittelun opinnoissa perehdytään kaikkien liikennemuotojen: joukkoliikenteen, autoliikenteen, pyöräilyn, kävelyn - ja pysäköinnin suunnitteluun sekä myös liikenteen ympäristövaikutuksiin ja niiden arviointiin. Lisäksi opiskelija saa valmiudet liikennesuunnittelussa tarvittavien liikennetutkimusten ja välityskykytarkastelujen tekemiseen sekä yleisimpien suunnitteluohjelmien käyttöön.

Viisaan liikkumisen ja älykkään liikenteen moduuleissa tutustutaan kestäväen liikkumisen edistämiseen, liikenteen palveluihin sekä autonomisen liikenteen kehitykseen. Lisäksi opiskelija oppii palvelumuotoilun perusteet ja merkityksen käyttäjälähtöisessä suunnitteluprosessissa.

Opiskelija voi täydentää osaamistaan ottamalla osaksi tutkintoaan HAMKin muiden koulutusalojen opetustarjontaa tai hyödyntäen eri korkeakoulujen kaikille opiskelijoille avoimia opintojaksoja. Osan opinnoista voi suorittaa myös nk. työpaikkaopintoina osallistumalla oman työpaikkansa projekteihin. Kansainvälisiä opintoja voi suorittaa opintojen aikana HAMKin kansainvälisissä vaihtokohteissa. **Myös yrittäjyyspolun valitseminen on mahdollista.**

Opinnäytetyö

Ammattikorkeakoulututkinnon opinnäytetyön laajuus on 15 op. Opinnäytetyön tavoitteena on vahvistaa sekä yleisiä työelämävalmiuksia että alakohtaisia ammatillisia kompetensseja. Opinnäytetyön tekeminen on oppimisprosessi, jossa opiskelija oppii työskentelemään tutkivalla, analyysoivalla ja kehittäväällä työotteella.

SIJOITTUMINEN TYÖLÄMÄÄN

Liikennealan koulutus antaa pätevyyden toimia laaja-alaisesti niin julkisella kuin yksityiselläkin sektorilla. Voit valmistuttuasi toimia kunnan tai kaupungin liikennesuunnittelijana, joukkoliikenneoperaattorilla erilaisissa tehtävissä tai yksityisellä sektorilla (esimerkiksi konsultti) suunnittelijana tai tie- ja katuverkon kunnossa- ja ylläpitoon liittyvissä tehtävissä hoidon alueurakoista vastaavissa yrityksissä. Myös valtionhallinto (esimerkiksi Traficom, Väylävirasto, ELY-keskukset) sekä aluehallinto (HSL, maakuntien liitot) työllistävät paljon liikennealan osaajia. **Liikennealan koulutus tukee myös mahdollisuuksiasi toimia yrittäjänä.**

Liikennealan insinöörin työtehtävien kirjo on laaja aina liikennejärjestelmien suunnittelusta ja strategisesta ohjauksesta yksityiskohtaiseen liikenneympäristön suunnitteluun sekä liikkumisen ohjauksesta erilaisten älykkään liikenteen palvelujen suunnitteluun. Liikennealan insinöörin tehtävänimikkeitä voivat olla esimerkiksi liikenneinsinööri, liikennesuunnittelija, joukkoliikennesuunnittelija, maankäytön asiantuntija, konsultti ja aluevastaava.

Appendix 5: Model of Entrepreneurial Education

1st study year	2nd study year	3rd study year	4th study year
mentions of entrepreneurial skills and activities on the applicants' pages curriculum entrepreneurship texts			
implementation plan checklist use of the work program CV-/portfolio tasks projects highlighting entrepreneurial opportunities	implementation plan checklist use of the work program CV-/portfolio tasks projects highlighting entrepreneurial opportunities	implementation plan checklist use of the work program CV-/portfolio tasks projects highlighting entrepreneurial opportunities	work program as a tool in thesis supervision projects highlighting entrepreneurial opportunities cooperation with alumni and companies guiding to project work
Entrepreneurship Game Book			
cooperation with alumni and companies service design methods guiding to project work	cooperation with alumni and companies service design methods guiding to project work	cooperation with alumni and companies service design methods guiding to project work	guidance to actual entrepreneurship courses advancing entrepreneurial intentions
inclusion of actual entrepreneurship studies guidance to actual entrepreneurship courses identifying entrepreneurial intentions in a personal study discussion	inclusion of actual entrepreneurship studies guidance to actual entrepreneurship courses identifying entrepreneurial intentions in a personal study discussion	guidance to actual entrepreneurship courses advancing entrepreneurial intentions work program as a tool in thesis supervision	maintenance of alumni cooperation

Appendix 6: Entrepreneurial Competence Checklist for Teachers

		Levels of proficiency		
		1 st year implementations	2 nd year implementations	3 rd year implementations
Area	Competence	Foundation	Intermediate	Advanced
Ideas and opportunities	Spotting opportunities	find opportunities	address emerging needs	seize and shape opportunities to respond to challenges
	Creativity	use their creativity and develop new ideas	test and refine ideas	transform ideas into solutions
	Vision	imagine a desirable future	build inspiring vision engage others	use their vision to guide strategic decision-making
	Valuing ideas	understand that ideas have different kinds of values	compare different types of ideas or solutions	develop strategies to make the most value generated by ideas
	Ethical and sustainable thinking	recognize the impact of their choices and behaviors, both within the community and the environment	take ethical and sustainability implications into consideration in decision-making	make sure that their ethical and sustainability goals are met
Resources	Self-awareness and self-efficacy	trust their own ability to generate value to others	take advantage of their strengths and weaknesses	teaming up with others and by further developing their strengths
	Motivation and perseverance	follow their passion	put effort and resources into following their passion	stay focused on their passion and keep creating value despite setbacks
	Mobilizing resources	find and use resources responsibly	gather and manage different types of resources	define strategies to mobilize the resources they need
	Financial and economical literacy	draw up the budget for a simple activity	find funding options and manage a budget	make a plan for the financial sustainability of an activity
	Mobilizing others	communicate their ideas clearly and with enthusiasm	persuade, involve and inspire others	inspire others and get them on board for activities
Into action	Taking the initiative	show willingness at solving problems that affect their communities	initiate activities	look for opportunities to take the initiative
	Planning and management	define the goals for a simple activity	create an action plan, which identifies the priorities and milestones to achieve their goals	refine priorities and plans to adjust to changing circumstances
	Coping with uncertainty, ambiguity and risk	avoid being afraid of making mistakes while trying new things	evaluate the benefits and risks of alternative options and make choices that reflect their preferences	weigh up risks and make decisions despite uncertainty and ambiguity
	Working with others	work in a team	work together with a wide range of individuals and groups	build a team and networks based on the needs
	Learning through experience	recognise what they have learnt through taking part in activities	reflect and judge their achievements and failures and learn from these	improve their abilities by building on their previous experiences and interactions with others
<i>Does the implementation include...</i>				
Work program		Activity that can be added to a portfolio or CV	Project	Opportunity to spot entrepreneurial ideas
<i>All activities involve a production of cultural, social or commercial value</i>				