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LEARNING DIARIES IN STARTUP EDUCATION: AN EMPIRICAL & COMPARATIVE STUDY

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ABSTRACT

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The concept of startups and startup education has been recently rising in higher education. The concepts of entrepreneurship education, innovativeness, and challenge-based learning are themes that have been taught similarly to startup education. The startup education is a relatively new topic and the ways of doing startup education have been relatively little studied. This thesis aims to understand how learning diaries can be effectively used in startup education and how the learning diaries can be beneficial.

This thesis introduces a new model to be used in the startup education called The Startup Scratch Book. The startup scratch books are course works that combines traditional learning diaries and scrapbook elements. The model aims to help the teachers and the students to have a mutual understanding of the course requirements and create a single approach to be used in the startup education. The empirical data analyzed in this thesis is collected from the Lean Startup/ Venture Lab course held at the University of Jyväskylä in 2018 and 2019. The empirical data validates the importance of including specific aspects to the scratch book to increase the quality of the learning process.

The study claims that the startup scratch book can have a positive effect on the students learning and the effective use of the startup scratch books can improve the assessment process of the course because the students better understand what is required from them in terms of the course requirements.

Keywords: startup education, learning diary, challenge-based learning, business model canvas

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Startup-aiheinen opetus korkeakouluissa on kasvanut selvästi viimevuosien aikana. Opetus liittyen yrittäjyyteen, innovaatioihin sekä haastepohjainen opetus ovat teemoja, joita opetetaan usein samanlaisilla metodeilla, kuin startupeihin liittyviä asioita. Startup-opetus on melko uusi tutkimuskohde ja menetelmiä, joita startup-opetuksessa käytetään, on tutkittu melko vähän. Tämä tutkimus pyrkii ymmärtämään miten oppimispäiväkirjoja voitaisiin tehokkaasti hyödyntää startup-opetuksessa ja miten oppimispäiväkirjat voisivat olla hyödyllisiä.

Tämä tutkimus esittelee uuden mallin, jota voidaan käyttää startup-opetuksessa: The Startup Scratch Book-mallin. Startup scratch bookit ovat kurssitöitä, jotka yhdistelevät perinteisien oppimispäiväkirjojen ja leikekirjojen elementtejä. Malli pyrkii auttamaan sekä opettajia, että opiskelijoita saavuttamaan yhteisymmärryksen siitä, mitä kurssilla vaaditaan. Malli pyrkii kehittämään yksiselitteisen mallin, jota voidaan hyödyntää startup-opetuksessa. Tutkimuksessa käytetty empiirinen data on kerätty Lean Startup/ Venture Lab kurssilta, joka pidettiin Jyväskylän yliopistossa vuosina 2018 ja 2019. Empiirinen data vahvistaa tiettyjen aspektien sisällyttämisen tärkeyden scratch bookeissa, jotta scratch bookien laatu ja opiskelijoiden oppimisprosessi parantuisi.

Tämä tutkimus väittää, että Startup Scratch Book on menetelmä, jolla on positiivisia vaikutuksia opiskelijoiden oppimiseen ja scratch bookien tehokas käyttö auttaa myös opiskelijoita ymmärtämään, mitä heiltä kurssin puitteissa vaaditaan.

Asiasanat: startup opetus, oppimispäiväkirja, haastepohjainen oppiminen, business model canvas

FIGURES

TABLES

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Motivation

The amount of startups is constantly increasing and there are new startups started every day. The start-up concept has also grown from a teaching perspective and the focus on startups, entrepreneurship and innovation is also rising in universities and other institutions.

Entrepreneurship has been taught all around the world for a long time and the first courses about entrepreneurship were held over 50 years ago at Harvard (Katz, 2003). According to Blackford et al. (2009) courses taken and education about entrepreneurship are associated with the increased possibility of starting a new startup after graduation. In this study, the results showed a link between the education that encourages self-confidence, risk-taking capacity, and networking, and starting a new business after graduation can be found. (Blackford et al., 2009 p. 20-21.) Although entrepreneurship education has been researched in the past the research about startup education is a relatively new topic.

According to Chanin et al. (2018b, p. 167), the field of software startup education is relatively new and it has not been explored well enough yet and there is a clear need for more research especially about designing a single approach framework that can be used in software startup education. According to the study of Ralph (2018) about project management education, it is stated that activities like evidence-based readings, quiz-every-class, taking notes, a workbook of in-class activities, term projects, and peer reviews can be more effective and constructive than traditional lectures. The traditional teaching methods are often based on slide-supported lecturing and final exams at the end of the course and there is no focus on improvisation and solving real-life problems or challenges. (Ralph, 2018, p.185.)

The business model canvas is a tool often used in early-stage startups. It is a strategic tool that can help new businesses with a visualized framework that can help to focus on overcoming challenges by creating simple, relevant, and

understandable concepts and realizing what the most relevant aspects of the new business are. The business model canvas is often used as a tool in startup education. Another common tool in education is reflective learning diaries and these have been used in various fields in education for a long time.

The aim of this study is to understand how the startup education could be done so that students not only learn about startups and entrepreneurship but also understand how a startup is set up and what things are relevant to setting up a new startup. This study researches how the learning diaries can be used in the context of startup education. It is not common that early-stage startups have written documentation about early-stage business development methodologies. In this study, the material used is collected in the Lean Startup/Venture Lab course at the University of Jyväskylä. This documentation is relevant to gain an understanding of the possible processes and methodologies used in early-stage startups.

1.2 Research Question

The research question of this study is: How to use learning diaries to benefit startup education? In addition to the main research question the question has been divided into three sub-questions:

RQ1: What aspects should be covered in the learning diary in startup education?

RQ2: How to evaluate students' learning from a learning diary?

RQ3: How to influence the learning diary process?

1.3 Structure of the thesis

The thesis consists of a literature review and an empirical section. Section 1, introduction, includes the motivation of the thesis, research questions, and the structure of the thesis. In section 2, the literature review, the concepts of early-stage startup & educational startup, concepts of the business model canvas, lean startups, software startup education, and challenge-based learning are introduced and described. In this section the theoretical framework of this study is created and the current literature relevant for the thesis is referred.

The theoretical framework of this study is defined in section 3. In this section the research model (The Startup Scratch Book) is opened up and explained. In section 4, the context of this study is explained and the research methodology and data collection methods are discussed. In this section the empirical design is introduced.

Section 5 introduces the empirical results of the study. In the empirical results part, the results of the empirical study will be analyzed using qualitative methodologies, more precisely thematic analysis. In this section the key findings as empirical conclusion (EC) s and primary empirical conclusions (PEC) are presented.

After that section 6 includes discussion. In the discussion, the theoretical contributions and practical implications based on the empirical results and primary empirical conclusions (PECs) are covered. In this section the future implications based on the empirical results are discussed.

The conclusion, section 7, will include answers to the research questions, limitations of the study, and possible future research directions. This chapter concludes this thesis.

2 LITERATURE REVIEW

The literature review includes all of the important literature used in the theory of this thesis. The literature review consists of the definition of early-stage startups, lean startup, business model canvas and business model innovation, software startup education, and challenge-based learning.

2.1 Startups and early-stage startups

Giardino et al. (2014) introduce a variety of themes that are common to startups. These themes include characteristics such as lack of resources, reactivity, innovativeness, uncertainty, rapid evolution, time pressure, third-party dependency, small teams, usually only one product, a low-experience team, a new company, high-risk, and little working experience. (Giardino et al., 2014, p. 28-29.) Based on Sutton (2000) the ability to execute can be seen as a key capability of success of the startup. Startups can have challenges due to a lack of resources because the immaturity of processes can affect startup and its ability to execute. The process that a startup creates can form the basis for processes that a company can use and repeat later on when the maturity of the company increases. This is important because creating processes that are capable of repeatability can affect the success of the startup. To overcome these challenges that immaturity of processes might cause it is crucial to create a process and improve the processes used. The first step for creating a process is to define the process on a higher level. This definition should cover the overall structure of the process and flow. However, startup processes should also be flexible because changes often require a rapid and timely process, and responding and redefining processes is time-taking and costly. It is also important to learn from experiences and reuse things and experiences that have been discovered and proven good in the past. (Sutton, 2000, p.36.)

Startups and software startups differ from traditional and mature companies but the term software startup does not have a specific definition defined by

researchers. According to Untelkalmsteiner et al. (2016), the unifying factor in software startups is that they deal with uncertain conditions, grow quickly, develop products and services that are innovative, and aim for scalability. However, the definition can vary based on the research and constructions that are studied. (Untelkalmsteiner et al., 2016, p.91.)

According to Chanin et al. (2018) the concept of software startups is commonly taught on courses that differ from traditional lecture-based courses. The teaching methods in these non-traditional courses can include creating a mock-up startup in student teams and developing the idea into a real business plan. However, the term startup might not be used on this kind of course, and they are often more associated with innovation, entrepreneurship, and software engineering. (Chanin et al. 2018.) Teaching about startups is a relatively new research topic and educational startups have been researched only a little but the concept of the Entrepreneurship Education (EE) has been researched more. Based on the study of Blackford et al. (2009) EE can be associated with the increased possibility of starting a new startup and courses and education about starting a new business in various fields have been increasing lately in higher education. (Blackford et al., 2009 p. 20-21) In this study, the educational startups are mock-up startups created for the course and are not registered companies.

2.2 Lean startup

The origin of lean principles is in Japanese manufacturing, more precisely in Toyota. Using lean approaches can lead to improved performance of a company. "Lean" includes eliminating unnecessary steps, continuous flow, using cross-functional teams, and continually striving for improvement. With these methodologies companies can develop, produce, and distribute products with less effort, space, tools, time, and overall expense and they might become more flexible and responsive to customers' needs. (Womack, 1994, p.93.)
Ries (2011) introduces five principles for lean as follow:

- Entrepreneurs are everywhere
- Entrepreneurship is management
- Validated learning
- Build-measure-learn
- Innovation accounting

The first principle means that there are entrepreneurs everywhere and the Lean Startup approach can be used in various companies, large or small. The next principle is important because the new institution of a startup requires a new kind of management style. Validate learning in startups is crucial because startups exist to learn how to build a good business. Build-measure-learn means that building products from ideas, measuring customers' response and learning are all important steps for startups. Innovation accounting includes measuring

progress, setting up milestones, and prioritizing work. All of the principles are important parts of a lean startup. Ries (2011) introduces a build-measure-learn feedback loop that is one of the Lean Startup models. This model includes providing ideas into real products, measuring the customers' responses, and learning from the data. (Ries, 2011.)

Blank (2013) introduced the Customer Development Model that is often linked to lean startup methodologies. The model consists of customer discovery, customer validation, customer creation and company building. Customer discovery focuses on the problems and needs of the customer, customer validation focuses on developing a sales model that can be replicated, customer creation on creating end-user demand, and company building on transitioning the organization from one designed for learning and discovery to an organization that is ready for execution. (Blank, 2013, p. 16-17.)

2.3 Business Model and Business Model Canvas

Innovative business models are created every day all around the world. Business models are created to describe how an organization can create, deliver and capture value for companies, customers, and society. Osterwalder & Pigneur (2010) introduce a framework called Business Model Canvas (BMC) to visualize the building blocks of value creation. BMC can help with overcoming challenges of creating simple, relevant and understandable concepts without forgetting the complexity of enterprise functions. BMC includes nine building blocks that are customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships & cost structure.

2.3.1 Business model definition

According to Chesbrough (2010, p. 355-362) business model includes value proposition, revenue generation mechanism, the structure of the value chain, details the revenue mechanisms, cost structure, and profit potential and competitive strategy. Business models are often made to ensure that innovation delivers value to the customer. Business model innovations are seen as an important part of the success of the company. The challenge is that changing the business model is not easy and though there are tools and maps to help it might not be enough. Business model innovations require that the company has a good attitude toward business model innovations and experimentation.

According to Lindgardt et al. (2009) business model innovation consists of a value proposition that includes target segments, product or service offering, and revenue model and operating model that includes value chain, cost model and organization. Business model innovation can be more challenging to apply than e.g. process innovation but can create better returns. Amit & Zott (2012 p.36-42) introduce the positive effects of using business model innovation. Their

definition of business model is the ways that the company does its business and interacts with its customers, partners and vendors. Using business model innovation can increase the competitive advantage in the future and stay ahead of other businesses in the product innovation game. Using business model innovations can make it more difficult for competitors to replicate the business model. Before creating a new business model there are several aspects that need to be considered: needs that should be satisfied through the new model design, novel activities that are needed to satisfy these perceived needs, how the required activities can be linked to each other in new ways, the people to perform each of the activities that are part of the business model, the value creation process through the business model, and how revenue model fits with the company's business model.

2.3.2 BMC building blocks

As stated earlier, the Business Model Canvas introduced by Osterwalder & Pigneur (2010) includes nine building blocks that are introduced and shortly explained in figure 1.

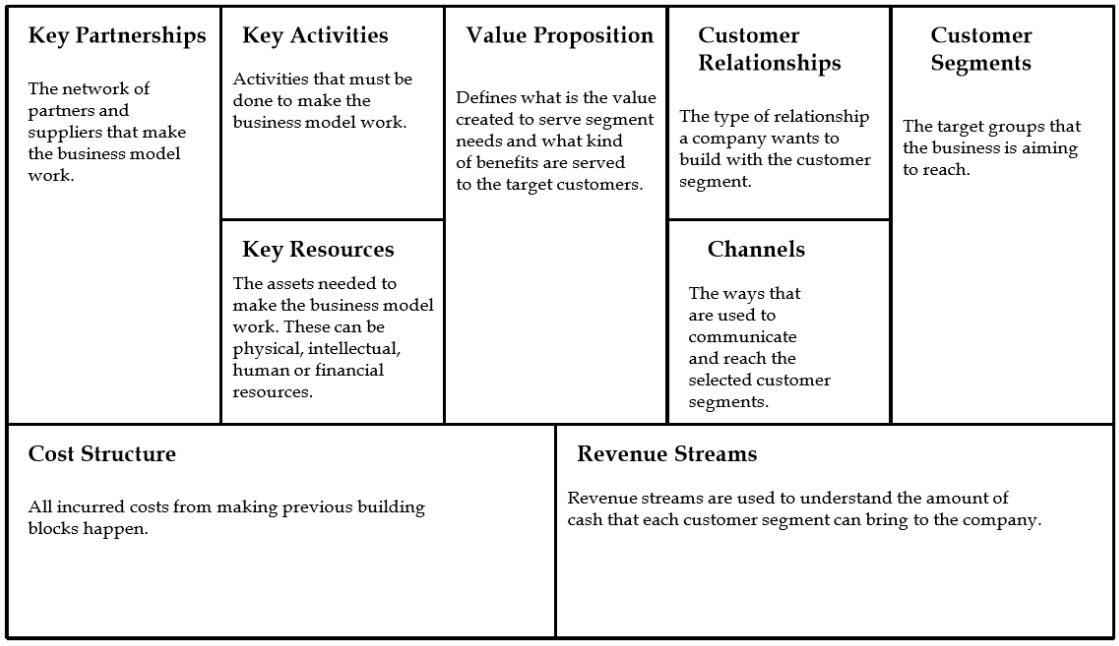

FIGURE 1 Business Model Canvas building blocks based on the Business Model Canvas (Osterwalder & Pigneur, 2010)

Customer segments should be defined based on common needs, common behaviors, or other attributes that the different customer groups have in common. This segmentation of customer groups can be done by asking:

- Does their need require a distinct offer?
- Are they reached through different distribution channels?

- Do they require different types of relationships?
- Do they have significantly different levels of profitability?
- Are they willing to pay for different aspects of the offer?

After the definition of the customer, segments are defined to allow the company to better understand the needs of similar customers. (Osterwalder & Pigneur, 2010.) According to Weinstein (2014) segmentation is a key activity for marketing to create a connection between the customer and the company. The segmentation process should consider customer motivation including the needs of the customer, the type and style of relationship wanted to be achieved and the risk management of the customer segment. (Weinstein, 2014, p. 259.)

Value proposition solves a customer problem or answers to customer needs. Values may be qualitative e.g. customer experience or quantitative e.g., price. A value proposition can be similar to an existing market or it may consist of completely new value due to lack of similar offering, tailored products, design, usability, or price. To reach the customer segments and solve a customer problem it is important to define what channels are used. Channels help customers to find the company and understand its value propositions and allow customers to purchase their product or service. (Osterwalder & Pigneur, 2010.)

Customer relationships can be personal, self-service, co-creation, automated, or some other. Customer relationships are crucial to define because the ways of sustaining relationships with different customer segments influence the overall customer experiences. When defining revenue streams, the company must consider the prices each customer segment is truly willing to pay for the product or service offered. Transaction revenues (one-time payments) and recurring revenues (ongoing payments) are the two types of revenue streams and there are various ways of generating them e.g., usage fees, subscription fees, leasing, renting, advertising, or licensing. Revenue streams can have different pricing mechanisms and the two main types are fixed pricing (based on static variables) and dynamic pricing (based on market conditions). (Osterwalder & Pigneur, 2010.)

Key resources can be categorized under four different headings: physical, intellectual, human, or financial resources. Physical resources such as buildings, vehicles, machines, systems, and other assets are often used in manufacturing. Intellectual resources like proprietary knowledge, brands, patents, partnerships, and customer databases are difficult to develop but are often certainly valuable resources. Human resources are important in every business, but especially in fields that require creativity or are knowledge-intensive. Last are the financial resources, which include, e.g., cash, lines of credit, or a stock option pool. These can be used in many kinds of situations such as hiring key employees. (Osterwalder & Pigneur, 2010.) According to Zhao et al. (2015) the choices made about the used resources combined to the level of experience in the team can have significant implications for the performance and success of the startup. For example, the combination of prior startup experience and strong technical

resources can reduce the fact that others imitate a company's product or service. (Zhao et al., 2015, p. 455.)

Production, problem-solving, and platform can be examples of key activities. Key activities can be related to production, problem-solving, or network or platform development. There are four types of key partnerships: strategic alliances between non-competitors, coopetition (e.g., strategic partnerships between competitors), joint ventures to develop new businesses, and buyer-supplier relationships. It is important to understand who are the key partners and suppliers and what motivations behind them are. The last building block is the cost structure. Creating value and maintaining customer relationships as well as creating revenue incur costs. The costs can be calculated only after the definition of key resources, activities, and partnerships. There are two different ways for business model cost structure: value-driven and cost-driven. The value-driven approach is more focused on creating value than cost implications. The cost-driven approach focuses on minimizing costs. It is important to define the cost structure for the company. (Osterwalder & Pigneur, 2010.)

All of the building blocks described earlier are the key to understanding how organizations can create, deliver, and capture value for companies, customers, and society and what is needed to accomplish this value creation process. Using these building blocks it is easier to understand the complexity of enterprise functions and overcoming the challenges. (Osterwalder & Pigneur, 2010.

2.3.3 Team perspective

According to Kemell et al. (2020) the team perspective is not highlighted enough in the traditional business model canvas introduced by Osterwalder & Pigneur (2010), and the team element should be considered especially in the context of software startups. The team perspective should focus on the team's capabilities to go through with the idea of the startup. Their research suggests adding a new building block called the team. This building block would include the perspective of the team's resources e.g. skills, networks, and capabilities. This suggested that an additional block would be included in the business model canvas. (Kemell et al., 2020.) See figure 2.

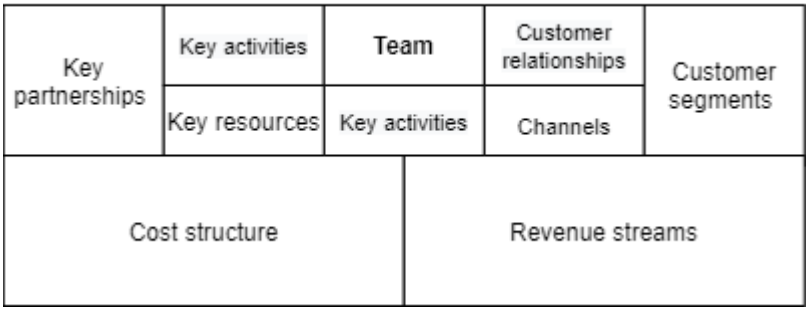

FIGURE 2 Business Model Canvas (Osterwalder & Pigneur, 2010) with additional team perspective created by Kemell et al. (2020)

2.4 Software Startup Education

According to Chanin et al. (2018a), the concept of software startups can be taught in universities in ways other than traditional lecture-based courses. Traditional lecture-based courses are often formed of lectures and final exams. The learning process is often evaluated based on the results of the final exam. In software startup education it is possible to teach the concept of a software startup by creating mock-up startups in student teams, and then developing the idea into a real business plan. The term startup might not be used on this kind of course and they are often more associated with innovation, entrepreneurship, and software engineering. The authors state that the concept of courses based on real-life situations is relevant and should be researched more. Using different frameworks can be an effective way to teach the concept of the startup creation process. Using e.g. BMC for educational purposes can be an effective way to help students define their visions for the business model creation and not focus only on the product or service offering but also other factors such as the market itself. (Chanin et al., 2018a, p.223-228.)

According to Chanin et al. (2018b), the concept of startup education can be challenging. There is no framework that suits every educational situation. The nature of the course will influence the type of practices, tools, and methodologies used. Another challenge is that real-life experiences are not easy to create and offer to students during a course in university. Educational choices can have a big impact on what a course accomplishes. The educational best practices introduced in a systematic mapping study made by Chanin et al. (2018b) include not having a final exam, learning through the process (talking to customers, working in teams, or building MVP), flipped classroom approach and focusing the journey not the endpoint. To understand the learning process students are often instructed to write personal and team reports and present the progress of their project. Documenting all the steps from the very beginning is crucial to understand the learning process of the students. (Chanin et al. 2018b, p. 225-227.)

The similar results were found in another study of Chanin et al. (2018) where the learning outcomes were listed in software startup education as follows: practical skills e.g. programming, strategies to test out business hypotheses, project management skills, understanding the different aspects of entrepreneurship, learning the skills of a startup practioner, innovative business practices, agile methods, team skills, using different tools e.g. GitHub and overall entrepreneurship. All of these outcomes and skills gained during the course are beneficial to an entrepreneur and they can be seen as a result of the good use of software startup education. (Chanin et al. 2018a, p. 226-227.)

2.4.1 Entrepreneurship Education

The debate on whether entrepreneurship can be taught is ongoing. While many of the aspects of entrepreneurship can be taught, it also requires a certain flair or attitude towards taking risks and there is a role for the gut feeling in entrepreneurship. However, there is a role and the need for entrepreneurship education. Entrepreneur education is commonly used to acquire knowledge and skills, to identify and stimulate entrepreneurial drive, talent, and skills, to devise attitudes towards change, to encourage new start-ups and other entrepreneurial ventures, and to develop empathy and support for all aspects of entrepreneurship. (Garavan & Barra, 1994, p.5.)

Entrepreneurship Education can be sorted into three different themes. The first theme is a teacher-centered teaching method where the teacher focuses on teaching students about entrepreneurship with the use of theoretical content. The second and third themes are relatively similar. These themes are teaching "for" and "through" entrepreneurship. In these two methods, the aim is to create an environment where students can imitate real business situations or create their own business. (Sirelkhatim & Gangi, 2015, p. 8.) This study focuses primarily on the second and third types of themes.

According to Taatila (2010) higher education institutes should offer more learning opportunities for entrepreneurship for students to increase the effect of EE. EE should be student-centric and utilize real-life cases in education. Also, it would be desirable to support more pragmatic approaches in cases of entrepreneurship education. The fact that entrepreneurship education may require changes to the current system should be seen as an opportunity to improve teaching, not so much as a challenge. (Taatila, 2010, p. 56-57.)

Genova and Gonzalez (2017) claim that there are three stages in the educational process in entrepreneurship education that are also relevant for startups. These stages are called instructing, training, and mentoring. The first stage, instructing, includes basic instructions such as rules, standards, style guidelines, and designs. In this stage the goal is to understand whether the student has learned the procedures and knows how to apply them in concrete situations. The second stage, training, includes the problem that is given to the students to solve. In this stage the students are able to find solutions of their own and in this stage, critical thinking and different solutions are the main outcomes. The last stage, mentoring, is the stage where the students are able to not only find effective solutions but also identify problems and define criteria to evaluate potential solutions and the student knows how to find and develop these solutions and goals. All of these stages have their own outcomes: the first stage helps the students understand the basic rules, the second stage gives the students the ability to find their own solutions and the last stage gives the ability to propose their own goals and objectives and increase creativity. (Genova & Gonzales, 2017, p. 1793-1799.)

Rasmussen & Sørheim (2006) introduce a study of action-based entrepreneurship education. Their study shows that EE focuses more on learning by

doing activities than traditional classroom teaching and the goal of the EE is not only to educate entrepreneurs but also establishing new ventures, commercializing university research, and to focus on the business opportunity and contextual issues. Their study introduces a link between entrepreneurship education and the number of new businesses started among the participants and this could be evidence that good quality entrepreneurship education is possible and educating entrepreneurs can be successful. The challenge with action-based learning is that it might not fit into the timetable of traditional university studies and entrepreneurship education can be seen as being in conflict with existing teaching practices and methodologies, and the culture of the university. (Rasmussen & Sørheim, 2006, p. 192-193.)

2.4.2 Entrepreneurship Education in Finland

Entrepreneurship Education has been used in the context of teaching about entrepreneurship in Finland. According to Ruskovaara & Tiikkala (2012 p.107) teachers in Finland appreciate and support students' self-dependence, self-confidence, responsibility, goal-orientation, self-directivity, and learning from mistakes. These characteristics are seen as key characteristics in the entrepreneur education environment. Although the teachers might not have been aware of the EE methodologies and principles, this study shows that similar approaches are already used for educational purposes.

The study of Sekkula-Leino et al. (2015, p. 399) shows similar results. According to the results of their study entrepreneurial teaching methods are used actively and regularly by Finnish teachers. The methodologies and practices used commonly are the following:

- Experiential learning
- Problem-solving and problem-based learning
- Encouraging responsibility, self-confidence and self-evaluation skills
- Operating independently
- Seeking different solutions

In addition to these methodologies used, different kinds of student activation models and methods are also used and this can be seen as learning "for" entrepreneurship in practice method. However, it is always possible to improve. Improvement could take a place for how the teachers are directed to use learning through entrepreneurship e.g. practice enterprises, cooperatives, and on-the-job learning methodologies. (Sekkula-Leino et al., 2015, p. 399-400) If the methodologies are used and the improvements are seen as valuable aspects of education, the quality of entrepreneurship education can increase.

2.5 Challenge-based Learning

Challenge Based Learning (CBL) is a framework that is based on solving real-world problems and challenges. The framework was created in 2008 by Apple, inc. and it is used to understand the basis of experiential learning. The framework consists of three phases (see figure 3):

1. Engage
2. Investigate
3. Act

All of these phases include different activities. The first phase is called *engage* and it includes big ideas such as wide concepts that are explored and they should be relevant and engaging to the students. The engage phase also includes essential questions related to the big idea and challenges that turn the essential question to acts. After these activities the *investigate* phase starts with guiding questions that include everything that the students need to learn. The next activity is called guiding activities and resources and this includes all of the tools and methods available for the students. The analysis is the activity that provides the foundation for the actual solution. The last phase is called *act* and it includes solution concept, implementation, and evaluation. The solution concept is the outcome from the investigate phase where the actual solution is developed, prototyped, and tested. Implementation should take place with a real relevant audience and evaluation verifies if the solution is relevant to the real-life challenge. (Cator & Torres, 2016, p.6-13.)

According to Gaskins et al. (2015) CBL is a suitable framework to be used in problem-solving contexts that are related to real-world challenges. Using CBL can lead to increased reflective thinking and putting knowledge into practice among students. To have the best outcome of using CBL it is crucial that students understand the importance of learning. Adding real-world challenges can help students to understand the importance of the themes they are learning and finding the motivation to solve certain challenges. (Gaskin et al., 2015, p. 40.) CBL has unique characteristics such as being a value-driven approach, improving self-awareness and self-leadership, and increasing entrepreneurial mindset and working methods among students. The sense of meaning through solving real-world challenges motivates students and helps them develop different skills such as teamwork, decision-making, communication, ethics, and leadership. (Malmqvist et al. 2015, p. 10.)

The use of this CBL framework has been found to have a positive impact on various aspects of learning. According to Detoni et al. (2019) the CBL model differs from other learning methodologies such as problem and project based learning because CBL ensures that the students can actively obtain knowledge through work on open-ended problems. For example the possibility of collaboration, the reflection process for the learning process, the active searching for technical knowledge, and the personal involvement to solve real-world prob-

lems and challenges have been increased among the students. The CBL framework is also increasing the motivation and engagement among students. However, it is also important to understand that properly replicating the problems of the world in a learning environment can be challenging and creativity plays an important role in connecting students to real problems and real users. (Detoni et al. 2019, p. 551-552.)

FIGURE 3 CBL model based on Cator & Torres (2016)

2.5.1 Challenge-based startup learning

Chanin et al. (2018c) introduce Challenge Based Startup Learning (CBSL) framework and it is a combination of Challenge Based Learning, lean startup, customer development, and software development techniques. The first step in this model, engage, is similar to the CBL framework. This step includes defining big ideas, essential questions, and challenges. This step focuses on engaging the students and building excitement to ensure motivation. The next step is called the sprint phase and it is a combination of investigating and act phases and activities in CBL. The sprint length suggested is from two weeks to four weeks but the length and number of sprints can be defined to be suitable for the project. At the beginning of the process, the sprints often focus more on investigation activities, and after the necessary information is gathered and investigated the act activities such as delivering software become more important. With this framework, there is always the possibility to go back and investigate more if there is something new to be investigated. (Chanin et al., 2018c, p. 268-269.)

During the first sprint, it is important to focus on collecting information, e.g. through interviews. It is important that enough people are involved in the interviews to identify certain patterns and validate the problem. For the next sprint, value proposition testing is suggested activity. The goal of this activity is to learn whether potential customers can be attracted and if they are interested in the proposed value proposition. The next step includes creating the audience

and then maintaining it e.g. through social media channels. After these steps, students should have enough information to build the first prototype and the sprints can focus more on acting instead of investigating. At the end of each sprint, it would be necessary to have something concrete to show to potential customers. It is also important to reflect on the experiences because reflection is important for the overall learning process. Throughout the course, it is important that the end result is not the focus, but the whole process. The outcome of using the CBSL framework was that the students were more engaged and learned more about the process of developing a startup. (Chanin et al., 2018c, p. 268-269.)

2.5.2 Learning diary

According to Moon (2006), a learning diary is a vehicle for reflection. The concept of a learning diary can be covered with various different terms that describe the same concept. In addition to the term learning diary, the terms learning journal, learning diary and learning log are most often used. (Moon, 2006. p.1-2.) In this thesis term used is learning diary. According to Hyppönen & Linden (2009) a learning diary is a pedagogical method that can be used in various situations. The aim of a learning diary is that the students write a learning diary as the course progresses throughout the course. The learning diary can include learning experiences, events, open questions, and self-assessment. Learning diaries can have various positive effects. With the help of these learning diaries, it is possible for the teacher to find out what was unclear during the course, what was challenging, and what the student actually learned. For the students, writing a learning diary can clarify students' thoughts and thus lead to their deeper learning. There are also certain challenges in using learning diaries as a pedagogical method. If a learning diary is not written regularly but is left to be written at the end of the course, then the students' processing of their own learning may become more difficult and thus the learning diary will not achieve the desired result. From the teacher's perspective, the challenges include providing practices and guidelines and the time that is consumed in the reading, commenting, and evaluating all of the learning diaries. (Hyppönen & Linden, 2009, p. 38.)

According to the study of Pavlovich et al. (2009), learning journals are good tools to gain an understanding of how students reflect on their own learning and develop their critical thinking skills. Their research presented three important themes in learning journals: finding the students' voices, a new space for learning, and realizing a higher purpose. It was seen as an important aspect to get the student emotionally involved and using their own voice to get an understanding of the connections between themselves and the assignment. The next theme is a new space for learning and optimally this would create a well-designed and assessed learning environment, given that the assignment is carefully designed and executed. The last theme, realizing a higher purpose, and this would be achieved through personal development, reflective process, inner

learning, and the natural abilities of the person to filter to the surface. (Pavlovich et al., 2009, 52-56.)

According to (Dignath-van Ewijk, 2015, p.91-92) learning diaries showed to have a positive effect on students' metacognitive skills and attitude, and on their time management skills. In this study, the motivation was not significantly increased because of the learning diary but some positive effects were found in the students' motivational strategy use. According to Park (2003), writing learning diaries can also increase the engagement and motivation of the students. Using learning diaries as a teaching method can increase self-awareness of the students and students can better understand their own learning process. From a teacher's perspective learning diaries can provide insights into how students study and how they handle different situations and possible challenges. From learning diaries teachers might also learn how the understanding of the students changes through the course, and how the responsibilities of their own learning were taken. (Park, 2003, p. 196.) The study of Woodward (1998) also pointed out that the use of reflective diaries can increase the students' self-assessment skills and help them to discover who they are, what they know, and what they could do (Woodward, 1998, p. 421).

According to Prinsloo et al. (2011) there are differences between unstructured learning diaries and structured learning diaries. If the learning diary is structured the written text is often more reflective but lacks spontaneity. Unstructured learning diaries might be more like logs rather than reflective journals but can improve the self-awareness of the students. In addition to well-structured diaries the unstructured diaries can also have a positive effect on students learning e.g. spontaneity and awareness. (Prinsloo et al., 2011, p. 27.) According to Loo et al. (2002) the positive outcomes of using reflective diaries can include not only a student's own learning process but also can increase in the understanding of the group process. Also improving the learning and effectiveness of the team was mentioned. For example, if the challenges in the communication are noticed early on because of the reflection the communication can be improved. (Loo et al., 2002, p. 138.)

The trust between the writer and the reader plays an important role in the process of writing a learning diary. The lack of trust can cause the writers to not write exactly what is on their minds honestly and that can keep them from engaging in meaningful writing, reflecting, and learning processes. (English, 2001, p.29-30.) According to the study of Maloney et al. (2013) in the field of health professional students the truthfulness in their reflective essays can be a challenge and only 20% of the students claimed to be completely honest in their reflection. The reasons why students are not completely honest can be either psychological or physical and they are introduced in figure 4. Psychological reasons include task expectations and preconceptions, beliefs, fears, and feelings. Students may think that showing emotions can have a negative effect and they are seen as unprofessional and in general, sharing emotions can be challenging for some students. Physical limitations to honest reflection include assessment criteria, word count, or other parameters, recall, and clinical experiences. Stu-

dents might feel like they need to censor themselves because the reflection can affect their grades. Remembering the details can also be a challenge if the reflection is written after a longer period of time. (Maloney et al. 2013, p. 622-625.)

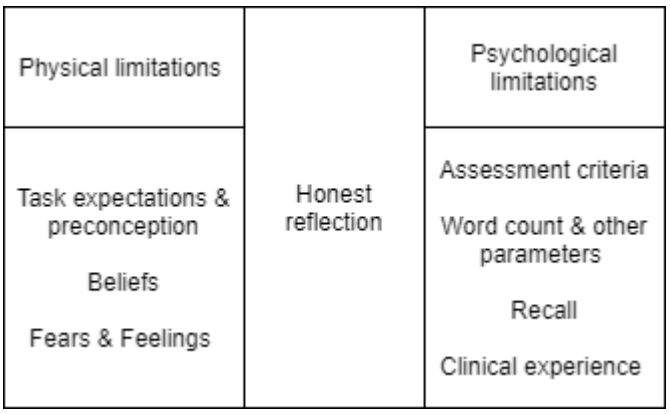

FIGURE 4 Limitations to honest reflection based on Maloney et al. (2013)

2.5.3 Assessing the learning diary

While assessing learning diaries the most important focus should be on the purpose of the learning diary. The assessment criteria and the techniques used should be based on the purpose of the diary e.g. to enable the learning of something or to support creative thinking. Another important focus when making an assessment is whether the learning diary is intended to focus on a process of reflective learning or the learning of content. (Moon, 2006, p.110.) General assessment criteria include at least some of the following:

- Length
- Presentation and legibility
- Number or regularity of entries
- Clarity and the quality of observation
- Evidence of speculation
- Evidence of a willingness to revise ideas
- Honesty and self-assessment
- The thoroughness of reflection and self-awareness
- Depth and detail of reflective accounts
- Evidence of creative thinking
- Evidence of critical thinking
- A deep approach to the subject matter
- Representation of different cognitive skills
- Relationship of the entries in the journal to any relevant coursework, theories, etc.

- Match of the content and outcomes of the journal work to course objectives, learning outcomes for the journal or purposes that the journal is intended to fulfill
- Questions that arise from the reflective processes and on which to reflect further

The amount of material to be evaluated can be large and coping with this issue can be challenging. To overcome these issues students can be instructed to restrain the volume of their writing, or to summarize the material. It is also possible that only part of the work will be evaluated, which makes the work less time-consuming. (Moon, 2006, p.114.)

Moon introduces a framework originally created by Hatton & Smith (1995). In the framework of Hatton & Smith (1995) includes four different stages in journal writing. The first stage is descriptive writing and this stage includes a description of events or literature reports and does not include more discussion. The second stage is the descriptive reflection and this stage includes a description of events but additionally some justification in relatively descriptive language. The third stage is called dialogic reflection and in this stage, the written text is analytical or integrative and it includes linking factors and perspectives. The last stage, critical reflection, includes awareness of multiple historical and socio-political contexts and the text is highly critical.

According to Loo et al. (2002) there are some recommended actions when using reflective learning journals as a teaching method. The objectives of the journals should be clear and specified to the students. The importance of the reflectiveness should be noted and the journals should be treated confidentially. Providing instructional support and feedback when making a learning diary also helps students respond to objectives. (Loo et al., 2002, p. 138.)

However, the ethical concern regarding the use of learning diaries as a teaching technique and assessing them should not be overlooked. According to English (2001), the following guidelines can be used to overcome this challenge. The journals should be treated with respect, justice, caring, and self-awareness and the learners' opportunities for positive outcomes should be maximized. (English, 2001, p.32-33.)

Self-assessment has also emerged in the literature regarding higher education. According to Andrade & Du (2007) giving students an opportunity to self-assess their learning can increase reflectivity on the quality of students' learning. This can lead to deeper learning and improvement. Other positive outcomes of self-assessment are improvements in grades, the better quality of work, and increased motivation and learning. The self-assessment has challenges when the students are not aware of the assessment criteria. This can be solved by making sure that students know what the teacher expects of them. (Andrade & Du, 2007, p. 159-160.) The results of the study of Nieminen et al. (2019), shows that the self-assessment of the students increased the level of depth in learning. The link between the deep approach and higher achievements was found. Although student self-assessment challenges current assessment techniques and methodologies, its benefits for lifelong learning and in-depth learning are significant.

For this reason, student self-assessment should be utilized in higher education. (Nieminen et al., 2019, p. 13-14.)

3 RESEARCH MODEL: THE STARTUP SCRATCH BOOK

3.1 The startup scratch book

Scratch books are a type of learning diaries used in this study. The difference between a regular learning diary and the scratch book is that the students are instructed to write down the steps made in the course regularly and include all of the important and even not so important information in the book. In this thesis we use scratch books written by the students from the lean startup course and the book included each step made in the process of starting a new startup. The concept of scratch books used in this thesis is created for the Lean startup/ Venture Lab course at the University of Jyväskylä and it is created by the course teachers. The scratch books are combinations of scrapbooks and learning diaries and they are created to track the process of creating a new startup.

The model of the startup scratch book consists of building blocks (relevance, depth, reflection, and presentation) and the content of the building blocks of the startup scratch book and the content of the startup scratch book based on the BMC. These two stages in the model combined together will create the final startup scratch book and what are the aspects that the scratch book should include and what is assessed in the scratch books. The model is based on general assessment criteria introduced by Moon (2006) and business model canvas introduced by Osterwalder & Pigneur (2010).

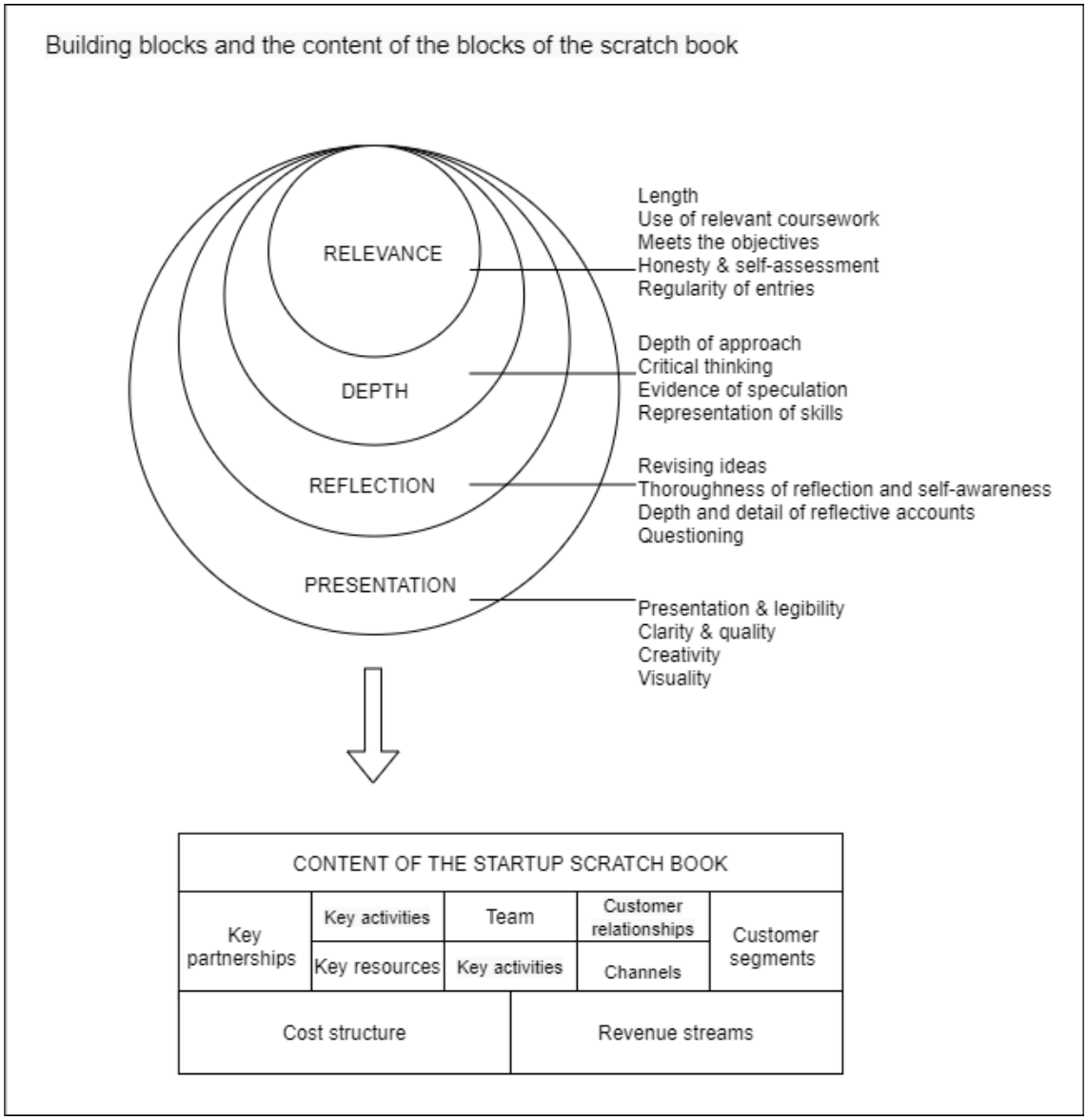

FIGURE 5 Building blocks and the content of the Startup Scratch Book.

3.1.1 Relevance

Relevance holds the foundation for a scratch book. Length is defined in the course requirements and the length is evaluated according to this requirement.

The use of relevant coursework includes the use of academic literature, frameworks, etc. which have emerged during the course or in the course requirements. Meeting the objectives means that the scratch book includes all of the elements that are defined in the course requirements. Honesty and self-assessment can be hard to evaluate. According to Maloney et al. (2013) the reasons for dishonest reflection can be either physical or psychological (see figure 4). To overcome these challenges it is important to understand this when defining course requirements and to encourage students to be honest. Honesty can be seen in the regularity of entries and in the reflection. The regularity of entries

means that the writing process is done regularly and the text includes dates so that the reviewer can see them.

If relevance is well-considered and all the aspects related to relevance are implemented, the work meets the course requirements and objectives well. Well-established relevance creates the basis for high-quality coursework. Poorly implemented relevance may result in an insufficient response to course objectives and requirements.

3.1.2 Depth

Depth includes how deeply and accurately the text is produced. According to Moon (2006) depth and detail of reflective accounts can be one of the assessment criteria of learning diary (Moon, 2006, p.110). The depth of approach includes aspects of versatility, depth of thought, and reflection. Depth can be also assessed by the use of relevant scientific references. Critical thinking means that criticality visible in the text and the text produced includes critical thinking and reflection. Evidence of speculation means, that the possible speculation is visible in the text. When assessing the depth, it is important to look at the texts as a whole and assess the depth of work for all aspects. Representation of skills includes the abilities/skills of the students and those skills learned during the course are reflected in the text that is not required to use but has been chosen nonetheless to bring depth to the work.

An in-depth approach helps to transform the description of a business into a versatile, well-reasoned, in-depth description. If a deep approach is not adopted or is adopted poorly, the work will easily remain one-sided and superficial.

3.1.3 Reflection

According to Moon (2006) reflection is done right when the text is analytical or integrative and it includes linking factors and perspectives. Revising ideas means that the revising process is visible in the text and that ideas and implementations are revised as the work evolves. The thoroughness of reflection means that the reflection is seen in the text and it is many-sided and comprehensive. Questioning includes the question of if the ideas and sources are questioned and how this is shown in the text. Depth and detail include the depth of reflection and the fact that the reflection process is done in detail.

High-quality reflection focuses on the whole learning process in many ways and answers the questions of what, why, and how. Poor reflection only superficially describes what has been done or what has happened, but does not delve into why something happened and what was learned from it.

3.1.4 Presentation

The presentation includes aspects related to the visual appearance and layout of the work. Presentation legibility includes that the source references are marked correctly and the text is honest. Clarity & quality means that the content is clear and understandable and it is done with good quality. Creativity means that creativity is shown in ideas and implementations and in the layout. Representation of skills includes the abilities/skills of the students and those skills learned during the course are reflected in the text. Visuality includes visual appearance, such as pictures, tables, etc.

A good presentation includes a clear structure, illustrative graphs, and tables if it is possible to include them, fluent language, and visual aspects. A poorly executed presentation is unclear and difficult to understand.

3.1.5 Content

Content is defined in the course requirements and the content of the business model canvas is shown in the scratch book. All of the building blocks of the business model canvas (see figure 1.) should be covered in the finished work and all of these themes have been properly covered. The content should include the qualities introduced in relevance, depth, reflection, and presentation blocks.

If all the parts of the content presented in the model have been handled well and with high quality, the business model is already comprehensive. On the other hand, if the content is not handled with sufficient precision, some aspects of the business may be completely or partially ignored.

4 RESEARCH METHODOLOGY

The primary goal of the empirical part of this thesis is to understand the methodologies used in early-stage startups and to test the validity of the suggested theoretical framework associated with CBSL. This chapter includes the context of the study and methodology and data collection sections. In the context of the study the context of this study is described and the baseline of the research is introduced. Methodology and data collection section describes the methodology used in this thesis and data collection process.

4.1 Context of the study

The empirical data used in this thesis is the scratch books collected on a Lean Startup/Venture Lab course held at the University of Jyväskylä in 2018 and 2019. The goal of the course was to prepare students to work and succeed in a dynamic environment and learn in practical terms how to set up and run a software startup. Course requirements require students to produce a scratch book, and these books affect the course grade.

The data analyzed in this thesis is in the form of a scratch book. The scratch books are a combination of a learning diary and scrapbook and they include the overall process of creating a new startup in textual and visual form. The term scratch book is created by the course teachers and the term scratch book is used to describe these course assignments in this thesis. The analyzed scratch books were selected randomly from all the scratch books collected from the courses. In this study eight scratch books will be analyzed, four from the course held in 2018 and four from the 2019 course. Teams one, two, three, and four are randomly selected from the 2018 course scratch books. Teams five, six, seven, and eight are randomly selected from the 2019 course scratch books, and they are introduced in table 1. The scratch books from different years will be analyzed separately and then the results will be compared.

TABLE 1 The teams in two different years

Course held in 2018	Course held in 2019
Team 1	Team 5
Team 2	Team 6
Team 3	Team 7
Team 4	Team 8

4.2 Methodology and data collection

The empirical data used in this thesis was collected from scratch books on the Lean Startup Course mentioned before. The data used in the context of this thesis is qualitative textual data. The purpose of the study is to analyze non-numeric data to gain a wide understanding of the phenomenon that is a common characteristic of qualitative research. The methodology used to analyze the results is qualitative thematic analysis. The qualitative analysis includes risks just like every other research methodology. According to Bengetsson, (2016) human mistakes are always possible. Mistakes can be caused by fatigue, error interpretation, and personal bias. It is the responsibility of the researcher to maintain the quality of the process by assuring validity and reliability throughout the entire study. (Bengetsson, 2016, p. 9-11.)

According to Ratner (2002) subjectivity and objectivity are important aspects of the qualitative study. The subjectivity of the researcher is closely involved in scientific research and the challenges of subjectivity and objectivity should not be overlooked. (Ratner, 2002, p. 1.) The challenge of subjectivity is especially related to the qualitative methodologies because the quantitative methodologies are more structured and researches that are using qualitative methodologies are often interacting closely with the research participants (Mruck & Breuer, 2003, p. 1). However, according to Garcia & Quek (1997) subjectivity of the research can be also seen as strength. Subjectivity can be used to gain a deeper understanding of the phenomenon. The comparison between qualitative and quantitative methodologies because the methodologies aim to answer different questions and theoretical issues and while the objectivity is seen as a positive outcome of the quantitative methodologies, the subjectivity of qualitative research should be seen but not exaggerated. (Garcia & Quek, 1997, p.445-459.)

The textual data gathered from the scratch books from the Lean startup/ Venture lab course will be analyzed by using thematic analysis methodologies. Braun & Clarke (2012) describe in their research that the thematic analysis as a

method to systematically identify, organize, and offer insight to different patterns (themes) that are found from the data (Braun & Clarke, 2012, p.57). According to Nowell et al. (2017) the thematic analysis is often used with qualitative research and it can be used widely with different methodological analyses and various research questions. The thematic analysis includes different phases. These phases are called familiarizing yourself with your data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Using these phases can help to create systematic approach to thematic analysis and the data. (Nowell et al., 2017, p.2-4.)

As Braun & Clarke (2006) state in their research, the advantages of thematic analysis are various. These advantages include different aspects and they can be seen as following:

- Flexibility
- A relatively easy and quick method to learn
- It does not require a lot of experience in qualitative research
- Results are generally accessible to the public
- Highlighting similarities and differences across the data set
- Unanticipated insights can be created

Flexibility is seen as one of the main advantages of thematic analysis and for that reason, it is important not to limit this flexibility. However, the critic about the absence of clear and concise guidelines must be considered when using thematic analysis. (Braun & Clarke, 2006, p. 5-36.)

However, just like every other research methodology, thematic analysis has also challenges. For example, according to Braun & Clarke (2006) if the themes do not work or there is too much overlap between different themes the thematic analysis can be challenging. If the themes are not coherent and consistent enough the outcome of using the methodology can lead to failure and the overall analysis will be unconvincing and weak. Also the data and the analytics must be carefully matched so that the claims made based on them will be justifiable. The possibility of a lack of academic literature should also be considered. (Braun & Clarke, 2006, p.25-26.) These challenges should be taken into account when conducting research.

While selecting the themes for the thematic analysis the importance of the selection must be considered. According to Aronson (1995) the themes selected must be augmented. The argumentation can be done by using the previous literature. (Aronson, 1995.) The themes selected for this research are based on the startup scratch book framework (figure) and it includes building blocks based on Moon (2006) and the BMC framework made by Ries (2011). The themes selected for the research are:

- Relevance
- Depth
- Reflection
- Presentation
- Content

Although the thematic analysis can be seen as a foundational method, according to Braun & Clarke (2015) the thematic analysis can be just as sophisticated as other methodologies. The process of creating a good quality thematic analysis needs to be done carefully. The validation process in the qualitative study includes the consideration of the possibilities of errors and bias and to understand that the individual differences in the research can be generalized. Understanding the validation of qualitative methodologies is important when the aim is to create good quality research. (Braun & Clarke, 2015. p. 246-260.)

In addition to the thematic analysis this study also utilizes comparative methods. According to Rihoux & Ragin (2008) the comparison can be seen as a key operation in various empirical contexts. This study uses thematic analysis methods. Because the data is collected from two different years and there are some changes in the data the results of two different years will be analyzed separately and then compared.

5 EMPIRICAL RESULTS

5.1 Overview of the scratch books

The Lean Startup/Venture Lab course was held in fall 2018 and fall 2019. The intent of the Startup Scratch Book is to leave a trace of the journey in a physical format. The course requirements included collecting all of the materials related to the project and writing a reflective learning diary. The learning diary consists of recording, structuring, reflecting, developing, and evidencing learning and the development of the idea to a business model. The course requirements slightly changed in 2019 based on the scratch books from the previous year. In this year the minimum length for the scratch books was 100 pages. The inclusion of communication (emails, WhatsApp, discord, slack etc.), sketches, drafts, and ideas were added and its importance was underlined. Chronological order was suggested and inclusion of the table of contents was included in the requirements. The course work also had to be returned weekly, which was not in the 2018 requirements. Because of these changes the scratch books of these two different courses will be analyzed separately and then compared after.

TABLE 2 Changes made in requirements

Building Blocks	**Difference**
Relevance	Length
Presentation	Table of content
Presentation	Communication, sketches, drafts & ideas
Relevance	Weekly deadlines

5.2 Relevance

In terms of relevance, it is essential to study how the course objectives and guidelines have been realized in the course scratch book. From a teacher's perspective, providing practices and guidelines can be one the biggest challenges while guiding students in writing a learning diary (Hyppönen & Linden, 2009, p. 38). Because of the challenges in guiding the requirement became more precise after 2018 when the teachers saw what was working and with what the students needed more guidance. The course requirements and objectives changed slightly in two different years so the relevance in the scratch books of different years is different. In this section we analyze the relevance of the 2018 and 2019 scratch books and compare them.

TABLE 3 Changes in requirements in Relevance

Building Blocks	Difference	2018	2019
Relevance	Length	Not defined	Minimum 100 pages
Relevance	Weekly deadlines	Not required	Required

5.2.1 Relevance in 2018

The aspect of length was not specified in the course requirements this year so the length of the scratch books varied. The pages were not numbered in the selected scratch books this year. Because the length or including page numbers were not specified in the course requirements this year the length or page numbers do not affect the assessment. The regularity of entries was introduced in the course requirements but the way of showing the regularity was not specified. Two out of four teams did not show regularity by using dates so the regularity of entries could not be seen. This made the assessment process of the scratch books challenging because as stated by Hyppönen & Linden (2009, p. 38) if the learning process is not written down regularly, the learning diary might not achieve the desired result. Also the honest approach might decrease if the writing process is not done regularly and the students might not remember all of the details (Maloney et al. 2013, p. 625). One of the teams showed regularity only in a separate learning diary section at the end of the scratch book and one team showed regularity continuously in the scratch book by using dates and also in a separate learning diary section. Because the course requirements were not very specific this year the aspects of length or how to show regularity were difficult to assess and they could not be expected to be included in the scratch books.

The use of relevant coursework was shown in different ways. One of the often presented course materials was the business model canvas and the use of

the business model canvas was shown in most of the scratch books. All teams except one introduced the business model canvas in their scratch book. The BMC was described as a useful tool.

> "Without business model canvas our ideas would have been mixed in different papers etc. It's a good tool for establishing your idea and considering different aspects of it." (Team 3)

Lean Startup Cards that were introduced during the course and were created by one of the course teachers were also part of the methodologies used during the course. These Lean Startup Cards were seen as a useful tool and the use of this method was shown in two scratch books. One of the teams introduced the steps and the actions they did and one of the teams reflected the use of the methodology.

> "We found the cards very similar to using Steve Blanks customer validation methods alongside Eric Reis's Lean Startup methodology. The cards could certainly be very useful for teams to use as a checklist and a way of reminding what still needs to be done or proceeded further with."(Team 1)

Validating the business idea was also introduced in the course requirements. All of the scratch books included market research about the existing markets and showed evidence of using some secondary data sources e.g. market reports or other statistics. Collecting own primary data from potential customers or industry leaders were also required. Almost all of the teams created a survey to understand potential customers or the industry better. Only one out of four teams did not introduce a survey but collected some primary data about the industry by phone calls and emails.

> "We did a market research and found a few similar services. Market research was done by finding information from internet, by phone calls and emails. Market research showed us that there can be demand for our service." (Team 3)

The customer surveys were used in three of four teams and the use of surveys was important for the validation process. However, the process of creating the survey was challenging and the process of either creating an online survey or face-to-face interviews included different aspects and questions.

> "Creating a list of correct questions is crucial for the whole process of customer research, because asking 'wrong' questions will lead to getting invalid answers for the case. " (Team 2)

> "During the customer validation, we also understood how time consuming the process is. First, it is essential to think what information is needed, formulate the questions accordingly and create a plan to conduct the surveys in terms of place, data gathering method (recording, notes etc.) and target group, for example." (Team 4)

> "Another aspect of the interviews was to get data about concerns people might have regarding the service. This would later help us to tackle the possible problems in advance." (Team 4)

Honesty and self-assessment were difficult to assess when the regularity and reflective thinking was quantitatively limited. However, the screenshots of the emails and communication can be seen to describe honesty and reflective thinking and own thoughts should be seen as proof of honesty.

> EC1: Relevance this year was shown mostly in the form of using relevant coursework, theories e.g., and meeting the course objectives. The course objectives were met and the most used theory was the BMC.

5.2.2 Relevance in 2019

The course requirements and instructions were changed in the year 2019. All of the scratch books this year had over 100 pages and pages were numbered. The assessment process was easier when the length was defined in the course requirements. Regularity was shown in all of the scratch books by using dates and the course organizers wanted to see the progress of the scratch books during the course and this was monitored by regular deadlines. Because regularity was monitored this year the challenges related to the lack of regularity decreased.

The use of business model canvas was visible in all of the scratch books this year. All of the teams had a picture of the business model canvas and the building blocks were discussed in the scratch books. The use of the business model canvas was defined as helpful.

> "The business model canvas truly helped us to make our business idea more precise. We also noticed that we had to rethink some parts and the canvas helped to think about each part first in an isolated way and then how it relates to other parts." (Team 7)

Validating the business idea was also one of the requirements of the course and similarly to 2018 all of the teams validated the business idea by using customer surveys and using market research. Searching information about the business and the existing market was one of the first steps in the process.

> "After coming up with an appealing idea, we started to prepare for validating our idea. For validation purposes we gathered various information about the market and its feasibility." (Team 5)

> "To validate our business idea, we searched for existing competition within this field." (Team 8)

Creating a customer survey was used to gather primary data from potential customers or other key persons. Analyzing the data from the surveys was one

of the steps that helped in the customer validation process and to understand if the business is offering value or solving customers' problems.

> "We received almost 50 replies and 80% of those replies was interested in participating in our wine tasting. For us, our business idea got validation. Over half potential customers were between 26-35 years of age, which means millennials and women."

> "We improved our business idea by surveying and interviewing our target groups - the student and companies" (Team 7)

In addition to online surveys, emails, and phone calls, face-to-face interviews were also methods to validate the business idea. All kinds of surveys online or face-to-face were seen as a tool to ensure that the business is going the right way.

> "Face-to-face interviewing with target users and end-users: This helped us understand about the end-user's preference and needs regarding home care support." (Team 8)

Honesty and self-assessment of the scratch books can be assessed by the regularity of entries, use of relevant coursework, and reflection. The reflection parts showed the level of self-assessment and honesty was shown in different ways. For example, one of the teams used screenshots of the communication between the team members during the course. The screenshots showed the discussions made as they were and this showed extreme honesty. In these messages, the team for example discussed how they hoped that the course teachers will take into account that their group is smaller than the others. Other ways of showing honesty were also shown in using dates, expressing own opinions and ideas, quoting sources, and including screenshots of emails and other communication.

> EC2: Relevance was shown in the length, formatting, using the course tools and frameworks, and meeting the course objectives. The course objectives were met and different tools suggested during the course were used and seen as helpful.

5.2.3 Relevance comparison

Relevance was shown in different ways in the two courses and the biggest reason for that were the changed course requirements. Relevant coursework was used in both years and the most important framework used was the BMC. The use of business model canvas was introduced in course material and teams found the use of it helpful both years. Overall, the outcome of the course was to create a scratch book that includes the whole process of creating a new startup. This objective was met by all of the teams.

Validating the business idea by doing market research was similar both years. Creating different surveys (online, face-to-face) was also a method used in both years. Honesty and self-assessment were difficult to validate but the use of dates, screenshots, and communications was seen as proof of honesty. The honesty and self-assessment were more visible in 2019 and the use of dates, visuality, use of references, and showing it, and reflection was seen as an honest approach.

The trust between the writer and the reader is important in the process of writing a learning diary and the lack of trust can cause dishonesty, lack of truthful reflection, and difficulties in the learning processes (English, 2001, p.29-30). The honest communication and reflection were shown in the scratch books and the trust between the students and the teacher seemed to be there. However, if honesty is to be increased in the future, it is good that honesty is encouraged and not punished by the reviewer.

> EC3: The relevance was completed both of the years but the change in the course requirements (e.g. length) increased the quality of the relevance in 2019. When the course included theories, frameworks, or tools to use in the requirements, the students found it helpful.

TABLE 4 Empirical conclusions for Relevance

Identifier	Empirical conclusion
EC1	Relevance in 2018 was shown mostly in the form of using relevant coursework, theories e.g., and meeting the course objectives. The course objectives were met and the most used theory was the BMC.
EC2	Relevance was shown in the length, formatting, using the course tools and frameworks, and meeting the course objectives. The course objectives were met and different tools suggested during the course were used and seen as helpful.
EC3	The relevance was completed both of the years but the change in the course requirements (e.g. length) increased the quality of the relevance in 2019. When the course included theories, frameworks, or tools to use in the requirements, the students found it helpful.

PEC1: In terms of learning, it is important that students have clear instructions and an understanding of what the objectives of the course are. Clear guidance and goals are the basis for the scratch books.

5.3 Depth

As stated in figure 5, depth includes depth of approach, critical thinking, and evidence of speculation. One aspect of the depth is that the written text and decisions made have some scientific basis and sources that support the ideas or results. The course requirements did not change regarding aspects of depth but the results in two different years were different.

5.3.1 Depth in 2018

The number of scientific articles and references to them was shown in the scratch books but the reflection and conclusions based on them were minor. Critical thinking was shown in the use of different scientific references and finding different references to support the ideas. Critical thinking was also shown in revising ideas and changing plans according to feedback or other information. Critical evaluation of the used references was not clearly shown because even though there were scientific articles and researches used in the scratch books, the relevance or impact of these articles was not opened up in the text every time. However, some of these articles were reflected separately. One of the team separately described the learning points from the research made. Two of the teams did reflections from the references and two did not really open up what they learned from the research.

> "We have learned from our competition what they are doing, what's working. The dockless competitors gave us validation for the earning model and the user base. Some ideas for our problem mapping and how to combat those issues." (Team 4)

Evidence of speculation was mostly seen in reflective thinking and writing down own opinions. If there was a reference for some idea or aspect, it was referred. One of the aspects of depth is the representation of skills that are not specifically required in course requirements. One of the teams showed a depth of approach by using flow charts to visualize their business. Different teams learned to use different tools etc. to get a deeper approach to their business idea for example to create MVP or create cash flow statements.

> "A prototype of the app was designed and created with Justinmind, which is a free tool for designing web & mobile apps." (Team 4)

> "Making the cash flow statement and the valuation process was a good practical way to learn about startup economics." (Team 1)

Overall the depth was shown as a use of relevant articles and other references but this year the research done was not really reflectively opened up. Another

way of showing the depth of approach was learning different skills e.g. different tools that were not required in terms of relevance.

> EC4: Depth of approach seemed to be challenging but the use of relevant scientific articles was shown. Representation of skills was also a big role in showing the depth of approach.

5.3.2 Depth in 2019

In 2019, the number of referrals had increased significantly. One of the teams introduced various scientific articles to support their own business ideas and market but the selected articles were not really linked to the other aspects of the scratch book so the depth could not be seen. All the other three teams showed links with the scientific research and references and the other subjects and content of the scratch books.

> "It (the article) has quite interesting insights regarding the understanding of wine industry in a particular market." Team 5

Depth was shown as a representation of skills. One of the teams also used the depth by using value proposition canvas in addition to the traditional business model canvas. Using frameworks not introduced in the course can be seen as an aspect of depth. One example of using different skills to gain depth is that one team used Google Analytics to analyze the business more detailed and this was not shown in other teams and was not required. Some teams learned to use different tools to increase their business idea.

> "We started to form the marketing material and formed the business idea at the same time. It was a good way to get some feedback early and then to base further actions on that. I think we practiced the lean way of doing things this week. It was also quite graphical since we prototyped user interfaces and used different kind of methods for that. We learned new tools like Invision and paper prototyping. " (Team 7)

The depth of the approach was shown this year in the form of using various relevant articles and other references. The articles were reflected and opened up to explain why the information is important for the business. The representation of skills that were not required in terms of relevance was also proof of the depth of approach.

> EC5: Referring to scientific articles and linking them to the business idea was showing the depth of approach. Also criticality, evidence of speculation, and representation of skills were shown.

5.3.3 Depth comparison

All eight teams had references and they were used in different aspects of the scratch book, some more than others. The references used included e.g. news, blog posts, statistics, and scientific articles. There were differences in the depth of the two different courses. The number of references increased in 2019 and reflective thinking about the references increased. Critical thinking was shown mostly in reflection and evidence of speculation was handled in such a way that one's own thoughts and quotes from others were clearly and correctly marked. The representation of skills was shown in both years and was shown mostly in the form of learning to use new tools. Most of these tools were either analytical, visual, or calculating costs or other finances.

> EC6: The depth was significantly increased in 2019 although the requirements regarding the depth of approach were not changed. The changes in the requirements, e.g. increased length, in the relevance increased also the quality of depth.

TABLE 5 Empirical conclusions for Depth

Identifier	Empirical conclusion
EC4	The depth of approach seemed to be challenging but the use of relevant scientific articles was shown. Representation of skills was also a big role in showing the depth of approach.
EC5	Referring to scientific articles and linking them to the business idea was showing the depth of approach. Also criticality, evidence of speculation, and representation of skills were shown.
EC6	The depth was significantly increased in 2019 although the requirements regarding the depth of approach were not changed. The changes in the requirements, e.g. increased length, in the relevance increased also the quality of depth.

PEC2: In scratch books, requiring depth from students brings a variety of ideas and thoughts into text and students can better justify their decisions. The idea alone is not enough and the aspects of depth show that the idea has been carefully thought out and justified by the students.

5.4 Reflection

The reflection part of the scratch book is a key in the traditional learning diaries. The reflection is important for the overall learning process so the importance of reflection and reflective thinking should not be underestimated (Chanin et al., 2018, p. 268-269). There was a big difference in the scratch books in different

years. The course requirements included reflectivity both years and the students were instructed to write a reflective learning diary about their progress during the course. The reflection is analyzed in both years and the results will be compared after that.

5.4.1 Reflection in 2018

The first year's (2018) scratch books consisted mostly of describing the business idea and the actions made and the reflection part was more in the background. Revising ideas is seen as a part of the reflection process and one of the teams showed a revising process in their scratch book.

> "Meeting showed us that we can expand our idea. There is a big risk that startuppers create their own "bubble" if they don't don't discuss about the idea with others. " (Team 3)

Challenges were also noted in the scratch books. The aspect of learning from mistakes and questioning was shown in different scratch books. However, sometimes the mistakes or challenges were not identified and had not been opened or reflected when they were mentioned.

> "As we identified the mistakes, learned from those" (Team 4)

Two of the teams included a separate learning diary section. The reflection was shown in these learning diary sections and one of the two teams identified some of the challenges they might face and how these were identified in this section.

> "Another aspect of the interviews was to get data about concerns people might have regarding the service. This would later help us to tackle the possible problems in advance." (Team 4)

> "During the customer validation, we also understood how time consuming the process is. First, it is essential to think what information is needed, formulate the questions accordingly and create a plan to conduct the surveys in terms of place, data gathering method (recording, notes etc.) and target group, for example." (Team 4)

Reflection was shown in different ways. The teams that used a separated learning diary section reflected more than the two teams that did not include the learning diary section. The separate learning diary was not required and the reflection could have been done in other ways but the separate learning diary seemed to be more reflective than the two teams that reflected during the scratch books with no learning diary section.

> EC7: Reflection was shown in revising ideas and describing challenges and understanding them. The amount of reflection was not outstanding.

5.4.2 Reflection in 2019

In 2019 scratch books the reflection part was more visible. The change in guidance between these two courses where the reflection part was highlighted was the reason for this change. The amount of reflective thinking and reflection was increased in the year 2019.

Reflection includes revising ideas. The evidence of revising ideas shows that the options are thought through and reflections are made. Revising ideas was shown in different scratch books. One of the teams revised their idea because they did not have enough evidence that the idea at the time was interesting enough.

> "We followed this direction (pivoting) and noticed quickly that instead of wasting time and resources in trying to create something that people do not want in the first place, we ought to change our target customer and service. " (Team 5)

Reflection was also shown in identifying challenges. Some of the challenges were specified and the challenge and a possible solution were introduced. The process of reflecting challenges is important when assessing the overall learning process.

> "No-one had any critics regarding anything. That was a clear validation that the customer validation has to be more anonymous." (Team 5)

The reflection about the course as a whole was also visible in different ways and teams described the most important outcomes and learning points in different ways. For example the process of creating a whole new business was mentioned but also some more specific aspects of the course.

> "This course, building a start-up company, has been extremely interesting from the start. Going further than just theoretical point of view, we learned what entrepreneurship is in practice." (Team 5)

> "During the Venture Lab course, the most meaningful and impressive task was the customer validation. For us, this phase was the most important step that decided the viability of the business." (Team 8)

Reflection was shown in various ways and reflective thinking was visible in the scratch books. The course required reflective thinking and showing the reflection of the overall progress during the course and this was visible.

> EC8: Reflection was visible during the scratch books not only in separate learning diary sections. Used references, ideas, challenges, and outcomes were reflected and the learning process of the team was shown.

5.4.3 Reflection comparison

Overall, the reflection was made on different levels for all teams, some reflected regularly and some had left the reflection in a separate learning diary section at the end of the work. The amount of reflective thinking increased in 2019 and the reflection of scientific articles and reflective thinking about the whole learning process was more visible.

The reflection of references e.g. scientific articles, news, blog posts, statistics etc., was more visible in the 2019 scratch books and some of the articles used in 2018 were not reflected at all. Learning points and reflecting the overall outcomes of the whole course was also more visible in the 2019 scratch books. Revising ideas was seen in both years. The reason for revising ideas and changing plans was often a conclusion from the team's communication or communication with the mentor.

> EC9: Reflection increased during 2019 even though the requirements did not change regarding the reflection. The reflective approach increased the relevance and quality of scratch books. A reflective approach helps to understand the learning process of students, but also the challenges they face.

TABLE 6 Empirical conclusions for Reflection

Identifier	Empirical conclusion
EC7	Reflection was shown in revising ideas and describing challenges and understanding them. The amount of reflection was not outstanding.
EC8	Reflection was visible during the scratch books not only in separate learning diary sections. Used references, ideas, challenges, and outcomes were reflected and the learning process of the team was shown.
EC9	Reflection increased during 2019 even though the requirements did not change regarding the reflection. The reflective approach increased the relevance and quality of scratch books. A reflective approach helps to understand the learning process of students, but also the challenges they face.

PEC3: If students reflect on their own learning while making the scratch books, it will help both the students and the teachers to see the overall learning process and possible challenges during the course.

5.5 Presentation

The presentation includes different aspects of the layout of the scratch books eg. visuality, pictures, clarity, etc. In addition to the visuality, the presentation includes the clarity and the quality of the scratch books. There were some changes made in the course requirements of the different years that affected the scratch books of 2019.

TABLE 7 Changes in requirements in Presentation

Building Blocks	Difference	2018	2019
Presentation	Table of content	Not required	Required
Presentation	Communication, sketches, drafts & ideas	Not required	Required

5.5.1 Presentation in 2018

The visuality was visible in all the scratch books e.g. in the form of figures. The visuality was visible in all the scratch books e.g. in the form of figures, photographs, and tables. Two of the teams also used handwritten text in addition to computer-typed text. Two out of four teams had sketches and hand-drawn tables to bring visual aspects to their presentation. All of the scratch books included visual aspects including pictures of the prototypes, MVP, logos, or other relevant visual aspects of their business idea. All of the teams visualized calculations in the form of various tables.

Clarity and quality were shown in different ways. Of the 2018 team coursework, two out of four had a table of contents, and the text was structured by using the headlines introduced in there. The clear structure made it easier to go through the work and, on the other hand, the unclear structure also made it difficult to examine other building blocks used for the assessment process.

> EC10: Presentation was shown during the scratch books as a form of various pictures and tables etc. Visuality was shown but the clarity and quality this year varied.

5.5.2 Presentation in 2019

Clarity was significantly increased this year and the reason for that was in the changed course requirements. The guidance required a table of content to be included in the scratch books. All of the teams had a clear table of contents, af-

ter which the text was clearly structured according to headings and this increased the clarity and the quality of the scratch books. This improved the assessment process of other aspects of the scratch books.

Visuality and creativity were shown in the form of pictures, tables, and other visual content. All of the teams this year included various visual aspects regularly during the scratch books. The scratch books included sketches, drawings, and handwritten text as an aspect of visuality. Two out of four teams included hand-drawn pictures of the BMC framework and two included virtual versions of the BMC. Also various photos about the idea or about the team were included. The visual aspect makes it easier to read scratch books and for example using tables to show financial calculations make the scratch book clearer.

> EC11: Clarity and quality were shown in all of the scratch books and visuality was shown regularly during the scratch books e.g. pictures, tables, sketches.

5.5.3 Presentation comparison

The clarity and quality of the scratch books improved in the 2019 course compared to the course held in 2018. One of the reasons for this improvement was the changed requirements and clearer and more precise guidance. Because the 2019 course included the structure and use of the table of contents in the requirements these aspects were found in all of the scratch books this year. These things were not in the requirements in the 2018 course and that is the reason why the structures were unclear.

> EC12: The quality and clarity increase significantly after the course required table of content. The small change in requirements made the scratch book distinctly clearer and easier to read.

TABLE 8 Empirical conclusions for Presentation

Identifier	Empirical conclusion
EC10	The presentation was shown during the scratch books as a form of various pictures and tables etc. Visuality was shown but the clarity and quality this year varied.
EC11	Clarity and quality were shown in all of the scratch books and visuality was shown regularly during the scratch books e.g. pictures, tables, sketches.
EC12	The quality and clarity increase significantly after the course required a table of content. The small change in requirements made the scratch book distinctly clearer and easier to read.

PEC4: Visuality, clarity, and quality make scratch books clear to read and easier to

evaluate. The quality and clarity are crucial to make the scratch books understandable and without these, it would be difficult to read and process the scratch books.

5.6 Content

The content of the startup scratch books should include all of the building blocks of the traditional business model canvas (key partnerships, key activities, key resources, value proposition, customer relationships, channels, customer segments, cost structure, revenue stream) introduced by Osterwalder & Pigneur (2010). The content includes also the team perspective introduced by Kemell et al. (2020).

5.6.1 Content in 2018

Three of the four scratch books analyzed contained a picture of the business model canvas so the content of the BMC was visible in a visual way. In one scratch book the business model canvas was not included visually, nor were all aspects covered in the rest of the text.

Key partnerships were visible in the business model canvases and one team that did not include the canvas did not either describe the key partnerships. Key activities and key resources were described in all of the teams. The value proposition was included in all of the scratch books and understanding what the value for the business is, is one of the starting points for this course. The value proposition was often confirmed by creating a survey about the business and doing market research on the internet. After the survey teams knew better about the customer's needs and what would be valuable for potential future customers.

Customer relationships were also described and social media was one way to keep the customer relationship close. Another way to keep the relationships with the customers was special offers or free usage of the service. Channels were defined in all of the scratch books. Social media was defined as one of the channels in two out of four teams and the social media platforms mentioned were Facebook and Instagram.

> "We joined quite many social media groups for parents so that we can be ready to share the idea once we have a presentable image of our MVP…We also joined a group aimed at parents in which companies wanting to market to parents are allowed to to join and register their company." (Team 1)

While defining customer segments it is important to think who the potential customers for the service are and all of the teams had visible proof of the defining potential and most common customer segments.

The cost structure was visible in all of the scratch books. The cost structure was visible in the form of a calculation and all of the teams had these. One of the teams described that e.g. app maintenance, servers, adding new features were part of the cost structure. Cash flows and the cash flow statement was also visible.

> "The amount of investments needed was based on the cumulative cash flow and the costs in the cash flow statement" (Team 1)

Revenue streams were covered in the scratch books and the different revenue streams were visible in the BMC framework in three out of four scratch books. The team perspective was visible in the scratch books. All of the scratch books included a mention of the team members but the teams were not introduced comprehensively. The co Overall the content was included in the scratch books and the content was defined adequately. In addition to the content specified above the scratch books included irrelevant content.

> EC13: The BMC framework was not used in all of the scratch books and the content was not opened up in each scratch book. However the content was mostly covered. The amount of irrelevant content (not introduced in the Startup Scratch Book framework) was not significant.

5.6.2 Content in 2019

The business model canvas framework was included in all of the four scratch books and most of the teams also described the content of the different building blocks more detailed in their text.

Key partnerships were described by all four teams. One of the team also asked what could be the motivation for the partnership and the answer was monetary profits. Key activities and key resources were also described in all of the teams and key resources included e.g. human resources. All of the team introduced their value proposition and it was confirmed by creating a survey and research about the business.

Customer relationships and channels were included by all of the teams and social media was often defined as one of the channels. Customer segments were specified in all of the scratch books. Cost structures and revenue streams were also included in all of the scratch books.

> "Overall revenues are a combination of multiple projects that are individual revenue streams." (Team 6)

The team perspective was also part of the content and the scratch books. All of the teams introduced the team and the members and the team introduction often included a brief description of the person, skills, and the focus in the course project. At the beginning of the course the students can either select their team

and then come up with an idea, join a group with an idea, or take part in the assignment of a company. The team perspective in these different situations is various.

> "For our team it was really important that we got to choose our team members on our own and we came up with the business idea together. It would have been difficult to reach the same motivation level and excitement, if the team would have been decided for us." (Team 5)

> "Our team building was a bit different from that of a start-up as the setting is more or less a project given by [a company name] and there was little information on the entire project prior to team building." (Team 6)

The team perspective was visible when describing the communication during the course and also when describing possible challenges and disagreements. The team is a key aspect of communicating within the team and also overcoming challenges, issues, or solving disagreements between the team members. The communication between the team members was shown as screen shots of the communication in the scratch books.

> "When looking at our team, we had our first major disagreement this week. We are able to reach an agreement without any difficulties, which shows how well our team is functioning." (Team 6)

In addition to the content of the BMC building blocks the scratch books also included irrelevant content due to the course requirements. This irrelevant content included e.g. communication that was not relevant for the course.

The content included all of the building blocks of the BMC framework and the different blocks were defined and described in the scratch books well. The team perspective was seen as a very important building block for a good startup.

> EC14: The BMC framework was included in all of the scratch books and the content was mostly opened up in the text form as well. Irrelevant information (not introduced in the Startup Scratch Book framework) was included in the sketchbooks.

5.6.3 Content comparison

The content was similar in both courses but there were some differences in different years. In 2018 three out of four teams included the BMC framework but in 2019 all of the teams included the BMC. Another big difference in these two years was that the team perspective was more visible in 2019. In 2018 the team members were briefly introduced but in 2019 the team aspects were more detailed and it was seen as one of the most important things to create a business. The amount of irrelevant content also varied in two different courses. In 2018

the amount of irrelevant content was not significant while the scratch books were shorter and more focused on describing the business idea. The amount of irrelevant content 2019 increased and it can be a result of the changes in course requirements. The course required this year a minimum of 100 pages. The amount of irrelevant content might have increased because the content was attached to scratch books to increase the overall volume and adding length. When there was no defined length in 2018 the need for adding irrelevant content to increase the length was not essential.

> EC15: Including the BMC helped bring all of the building blocks into the scratch books.

TABLE 9 Empirical conclusions for Content

Identifier	Empirical conclusion
EC13	The BMC framework was not used in all of the scratch books and the content was not opened up in each scratch book. However the content was mostly covered. The amount of irrelevant content (not introduced in the Startup Scratch Book framework) was not significant.
EC14	The BMC framework was included in all of the scratch books and the content was mostly opened up in the text form as well. Irrelevant information (not introduced in the Startup Scratch Book framework) was included in the sketchbooks.
EC15	Including the BMC helped to bring all of the building blocks into the scratch books.

PEC5: The content of the scratch books influences how extensively the different perspectives are covered and how well the business is planned. The building blocks of the BMC and the additional team perspective covers a wide range of areas of the business plan.

5.7 Summary

After analyzing selected scratch books from two different years the main conclusion is that when the guidance is done right and when the students know what they should include to their scratch books the quality of the scratch books increase. One thing that can possibly decrease when giving strict rules and guidelines is creativity, but if the creativity is encouraged by the teachers the strict guidelines might have no effect on the amount of creativity. However the changes in creativity were not seen in the scratch books analyzed. Overall the scratch books analyzed from 2018 were more compact and they were more de-

scriptive of the business itself (idea, value, how to succeed) than reflective of the team members' learning process. In 2019 the scratch books included both descriptions of the business and reflection of the learning process. However the irrelevant content increased in 2019 when the scratch books were required to be at least 100 pages long.

Overall all of the aspects of the startup scratch book model were covered in the scratch books even though scratch books were created before the model was made. The aspects of the model seem to be a good base for the scratch books and including all of the aspects will create a comprehensive story for a new startup creation process.

5.8 Empirical conclusions and primary empirical conclusions

The empirical conclusions are conclusions based on the analyzed data. All of the ECs made are visible in the TABLE 10. The primary empirical conclusions are made based on empirical analysis and they are combination of different empirical conclusions made in each theme. These observations will be discussed in the context of the previous literature introduced in the literature review of the thesis.

TABLE 10 Empirical conclusions

Identifier	Empirical conclusion
EC1	The relevance in 2018 was shown mostly in the form of using relevant coursework, theories e.g., and meeting the course objectives. The course objectives were met and the most used theory was the BMC.
EC2	Relevance in 2019 was shown in the length, formatting, using the course tools and frameworks, and meeting the course objectives. The course objectives were met and different tools suggested during the course were used and seen as helpful.
EC3	The relevance was completed both of the years but the change in the course requirements (e.g. length) increased the quality of the relevance in 2019. When the course included theories, frameworks, or tools to use in the requirements, the students found it helpful.
EC4	The depth of approach seemed to be challenging but the use of relevant scientific articles was shown. Representation of skills was also a big role in showing the depth of approach.
EC5	Referring to scientific articles and linking them to the business idea was showing the depth of approach. Also, criticality, evidence of speculation, and representation of skills were shown.
EC6	The depth was significantly increased in 2019 although the requirements regarding the depth of approach were not changed. The changes in the requirements, e.g. increased length, in the relevance increased also the quality of depth.

EC7	Reflection was shown in revising ideas and describing challenges and understanding them. The amount of reflection was not outstanding.
EC8	Reflection was visible during the scratch books not only in separate learning diary sections. Used references, ideas, challenges, and outcomes were reflected
EC9	Reflection increased during 2019 even though the requirements did not change regarding the reflection. The reflective approach increased the relevance and quality of scratch books. A reflective approach helps to understand the learning process of students, but also the challenges they face.
EC10	The presentation was shown during the scratch books as a form of various pictures and tables etc. Visuality was shown but the clarity and quality this year varied.
EC11	Clarity and quality were shown in all of the scratch books and visuality was shown regularly during the scratch books e.g. pictures, tables, and sketches.
EC12	The quality and clarity increase significantly after the course required a table of content. The small change in requirements made the scratch book distinctly clearer and easier to read.
EC13	The BMC framework was not used in all of the scratch books and the content was not opened up in each scratch book. However, the content was mostly covered. The amount of irrelevant content (not introduced in the Startup Scratch Book framework) was not significant.
EC14	The BMC framework was included in all of the scratch books and the content was mostly opened up in the text form as well. Irrelevant information (not introduced in the Startup Scratch Book framework) was included in the sketchbooks.
EC15	Including the BMC helped bringing all of the building blocks into the scratch books.

The empirical conclusions are made based in the conclusions of different themes and comparison of the different years scratch books. Table 11 includes all of the primary empirical conclusions made based on the data collected.

TABLE 11 Primary empirical conclusions

Identifier	**Primary empirical conclusion**
PEC1	In terms of learning, it is important that students have clear instructions and an understanding of what the objectives of the course are. Clear guidance and goals are the basis for the scratch books.
PEC2	In scratch books, requiring depth from students brings a variety of ideas and thoughts into text and students can better justify their decisions. The idea alone is not enough and the aspects of depth show that the idea has been carefully thought out and justified by the students.
PEC3	If students reflect on their own learning while making the scratch books, it will help both the students and the teachers to see the overall learning process and possible challenges during the course.

PEC4	Visuality, clarity, and quality make scratch books clear to read and easier to evaluate. The quality and clarity are crucial to make the scratch books understandable and without these, it would be difficult to read and process the scratch books.
PEC5	The content of the scratch books influences how extensively the different perspectives are covered and how well the business is planned. The building blocks of the BMC and the additional team perspective covers a wide range of areas of the business plan.

The primary empirical conclusions are a base for the discussion in the following chapter. The PECs will be also discussed in the context of practical implications and theoretical contributions in following chapter.

6 DISCUSSION

In this section the results of the empirical analysis will be discussed. The discussion will include practical implications, theoretical contributions, and future implications based on the data analyzed and the primary empirical conclusions (PECs) made. The primary empirical conclusions are considered in the next chapters, practical implications, theoretical contributions and future implications based on the previous literature about the themes.

6.1 Practical implications

Based on the primary empirical conclusions practical suggestions to startup education can be implemented. Chanin et al. (2018b, p. 167) stated that there is a need for a single approach to be designed to use in startup education. The startup scratch book model is a framework that can be used in the startup education context to improve startup education. The aim of the model created is that the students can have a clear impression of what is required from them and what are the aspects considered when the scratch books are assessed. From a teacher's perspective this model can help their assessment process and also they can use the model while introducing the scratch book and when they instruct the concept of the scratch books to the students. The use of reflective learning diaries can help the teachers see the overall learning process and see what was challenging or easy for the students and help the students to understand their own learning (Park, 2003, 196).

As stated in the PEC1 the relevance is the base for the scratch book and the model will give the base for the guidelines for the scratch books. Different aspects of relevance affect various things regarding the final course work. For example when the length is defined it increases the possibility that the issues required by the course will be processed with sufficient accuracy. However, it can also increase the amount of irrelevant content. In addition to length the use of relevant coursework and meeting the course objectives also affect the final

outcome and what is included in the scratch book. Honesty and self-assessment affect the reflection part and regularity of entries ensure that the events and lessons learned have not been forgotten and hence honesty is also growing. The study of Loo et al. (2002), states that the objectives of the learning diaries should be clear and specified in detail to the students. If the students know what they are expected to do, the possibility of achieving the wanted results increases. (Loo et al., 2002.)

PEC2 states that even the greatest idea is not enough alone but the aspects of depth give the idea value and versatility. The depth includes depth of approach, critical thinking, evidence of speculation, and representation of skills. From the teacher's perspective including depth to the instructions can cause that the scratch books are not only a description of a business idea but the idea also includes in-depth reflection on different areas of business. From a student's perspective the encouragement to deep approach can increase the knowledge and understanding of the team's own business idea and about startups as a whole. The software startup education also encourages learning different skills and challenge-based learning is often linked to increasing students' skills e.g. management skills, team skills, and using different tools (Chanin et al. 2018a, p. 226-227).

The reflection was in the course requirements and the idea of the scratch books include that students reflect their learning. Reflection is also seen as a key element in traditional learning diaries (Moon, 2006, p. 1-2). As PEC3 states the reflection helps both students and the teachers so the reflection should be included in the scratch books and the instructions should include it. Reflection is an important part of the process of deep learning. According to Detoni et al. (2019, p.552), challenge-based methodologies can increase the possibility of reflection. The course objective includes creating a business and defining the value it creates so the course is based on solving real-world problems. This aspect can help the students understand the importance of reflection. Visual aspects make the scratch books more pleasant to read and the clear structure makes the assessment process more effortless as PEC4 also states. The last aspect of the startup scratch book model was the content and the content part is created for the startup concept and for creating a new startup. PEC5 states that including the blocks of BMC and the team perspective comprehensively covers different divisions of the business plan. If the model is used in other than startup context the content part can be changed to cover the content of the theme desired. The guidance of the content can increase the possibility that all of the different aspects of business models are covered. The importance of using different frameworks on software startup education was also mentioned by Chanin et al. (2018a). Using different tools and frameworks such as BMC can help students to define their visions for the business model creation and not focus only on the idea itself but also other factors e.g. the market and the market possibilities and challenges. (Chanin et al., 2018a, p. 223-228.)

The use of startup scratch books can help the students to learn more about the process of creating a new startup. However, if the students are not aware of

how to create scratch books, what is required, and how the scratch books are evaluated the use of scratch books might cause worry and stress. The best result would be achieved if students understood the benefits of a reflectively implemented scratch book and used the scratch book as a tool to understand the goals of the course and how they can better understand their own learning instead of just completing the course.

Based on the analysis made the course instructions and guidelines can affect all of the other aspects as well. The link between the relevance and the other building blocks is not researched but the empirical conclusions show that the relevance can have an effect on the aspects of depth, reflection, and presentation as well. However, the practical implications of the startup scratch book model have yet to be confirmed by researching the subject more.

6.2 Theoretical contributions

The theoretical framework introduced in this thesis is based on literature concerning lean startup methodologies, the business model canvas, startup education, and entrepreneurship education, challenge-based learning, and learning diaries. A theoretical model for the Startup Scratch Book was created based on the literature. Established on the literature regarding learning diaries the four building blocks are created for the startup scratch book (relevance, depth, reflection, presentation), and based on the literature about BMC and startup education the content of the startup scratch book was created. The content includes the nine building blocks of the business model canvas and the added team element. This framework is created to help challenge-based startup education to form a framework to implement course work and assess the course outcomes.

The startup scratch book is a tool to create the overall learning process of creating a new business based on real-life challenges visible and to reflect the learning process as a whole. The effects of the startup scratch book can be similar to traditional learning diary outcomes. Pavlovich et al. (2009, p.56) introduce three themes important for the learning diaries: finding the students' voices, a new space for learning, and realizing a higher purpose. According to Park (2003) learning diaries increase engagement, motivation, self-awareness, and understanding of the individual learning process of the students. Learning diaries are also helpful from the teachers' perspective to understand how the students handle different situations and possible challenges and how and what they learned during the course. (Park, 2003, 196.) A challenge that was introduced regarding learning diaries by Hyppönen & Linden (2009, p. 38.) was that creating comprehensive guidance for the learning diaries can be a challenge for the teachers. The startup scratch book introduces a possible approach for creating a framework that includes every aspect that the students should consider including in the scratch books. The model can be used to help the teachers with the guiding process, creating the requirements, and assessing the students' work. The importance of creating clear guidance can be seen in the PEC1 that

states that the relevance of scratch books is related to the guidance given to the students. The importance of guidance can be seen also in the PEC4 that states that the visual aspects and clarity and quality are crucial elements for the scratch book. Guiding students on how to create clear and good quality work increases the overall quality of the scratch books. Guidance of the content that must be included in the scratch books is seen in the PEC 5 that states that the inclusion of all of the content introduced will make the scratch book encompassing.

PEC3 states that including reflectivity helps both the students and the teachers so see the overall learning process and possible challenges during the course. Reflective thinking and positive effects of using reflective writing as a teaching method were mentioned by Hyppönen & Linden (2009). Their research states that using learning diaries helps the teacher to find out what was unclear, what was challenging, and what the student learned. Writing a learning diary can clarify students' thoughts and thus lead to their deeper learning. (Hyppönen & Linden 2009, p. 38.)

PEC2 states that the depth of approach completes the business idea. One of the aspects of depth was the representation of skills. According to Malmqvist et al. (2015, p.10) the sense of meaning through solving real-world challenges motivates students and helps them develop different skills such as teamwork, decision-making, communication, ethics, and leadership and these skills can be examples of the skills that students gain during the course. According to Ries (2011) the content of the BMC is made for creating simple, relevant, and understandable concepts of enterprise functions, and the building blocks are covering these functions. PEC5 states that the content of the startup scratch book should include all the blocks mentioned and if they are covered comprehensively the scratch books are encompassing to meet the course objectives.

Tables 12 & 13 introduces the PECs and if the conclusions made were new scientific results, complementing results, or contradictory results. The results of this study were mainly complementing scientific results, but also one new result compared to the current literature was found.

TABLE 12 Complementing results based on PECs and current literature

Identifier	Primary empirical conclusion	Complementing
PEC1	In terms of learning, it is important that students have clear instructions and an understanding of what the objectives of the course are. Clear guidance and goals are the basis for the scratch books.	The objectives of the diaries should be clear and specified in detail to the students. (Loo et al., 2002)
PEC2	In scratch books, requiring depth from students brings a variety of ideas and thoughts into text and students can better justify their decisions. The idea alone is not enough and the aspects of depth show that the idea has been carefully thought out and justified by the students.	The appropriate level of depth required by the students must be discussed. (Moon, 2006)

	If students reflect on their own learning while making the scratch books, it will help both the students and the teachers to see the overall learning process and possible challenges during the course.	Through learning diaries, students better understand what they have learned and teachers understand how students 'understanding has evolved over the course. (Park 2003)
PEC5	The content of the scratch books influences how extensively the different perspectives are covered and how well the business is planned. The building blocks of the BMC and the additional team perspective covers a wide range of areas of the business plan.	BMC can help students to define their visions for the business model creation. (Chanin et al. 2018a)

Most of the findings and conclusions were noticed in the current literature and the conclusions made could be seen as complementary findings. The importance of the visual aspects and presentation was not noted in the literature and for that reason it is seen as a new scientific result.

TABLE 13 New results based on PECs and current literature

Identifier	**Primary empirical conclusion**	**New**
PEC4	Visuality, clarity, and quality make scratch books clear to read and easier to evaluate. The quality and clarity are crucial to make the scratch books understandable and without these, it would be difficult to read and process the scratch books.	Visuality was not mentioned in the current literature

The startup scratch book model combines the positive effects of using reflective learning diaries and challenge-based learning by creating a book where solving a real-life challenge by creating a new startup is done in a way that encourages the students to understand their own learning process. Using a challenge-based approach can lead to increased reflective thinking and putting knowledge into practice among students. Solving real-life challenges or creating a business that has real value to the customers is linked to positive effects. According to Gaskin et al. (2015), the real-life challenges help the students to understand the importance of the themes taught. It can also be seen as a way to increase the motivation of the students. (Gaskin et al., 2015, p. 40.) The outcome of the startup scratch book model is to create a book that is not only a reflective learning diary where the students describe what they do and what they learn during the course. The scratch books are also visual portfolios of new startup creation and they include important content of the creation process and the steps and decisions made as a team. The challenge-based baseline of the course combined with the positive effects of reflective learning diaries can increase the motivation of the students and help them increase the depth of their learning and help the student reflect on their own learning process.

6.3 Future implications

The Startup Scratch Book model introduced in this thesis can be used in startup education in the future. The model can be applied to the Lean Startup/Venture Lab course held at the University of Jyväskylä later in 2020. The model can be introduced to the students so that they can understand what will be expected from their scratch books and how the scratch books are assessed. The aim for the model is to give a clear base for both the teachers of the course and the students so that everyone knows what should be included in the scratch books and what kind of aspects affect the assessment process and the overall grade students receive from the course based on the scratch books. Because of the importance of truthfulness and the honest reflection of student's learning, the honest approach should be encouraged by the teachers and honesty should not affect the assessment negatively. The model is created to help the students and the teachers to have a mutual understanding of what is expected of the course and the scratch book and on what basis the assessment will be made. Understanding the assessment criteria makes it easier for students to complete the course work without having to worry about what is being assessed in the work and what should be included in the book. Clear instructions can help the students focus on the right things, so it can be assumed that precisely defining guidelines in advance will help students complete the course and reduce failure due to uncertainty.

6.3.1 Guidelines for the Startup Scratch Books

The Startup Scratch Book model should be introduced to the students at the beginning of the course before they begin the preparation and implementation of scratch books. The model presents four main categories (relevance, depth, reflection, and presentation), and all of the categories have sub-categories as well. The model also presents the content of the scratch book. In this chapter, the guidelines and instructions for using the startup scratch book model are presented. The model should be read from top to bottom.

1. The first category of the model is relevance, and all of the sub-categories of relevance should be included in the scratch book. After this, the student should understand why all aspects of relevance should be included in the work.
2. The next step is to present the next category, depth. Introducing the aspects of depth is crucial so that students can approach a given task with the right kind of precision and understand why this is important for the scratch books.
3. The next category that is presented in the model is reflection. This category should be explained to students so that they understand why reflec-

tion and related sub-categories are beneficial and how reflection is useful not only for teachers/assessors' perspective but also for the students themselves.

4. The last step in the building block section is the presentation. After introducing this category, students should understand how the scratch book is made in terms of visuality, clarity, and quality.
5. After the building blocks of the model are introduced, the next step is to present the content of the startup scratch books. The scratch books should include blocks based on the business model canvas so that all of the relevant fields in starting a new company are covered. Explaining all of the content that should be covered in the scratch book helps the students to understand why all of the themes are essential not only to the scratch book but for covering all fields in starting a new business.

After introducing the model, including all of the steps above, the students should understand why all components of the model are essential and should have a strong understanding of what it takes to complete the scratch book. Utilizing these guidelines, the use of the model should result in high-quality scratch books that meet the requirements of the course. The assessment of the scratch books should be based on the model and these guidelines on how to use the model. This will help students to understand what is required and what will be assessed in their scratch books.

7 CONCLUSION

This thesis studied how the use of learning diaries can be beneficial to startup education. This thesis introduces The Startup Scratch Book model that introduces the building blocks and the content of the scratch books that are textual work to express the students' overall learning process. The model is created based on the previous literature about assessment criteria for learning diaries and the content of the BMC.

The study was conducted following the qualitative thematic analysis and the data analyzed was collected from scratch books of the students of the Lean Startup/Venture Lab course. The research methodology was presented in section 4. The empirical results were presented in section 5 and further discussed in section 6. Section 6 includes the practical implications, theoretical contributions, and future implications of this study. In this section the thesis is concluded. First the research question and the sub-questions are answered. After that the limitations and future research possibilities are presented.

7.1 Answers to research questions

This chapter describes the answers to the research questions introduced in chapter 1 at the beginning of the thesis. The main research question that the thesis was aiming to answer was: How to use learning diaries to benefit startup education? To get an answer for the research question the theoretical model The Startup Scratch Book was created and then analyzed based on the empirical results.

The empirical results validated that the different aspects of the model were used and the way of using these aspects had an impact on the overall result of the scratch books. Relevance created a base for the scratch books and made them relevant to meet the course objectives. Depth increased the level of how the new business ideas were described and reflection was an important

part of the learning process. The presentation of the scratch books increased the clarity and the visual layout.

Three sub-questions were also made in addition to the main research question. The first sub-question sought an answer to the question: What aspects should be covered in the learning diary in startup education? The aspects to include in the startup scratch book model were based on the assessment criteria for learning diaries introduced by Moon (2006) and the criteria based on Moon was categorized in four different dimensions:

- Relevance
- Depth
- Reflection
- Presentation

These four dimensions included different aspects relevant to the dimension and based on the empirical research about the startup scratch books collected from the students all of the aspects were relevant to the overall process of creating a startup scratch book.

In addition to the aspects mentioned before the model also included the content of the startup scratch book. The content was based on the BMC framework created by Ries (2011) and the content also included the additional team component introduced by Kemell et al. (2020).

The second sub-question aimed to answer the question: How to evaluate students learning from a learning diary? To evaluate the students learning the model for the startup scratch book was created. The model is introduced to guide the students to do the right things but the model can also be used to evaluate the students' work. The learning process should be covered in the scratch books in a form of reflection so to get an understanding of the learning process the reflection should be included and the students should be guided to assess their own learning. Adding real-life challenges is linked to deeper learning and the students aim to understand the importance of the course better (Gaskin et al., 2015, p. 40). The scratch books are made based on business ideas that are created to solve some real-life challenge or create value for the customers. If this understanding is reflected in the scratch books the evaluation is easier. The evaluation process should be done based on the learning process introduced to scratch books. Another aspect of the assessment is to consider if the student's self-assessment could be used in the context of startup education. The self-assessment could increase the level of depth in the learning process and help the student understand better the learning outcomes of the course (Nieminen et al, 2019, Andrade & Du, 2007). The possibility of a student's self-assessment should be researched further.

The third sub-question of this thesis was: How to influence the learning diary process? The guidance of scratch books affects the overall outcome of the startup scratch books. The first scratch books were fairly broadly guided and in the second year the guidelines were refined. According to Prinsloo et al. (2011) the structure of the learning diary can affect the overall result. For example, if the learning diary is clearly structured the reflectiveness might increase but us-

ing unstructured diaries can improve self-awareness and awareness of others and there is more room for spontaneity. (Prinsloo et al. 2011, p. 27.) In this study the added structure increased reflection as well as the quality of the work, as more detailed instructions helped students respond to the course objectives.

The biggest changes in guidance were made to affect the relevance and the presentation. In table 14 the empirical conclusions of the comparison of the two courses held in different years are introduced. EC3 states that for example including minimum length was included in the requirements it had an impact on the overall quality of the scratch books. EC6 states that the depth also increased after the changes in the requirements were made even though the instructions did not directly affect depth. Also as stated in EC9 the requirements about reflection did not change. However, the amount of reflection also increased during the course. EC12 states that the quality and clarity increase after the course required table of content and the changes made increase the overall clarity of the scratch books.

The content section did not have changes in instructions or requirements but also the content was elaborated better. Although the guidelines did not change in all aspects, there was a change in all of them between different years. For example the change in required length could have been affecting the scope of the scratch books as a whole and the different areas were covered in more detail. To influence the students learning there can also be regular instructional support and giving feedback during the course can help the student understand better what is expected from them and how they can better answer the objectives of the course (Loo et al., 2002, p. 138).

TABLE 14 Empirical conclusions about comparison

Identifier	Empirical conclusion	Impact
EC3	The relevance was completed both of the years but the change in the course requirements (e.g. length) increased the quality of the relevance in 2019. When the course included theories, frameworks, or tools to use in the requirements, the students found it helpful.	Relevance
EC6	The depth was significantly increased in 2019 although the requirements regarding the depth of approach were not changed. The changes in the requirements, e.g. increased length, in the relevance increased also the quality of depth.	Depth
EC9	Reflection increased during 2019 even though the requirements did not change regarding the reflection. The reflective approach increased the relevance and quality of scratch books. A reflective approach helps to understand the learning process of students, but also the challenges they face.	Reflection
EC12	The quality and clarity increase significantly after the course required table of content. The small change in requirements made the scratch book distinctly clearer and easier to read.	Presentation
EC15	Including the BMC helped bring all of the building blocks into the scratch books.	Content

7.2 Limitations of the study

When it comes to the limitation of this study, some aspects must be considered. The empirical material for the study was collected from the course held in the University of Jyväskylä in 2018 and 2019 so the material was collected from only one specific course. The data collected covers information from the students from one country and one city in Finland and the course was held by the same group of teachers. This limits the empirical analysis to be done about one specific course held in two different years. The data to be analyzed were randomly selected from among the coursework and thus the material processed is also limited. Demographic variables have also not been taken into account in this study.

The analyzed data was in the form of textual course works created by the students. The empirical research does not include primary data collected straight by the researcher. Because of this limitation the data does not include e.g. students' opinions on the implementation of the course or instructions. Because of the limitations of the data the further validation needs more research. The author of the study was also a participant on the course in 2018, but the scratch book of the team that the author was a part of was not selected, so it does not raise a controversy. The results of the study were however linked to academic research and that increases the validity of the study. The study focuses on the students' perspective of scratch books and how the model can improve learning. The study does not focus on teachers' perspectives in terms of using startup scratch books.

7.3 Future research

This study opens a new conversation regarding the use of learning diaries as a pedagogical method in the context of startup education and how learning diaries can be beneficial to the startup education. The Startup Scratch Book Model should be researched further in the empirical context because the model is not tested in practice in this study. In the future, it should be investigated how the model in practice affects the scratch books of future courses and how the presentation of the model to students and its use in course evaluation affects the course. The proposed model should be researched further also in different contexts. For example the model has not been tested in practice in teaching, so the suitability of the model for instruction and the implementation of the model in accomplishing course work should be further investigated. The relationships between the different aspects of the model and how different building blocks of the model impact each other could also be researched further.

The teacher's perspective has not been studied in this thesis and the study focuses on the students' perspective of the scratch books. The use of the model in teaching and how it affects teaching and how to assess the scratch books should also be studied further. The assessment process while using the Startup Scratch book model in education should also be studied further.

The model has been created to meet the coursework needs of one particular course, but the model can also be applied to other courses or other fields. For this reason, the model should be studied from more different perspectives to find out if the model can be adapted to the other fields as well. The possibility of using student self-assessment in the context of startup scratch book assessment could also be further explored.

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APPENDIX 1 LIST OF ABBREVIATIONS

EC: Empirical conclusion
PEC: Primary empirical conclusion
EE: Entrepreneurship education
MVP: Minimum viable product
CBL: Challenge-based learning
CBSL: Challenge-based startup learning
BMC: Business Model Canvas