

Master's Programme in Information and Service Management

Defining educational productivity at a university

Learning as the value creation process

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Abstract

This thesis was done as part of a research project at Aalto University researching ways to measure educational productivity of higher education. The aim of this thesis was to define educational productivity as a concept and assess which aspects should be measured. This thesis was conducted as qualitative research, containing a literature review and an empirical section. In the literature review, I review how the societal role of Finnish universities has changed throughout history, and in what kind of operating environment universities today exist in. Additionally, I review earlier research on educational productivity as part of the literature review. The empirical section's data was mainly collected through semi-structured interviews. There were 11 semi-structured interviews in total. Participants included university faculty members and individuals working in close stakeholder organisations. The interviews were collected in collaboration with other students involved in the same research project. Data was analysed using grounded theory principles as the framework and utilising ATLAS.ti program as the main tool in the coding process.

Findings describe university's changing operating environment, where the university is aiming to meet the, at times conflicting, expectations of several stakeholders. Integral to the definition of educational productivity is learning as the value creation process. There are multiple factors, both direct and indirect, impacting this process. Quantifiable metrics were emphasised when determining inputs and outputs. Human capital, especially teaching resources, was emphasised as the most important input, and outcome defined as added value to students and surrounding society. Additionally, teaching quality was found to have strong links to productivity measurements.

Keywords Educational productivity, teaching quality, teaching resources, value creation process, productivity measurement

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Tiivistelmä

Tämä opinnäytetyö toteutettiin osana Aalto-yliopiston hanketta, joka pyrkii mittaamaan yliopisto-opetuksen tuottavuutta. Opinnäytetyön tavoitteena oli määritellä yliopisto-opetuksen tuottavuuden käsite ja arvioida siinä mitattavia tekijöitä. Opinnäytetyö toteutettiin laadullisena tutkimuksena, joka sisältää kirjallisuuskatsauksen ja empiirisen osion. Kirjallisuuskatsauksessa tarkastellaan suomalaisen yliopistolaitoksen yhteiskunnallisen tehtävän muutosta historian saatossa, ja millaisessa toimintaympäristössä suomalaiset yliopistot tänä päivänä toimivat. Kirjallisuuskatsauksessa esitellään myös aiempaa tutkimusta yliopisto-opetuksen tuottavuudesta. Empiirisen osion aineistona toimi 11 puolistrukturoitua haastattelua. Haastattelut koostuivat yliopiston henkilökunnasta ja läheisissä sidosryhmissä työskentelevistä henkilöistä. Haastattelut toteutettiin yhteistyössä muiden hankkeessa toimineiden opiskelijoiden kanssa. Data analysoitiin hyödyntäen grounded theory -tutkimusmenetelmän periaatteita, käyttäen ATLAS.ti-ohjelmaa välineenä koodausprosessissa.

Löydökset kuvaavat yliopiston muuttunutta toimintaympäristöä, missä yliopisto toimii useiden eri sidosryhmien ristipaineessa. Yliopisto-opetuksen tuottavuuden käsitteelle keskeistä on oppiminen arvonluontiprosessina. Prosessiin vaikuttavat monet tekijät, sekä suoraan että epäsuorasti. Esille nostetuissa panoksissa ja tuotoksissa korostuvat erityisesti numeerisesti mitattavissa olevat tekijät. Tuottavuutta kuvataan panosten ja tuotosten kautta, joissa korostuvat numeerisesti mitattavissa olevat tekijät. Inhimillinen pääoma, erityisesti opetukseen käytetyt resurssit, korostui tärkeimpänä panoksena. Päätuotoksena nähtiin tuotettu lisäarvo opiskelijoille ja yhteiskunnalle. Lisäksi havaittiin, että yliopisto-opetuksen laatu kytkeytyy vahvasti tuottavuuden määrittelyyn.

Avainsanat Yliopisto-opetuksen tuottavuus, opetuksen laatu, opetuksen resurssit, arvonluontiprosessi, tuottavuuden mittaaminen

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1 Introduction

This thesis is part of a wider research project focusing on the educational productivity of the Aalto University (referred to as *the university* in this thesis) that started in 2024. The project, led by associate professor Max Finne, involves students conducting their theses as part of the project. The end goal of the project is to measure the educational productivity of Aalto University and understand what drives productivity at universities to enable productivity gains.

The need to improve educational productivity stems from universities' funding model and operational environment which have changed during the past two decades (Seuri & Vartiainen, 2018; Heikkilä & Jokinen, 2015; Kaidesoja, 2018; Kuoppala, 2005). The funding of Finnish universities today is largely based on performance agreements, decided between the government and the universities for a four-year period at a time (Ministry of Education, 2024). The amount of public funding has decreased in the 2010s and the importance of external funding has grown (Seuri & Vartiainen, 2018; Kuoppala, 2005). Simultaneously Finland is aiming to grow the proportion of adults with a higher education degree as part of the national strategy for higher education and research in 2030 and has introduced extended missions for universities to achieve (Raerinne, 2025; Lyytinen et al., 2015; Ministry of Education, 2017). This is a phenomenon visible across Europe: universities are serving a growing number of students, but public funding is either staying at the same level or even decreasing (Olsen & Maassen, 2007). All the while the role of universities is extending from educating citizens and producing new knowledge to boosting innovation and economic growth (Välimaa, 2023; Björn et al., 2017; Gunn & Mintrum, 2016; Trippel et al., 2012; Geuna, 1999).

This changing operational environment is reflected in the way universities are managed. Processes commonly used in the business sector, such as quality management and enhancing productivity, are also being implemented in universities (Kaidesoja, 2018; Björn et al., 2017; Quinn et al., 2009). Overall, universities have moved closer to the business sector (Niiniluoto, 2015). Historically, universities have been disinclined to adopt processes aiming for efficiency, fearing that it would reflect negatively on the quality of education (Ng & Forbes, 2009). Even now that those practices are more commonly utilised in Finnish universities, many faculty members have reservations about the changes in governance as it has increased the sense of control within universities and expectations placed on the faculty (Brunila, 2019; Kallioinen, 2019).

This research project starts with defining what educational productivity means, what is commonly measured, and what aspects are possibly overlooked. These considerations form the focus of this thesis. Other students will then continue to discover topics such as data availability and reliability for

measuring purposes. At first, the focus of the project is mainly on the Aalto Business School.

Defining and measuring teaching outcomes is essential for universities to be able to not only assess the quality of their teaching, but also to evaluate the university's resource usage (Räty & Harava, 2008; Rhoades, 2001). This enables continuous improvement in processes and the setting of goals to enhance teaching productivity. This also enables universities to be compared to peer universities. Before data can be gathered and analysed, it is necessary to determine what educational outcomes and outputs can and should be measured as defining the outcome can be challenging (Makhoul, 2019; Huxley et al., 2018; Pascarella, 2006).

To ensure that meaningful outputs and outcomes are measured, we must first assess what sort of data could reveal the connections between the higher education experience and student development (Pascarella, 2006). Therefore, the project began with determining the educational outcomes we should measure and analyse, and what data related to them we have available.

Before discussing the research done as part of this thesis, the history of universities in Europe, productivity of services, and educational productivity in earlier research is reviewed in a literature review in chapter 2. Also, universities' funding models are discussed to set the premise for why universities today are looking to increase their productivity. The competitive operating environment of universities is also discussed, as well as processes related to it, such as university rankings and accreditation systems. With productivity, I start with defining what it traditionally means and reviewing known productivity challenges in the service sector, of which education forms a part of. This is to understand the overall theoretical framework that productivity connects to and to be able to assess how educational productivity differs from measuring productivity in other sectors. After that, I look at educational productivity per se in earlier research and the inputs, outputs, and the production process of education as discussed in earlier studies.

In chapter 3, I present the research material and methods of this thesis. The main research material was 11 semi-structured interviews during which we interviewed 14 interviewees in total. The data was analysed with the support of the grounded theory principles, allowing a flexible process of collecting and analysing data simultaneously. The data was first coded utilising the Atlas.ti software and then analysed more in-depth.

Findings are presented in chapter 4 and discussed further in chapter 5 where I also review the limitations of this thesis and suggest ideas for further research.

1.1 Research problem & questions

The main research problem is determining what educational inputs, outputs, and outcomes should be measured to be able to define and assess the

educational productivity of the Aalto Business School. From this problem, the following questions were defined.

- How is educational productivity defined?
- What do different productivity measurements indicate?
- What do productivity measurements overlook?
- How does educational productivity link to the quality of teaching?

2 The operating environment of universities today and educational productivity

2.1 European universities' mission historically and today

To define the educational productivity of a university, one should start with analysing and determining the mission of a university as studies show that organisations allocate resources differently based on their mission (Bartholomew, 2016). What are universities aiming to produce or what should they produce?

Historically, European universities can be seen to balance between two goals: educating citizens and producing knowledge and truth (Välimaa, 2023). This goal of producing education and enlightenment has been central for European universities for centuries. In Finland this echoes back to the founding document of the University of Helsinki, then called Kuninkaallinen Turun Akatemia (*the Royal Academy of Turku*), written in 1640 (Välimaa, 2023). The document and speeches given during the opening refer to the academy as a place where literacy skills, good manners, and virtues are born and taught (Välimaa, 2023; Niiniluoto, 2015). Later in the 1800s J.V. Snellman introduced the idea of what distinguishes a university from a school: he thought that universities should aim to educate thinking, responsible citizens whereas schools are more focused on conveying the importance of remembering facts and respecting authorities (Välimaa, 2023).

Our modern university today traces back to the Humboldt universities, one of the two main orientations of European universities in the 1800s and 1900s (Tirronen, 2007). The Humboldt universities, originated in Germany, emphasised the connection between research and teaching and the importance of specialisation of science (Nybom, 2007; Tirronen, 2007). The Humboldtian orientation was based on universities being separated from the state and the church, highlighting the importance of academic freedom (Nybom 2007; Tirronen, 2007). At that time, universities served only the elite, and university education was not accessible for all nor was it aiming to be, and Humboldtian universities could be seen somewhat isolated from the world and everyday life (Niiniluoto, 2015; Tirronen 2007).

In the latter half of the 1900s, universities opened up to serve the masses which brought them closer to the surrounding society (Tirronen, 2007; Kuoppala, 2005). This shift began in the United States soon after World War II and accelerated in Europe in the 1960s and 1970s (Ng & Forbes, 2009; Nybom 2007). In Finland too, the higher education sector expanded rapidly in the 20th century through political decision-making emphasising the role of education in rebuilding the nation after the wars (Välimaa, 2023). In 1970s there were already 20 higher education institutions established to support the needs of the growing number of high school graduates (Niiniluoto, 2015).

Universities' purpose was no longer to merely educate the privileged but to enable greater societal transformation (Tirronen, 2007). In Finland this was first visible when Helsinki School of Economics (*Kauppakorkeakoulu*) and School of Technology (*Teknillinen korkeakoulu*) were founded in 1911 and 1908 (Niiniluoto, 2015). Their mission was from the start to focus more on educating workforce for the business sector than to foster academic research (Niiniluoto, 2015). Already in 1960s higher education's role in accelerating economic growth was recognised (Välimaa, 2023). From 1960 to 1980, the number of university students in Finland grew from 25 503 students to 84 176 and the number of student enrollments still continued to grow in the 21st century (Välimaa, 2023; Kuoppala, 2005).

In Finland, the renewed Universities Act came into effect in 2010, strengthening the autonomy of universities (Seuri & Vartiainen, 2018; Yliopistolaki, 558/2009). Universities were transformed from state-owned institutions to separate, independent legal entities with greater economic autonomy and responsibility (Seuri & Vartiainen, 2018; Rinne et al., 2012). This reflects a European trend of granting universities increasingly more autonomy during the last decades, an ideal advocated already by the founding father of the Humboldtian tradition, Wilhem von Humboldt (de Boer et al., 2015; Nybom, 2007). Academic freedom has been aspired for throughout the history of European universities (Välimaa, 2023). As part of this change, professors and teachers moved from public-service employment to contractual employment (Kallioinen, 2019; Seuri & Vartiainen, 2018).

The ideal of producing education is still reflected in Finland's Universities Act (Yliopistolaki, 558/2009) where it is stated that the mission of universities is to foster independent scientific research as well as scientific and artistic education, and in universities' own strategies that emphasise the role of research and high-quality learning. The Humboldtian tradition of emphasising the connection between research and teaching is still visible in Finnish universities today (Niiniluoto, 2015).

When it comes to the idea of educating citizens, one should look at the overall relationship between university and surrounding society. The relationship between society and university is commonly seen as an interactive relationship in which the university aims to influence the framework that it is given by society instead of merely settling for the conditions as a receiving party (Välimaa 2023; Björn et al., 2017). This relationship is also captured in the previously mentioned Universities Act (Yliopistolaki, 558/2009).

In the latter half of the 20th century, the universities' funding model changed, and universities moved closer to the business sector (Niiniluoto, 2015; Kuoppala, 2005). The amount of research publications funded by companies began to rise in the 1980s and policy makers too have become increasingly interested in how research produced in universities could aim the economic growth of the nation (Geuna, 1999; Gunn & Mintrum, 2016). This reflects how the world has changed overall: in the global economy, knowledge

has overthrown the traditional factors of production and become the most significant driver of performance (Guile, 2003).

In this new era, global competition is accelerating and there is growing demand for new innovations which is reflected as an expectation for universities (Björn et al., 2017; Gunn & Mintrum, 2016). Especially important is how innovations produced in universities can be transformed into products (Björn et al., 2017; Liefner, 2003). As mentioned earlier, two core missions of universities are producing knowledge and providing higher education (Raerinne, 2025; Niiniluoto, 2015). Many researchers have found that a third mission of universities was introduced in 1990s, requiring universities to focus more on their societal contributions, such as transforming new knowledge into innovations (Raerinne, 2025; Heikkilä & Jokinen, 2015; Niiniluoto, 2015; Trippl et al., 2012; Zomer & Benneworth, 2011). This third mission has also been acknowledged in Finland, and the Ministry of Education has aimed to find ways to measure it in a meaningful way (Lyytinen et al., 2015). The mission and goals of universities overall have expanded from educating citizens to driving economic growth, placing more expectations on universities (Björn et al., 2017; Olsen, 2007).

One way to explain the recent transition in universities in Europe is through the framework of academic capitalism, concept first introduced and studied by Slaughter, Leslie, and Rhoades in late 1990s (Kaidesoja, 2018; Slaughter & Leslie, 2001; Rhoades & Slaughter, 1997). Academic capitalism refers to universities intertwining more and more with market and the logic of markets as well as becoming active participants in the market through, for example, investing in companies (Kaidesoja, 2018; Rhoades & Slaughter, 1997). Applying such concepts as productivity, efficiency, and performance agreements to universities can be seen to be part of academic capitalism (Kaidesoja, 2018). Although it should be noted that academic capitalism, a concept developed in the United States, should not be used to directly describe universities' development in Finland as universities in Finland and the US are not directly comparable (Kaidesoja, 2018).

It is good to state again that the historic development of universities in the United States differs quite drastically from the history of European universities. Universities in the United States started to educate the masses in the 19th century as workforce needed to become more specialised to different industry fields, in opposed to keeping universities available only for the few (Ng & Forbes, 2009). This has resulted in a higher proportion of adult citizens with college degrees than in almost any other country in the world (Areen, 2010). Methods adopted from the business sector were introduced in universities in the United States earlier than in Europe, so there are longer traditions in quality measurement in higher education in the United States as well as wider acceptance of them (Owlia & Aspinwall, 1997). The competitiveness of the environment and the more prominent role of philanthropy as part of the

funding model are further examples of differences between universities in Europe and the United States (Ng & Forbes, 2009).

Academic capitalism has links to neoliberalism and the New Public Management theory, which suggests that market-orientation is now expected also from the public sector, and methods known in the private sector, such as quality assurance, are used to manage public organisations (Björn et al., 2017; Dougherty & Natow, 2019). Many universities have implemented quality assurance methods, such as Total Quality Management and Quality Function Deployment (Quinn et al., 2009). Universities have had different reactions and implications from the introduction of the New Public Management. Some studies have found that more legitimate universities perform better under these new demands, and many universities have started to focus more on improving quality (Cattaneo et al., 2016; Quinn et al., 2009). At the same time, there have been strong criticism towards this transformation from the university personnel and scepticism towards methods used in the business sector, such as adapting quality assurance methods (Brunila, 2019; Ewell 1993, as cited in Quinn et al., 2009).

2.2 Universities' funding models

The introduction of New Public Management, or *management by results* doctrine, in the university sector has also meant that universities' funding is based more on the performance of universities: how many degrees, credits, and academic journals are being produced (Seuri & Vartiainen, 2018; Kuoppala, 2005).

As described in chapter 2.1, universities in the United States have been intertwined with the business sector longer than in Europe. European universities have relied far more on public funding than universities in the United States (Liefner, 2003). In Europe, the United Kingdom has led the introduction of neoliberalism in the higher education sector, and the role of private funding has been equally highlighted there sooner (Koskiahho, 2021; Lindberg, 2013; Liefner, 2003). However, in the recent decades, performance-based funding has become common in many other countries in Europe too, including Finland (Kaidesoja, 2018; Kuoppala, 2005).

In Finland, performance of a university has been considered a factor when allocating public funding since 1988, but the significance of it stayed relatively small throughout the 1990s (Seuri & Vartiainen, 2018; Kuoppala, 2005). Only since the 2000s has funding started to rely more heavily on the competitive aspects (Seuri & Vartiainen, 2018). In addition to that the amount of public funding allocated to universities has significantly decreased in the 2010s and the role of external funding has become more important (Seuri & Vartiainen, 2018; Kuoppala, 2005). This is a challenge seen across European countries: student enrollments have kept on growing but public funding has not increased at the same pace (Olsen & Maassen, 2007).

One aim of the funding model is to steer universities towards the strategic goals set by the Ministry of Education (Kuoppala, 2005). The performance agreements are negotiated between the government representatives and the universities, and they are set for the next four years. For the 2025-2028 term, the most significant individual metrics in the funding model are master's degrees and research publications, and other metrics include, for example, bachelor's degrees, employment after graduation, and student feedback (Ministry of Education, 2024). The metrics put more emphasis on education than other missions defined for universities, such as producing research (Raerinne, 2025). I look at these metrics more closely when discussing the productivity outputs in chapter 2.8. Notable about the funding model in Finland is that it aims to enhance the higher education sector as a whole (Raerinne, 2025). The proportion of adult citizen with a higher education degree is a metric followed closely in many western countries, and there is a new metric in the performance agreement aimed at supporting this goal (Raerinne, 2025; Ministry of Education, 2017). The reason for this is that strong emphasis is currently put on accelerating total productivity by investing in human capital, often done through formal education (Mäki-Fränti et al., 2023).

Changes in the funding model have increased the pressure on universities to become more efficient and productive. To ensure their autonomy, universities are aiming to become less dependent on the state with regards to their funding, making the role of non-government funding increasingly important (Tirronen, 2007).

Some see that this transformation has also meant that the role of universities as fostering education has been overtaken by the universities' role in driving economic growth, and that these two roles are conflicting (Välimaa, 2023; Björn et al., 2017). Instead of emphasising the intrinsic value of educating oneself to grow as a person and a citizen, there is now more pressure to be an efficient student and to graduate on time to be ready for the job market (Välimaa, 2023). The aim of education and a degree is to increase the value added by the individual in the culture or business sector, and most of this value is only realised after graduation (Räty & Harava, 2008). Universities are seen as important actors in positioning the nation in global competition, and as places where productive innovations are produced (Björn et al., 2017). Something to be considered during productivity calculations is balancing these different aims and critically reflecting whether they are conflicting.

Even though universities' position as drivers of economic growth seems to be emphasised in the modern age, the idea of universities serving societies is not new. Making an impact on society has always been part of universities' mission but perhaps the meaning has expanded in the recent decades (Björn et al., 2017; Lyytinen et al., 2015; Vähäkangas et al., 2008). As with other institutes, the relationship between society and universities is consistently

changing and evolving over time (Olsen, 2007). As stated previously, the goal of universities has always been to also educate citizens, not just produce new knowledge (Välimaa, 2023). Whether that has meant educating “civilised gentlemen” to lead the nation or to train the clergy, the university has never been completely separate from the surrounding society despite its aim for autonomy (Välimaa, 2023; Björn et al., 2017). One could argue that the transition of universities and their funding model simply reflects the changes of the society and the economy as a whole.

2.3 Productivity of services

Productivity refers to the ratio of inputs and outputs of a production process (e.g. Aspara et al., 2018; Steindel & Stiroh, 2001). Productivity can be defined as labour productivity: output per hour of work, or as total productivity, output per unit of all inputs (Steindel & Stiroh, 2001). Productivity was mentioned already in Adam Smith’s classic *The Wealth of Nations* in 1776, and it can be considered as one of the core concepts in economics (Ucak, 2015). When it comes to universities, considering productivity has historically been perceived as a risk to educational quality and universities have been reluctant to adopt a market perspective (Ng & Forbes, 2009). But as universities’ operating environment has transformed, striving for efficiency has become an important goal for them.

Hanushek and Ettema (2017) state that “If education were a factory, its product would be educated citizens” referring to elementary and secondary level education. Instead of a manufacturing process, it is more suitable to look to the service sector to find relevant productivity measurements and theories as education has traditionally been perceived as part of the service sector (Fuchs, 1965; Larson, 2008; Archibald & Feldman, 2008). Productivity of services has been studied increasingly during the past couple of decades (Hofmeister et al., 2024). Some argue that when reviewing the costs of an industry, it is best to review both what makes the industry different from other industries as well as to review the similarities (Archibald & Feldman, 2008). This is why I believe it is useful to take a look at productivity from the perspective of the service sector before focusing only on the educational sector.

Often used characteristics of services include intangibility, perishability, inseparability between production and consumption, and co-creation of the final ‘product’ by the customer and the service provider (Lau et al., 2011). Many of the attributes used to describe the service sector can be used to describe higher education too (Ng & Forbes, 2009). As with many other service sector industries, measuring quality accurately and reliably is a challenge in the education sector (Quinn et al., 2009). Businesses and institutions have adopted processes such as rankings and accreditations to compare the quality of their products or processes to those of peers (Bartlett et al., 2013).

The rising costs of higher education are a cause of concern in many countries. One quite popular explanation for the rising cost in service sector industries, especially in the United States, is Baumol's cost disease, a theory developed by William J. Baumol in the 1960s (Bates & Santerre, 2013). William J. Baumol and William Bowen started by studying performing arts in the 1960s and built a theory to explain why productivity did not increase in the arts sector like it did with other sectors (Baumol & Bowen, 1965). To put it simply, there are sectors where productivity cannot increase in the same rate due to the nature of the labour. A commonly used example from the arts industry when explaining Baumol's cost disease is a string quartet: it takes as long to play it today as it did 200 years ago (Fleischer, 2024; Heilbrun, 2003). As the 'production' of services in the culture sector cannot be enhanced through technological progress like in the manufacturing but the salaries must still rise due to the cost of living rising and due to competition for workers, it leads to decreased productivity (Last & Wetzell, 2011; Archibald & Feldman, 2008). The cost disease theory has also been applied to higher education (Bates & Santerre, 2013; Archibald & Feldman, 2008).

Performing arts and education share some similarities: in both fields economies of scale is emphasised as a way of increasing productivity. What this means in performing arts is playing for a larger audience and in higher education, giving a lecture to a larger number of students. In higher education though, raising the class size can often impact the quality of teaching (Archibald & Feldman, 2008). Throughout the service sector it has been recognised that for productivity growth to not have negative impacts on quality is likely to require a transformation in the technology of service delivery (Archibald & Feldman, 2008). In the service sector, a new concept considering both technical efficiency and the quality perceived by customers has been proposed (Calabrese, 2012). Technology has potential to increase productivity in higher education through, for example, online learning (Archibald & Feldman, 2008).

2.4 Educational productivity in earlier research

In higher education, the aim is to produce value to society through educated graduates (Räty & Harava, 2008; Helms & Key, 1994). However, gained competence is difficult to measure in higher education as it can be challenging even to define conclusively what the desired outcome should be (Makhoul, 2019; Huxley et al., 2018; Pascarella, 2006). When it comes to measuring productivity of education, common ground has been found amongst researchers on the importance of the subject but there are differing opinions on the measurement itself (e.g. Massy et al., 2012; Hanushek & Ettema, 2017; Räty & Kivistö, 2006). The conclusion seems to be that there are multiple ways to measure and calculate educational productivity (Räty & Kivistö, 2006). Importantly, chosen variables must describe the most central

processes, and the measurement should provide universities opportunities to set goals and allocate resources (Räty & Harava, 2008; Rhoades, 2001).

Often recited study on the productivity of higher education, referred to as the “Delaware study”, conducted by Middaugh, Graham and Shadid (2003) assessed the varying costs of higher education in the United States. The study found that discipline has great impact on the cost, for example, costs of mechanical engineering education are significantly higher than the cost of sociology studies (Middaugh et al., 2003). This is visible also on the research front: the number and length of publications as well as the resources required to produce research vary based on discipline (Rhoades, 2001). In Finland, this is acknowledged by allocating funds to certain fields requiring specific materials and infrastructure, such as technology and medicine, and especially labour-intensive fields requiring smaller student groups, such as arts (Seuri & Vartiainen, 2018).

Often analysed educational productivity aspects are student-faculty ratio, credits, contact teaching, graduation time as well as outcomes, such as employability and salary (Räty & Kivistö, 2006). Rhoades (2001) emphasises that different educational inputs are linked together and why it is thus important to assess the whole process, not just separate parts of it. Massy, Sullivan & Mackie (2012) also argue that measures that describe either inputs or outputs but not both, are not sufficient for analysing productivity. Another consideration is the level of measuring as productivity on an aggregate level might leave important details about differences between disciplines undiscovered (Middaugh et al., 2003).

In the education sector, defining who the customer might be challenging as universities are trying to meet the needs of multiple different stakeholders (Quinn et al., 2009). Multiple parties, such as students themselves, their parents, employers, and the society have been recognised in earlier research as important stakeholders, some of which are also possible customers of higher education (Benneworth & Jongbloed, 2010; Quinn et al., 2009). In earlier research, students have strongly identified themselves as the customers, but faculty members and even some researchers have had reservations about adopting that perspective (Delello et al., 2018; Ewell 1993, as cited in Quinn et al., 2009; Helms & Keys, 1994).

Räty and Kivistö (2006) conducted a wide analysis for the Finnish Government Institute for Economic Research on how to measure productivity of universities. They suggest multiple different productivity measures that have different perspectives on productivity such as aggregate productivity measure, quality adjusted aggregate productivity index, and graduation index. Some of the developed indexes are more suitable for yearly measurement and some showcase longer term trends. The quality adjusted aggregate productivity index would consider the students’ entry level capabilities. The graduation index would focus on the graduation time, which Räty and Kivistö identified as one of the core problems universities face. (Räty & Kivistö, 2006)

I believe it is also important to point out that focusing on the cost of higher education, especially when comparing the budgets between universities, seems to implicitly echo the resource theory of pedagogy. The resource theory of pedagogy refers to an idea where student learning is inherently linked to the resources available such as equipment and human resources, so that simply bringing together these resources will result in learning and development (Astin, 1999). Astin (1999) argued that more emphasis should be placed on how those resources are in fact utilised.

Archibald & Feldman (2008) argue that the rising costs in higher education echo what we see in other industries too and thus we should not focus in finding reasons from the higher education field specifically but instead look at rising costs in services industry more broadly. Studies have found that investing in developing employee skills has potential to increase productivity in the service sector (Hofmeister et al., 2024). Especially employees as well as teachers' intrinsic motivation is crucially important for the quality and efficiency of service (Chan & Wan, 2012; Liefner, 2003).

2.5 Inputs

2.5.1 Personnel cost and qualifications

Academic personnel's resources are a widely acknowledged contributor to educational productivity and an aspect that research has focused heavily on (Rhoades, 2001). Higher education is a highly labour-intensive sector and faculty salaries form a large part of the costs of higher education (Middaugh et al., 2003; Rhoades & Slaughter, 1997). Common ways to measure personnel input are student-teacher ratio; how many students are there per teacher, as well as contact teaching hours; how many hours are teachers spending teaching student (Bartholomew, 2016; Rätty & Harava, 2008; Kuoppala, 2005; Middaugh et al., 2003; Rhoades, 2001). When looking at the salary costs in more detail, the seniority of teaching faculty is often examined too as higher proportions of tenured faculty have been found to indicate higher cost levels (Middaugh et al., 2003).

How university faculty spend their time and whether they work hard enough has been a topic of public debate (e.g. Kallioinen, 2019; Delello et al., 2018). However, a study conducted in the United States found that workload of university faculty has increased, tenured professors working longer hours than rest of the staff despite claims that tenures would lead to inefficiency (Delello et al., 2018). Teaching activities conducted by university teachers include, for example, classroom teaching, giving feedback, updating content, and preparing materials (Delello et al., 2018). In addition to direct teaching activities, academic personnel's advising time has been found to have significant impact on student outcomes and satisfaction (Rhoades, 2001).

When it comes to teaching, economies of scale can be a way to increase productivity as mentioned in chapter 2.4. Higher teaching workload has been found to decrease cost, and smaller group sizes in, for example, doctoral instruction to vice versa increase costs of teaching (Middaugh et al., 2003). In Finland, academic productivity was found to increase in 1990s and early 2000s after the introduction of performance-based funding as more study credits and degrees per faculty member were produced (Räty & Harava, 2008; Kuoppala, 2005). But as mentioned, the appropriate student-teacher ratio is largely dependent on the discipline and topic at hand, and increasing the class size may impact the quality of teaching (Archibald & Feldman, 2008; Middaugh et al., 2003). Similarly, developments in academic productivity vary largely between disciplines and universities (Räty & Harava, 2008). Some studies have found that increasing class size decreases student satisfaction although the link was found to be weak (Gannaway et al., 2018).

As discussed in previous chapters, the operating environment of universities has changed, emphasising efficiency, productivity and competitive aspects more. As the role of teachers is well acknowledged to be an integral part of universities impacting both quality and productivity, many universities are aiming to enhance teaching. In some countries, such as Germany, performance measurements have been extended to also impact university teachers' salaries; one third of teachers' salaries is determined based on performance-based metrics (Wilkesmann & Lauer, 2020). Additionally, programs to improve teaching conditions and even awards aimed at established teachers have been introduced in German universities (Wilkesmann & Lauer, 2020).

Overall, findings on impacts of performance-based funding and new public management on faculty are somewhat conflicting. Some studies have found that it has made the job of academics increasingly more stressful and has put the academic personnel under increased scrutiny (Brunila, 2019; Björn et al., 2017). In Finland, concerns regarding burnout risk of university teachers have been raised (Meriläinen et al., 2016). Then again, some studies have found indications of performance-based funding increasing the efficiency of academic personnel (Liefner, 2003). Comparison study conducted by Wilkesmann and Lauer (2020) found that motivation and importance found in teaching is still mostly determined by teachers themselves, and introduction of new public management principles has not had significant impact on how teachers find their job. However, they did find some indications that teachers are feeling more self-conscious about how well they are performing (Wilkesmann & Lauer, 2020). Performance-based founding may also decrease willingness to take risks and conduct more curiosity-based research (Liefner, 2003).

Liefner (2003) also found that expectations of impacts of performance-based funding influence the outcomes; whether it is likely to have positive or negative impacts on areas such as internal efficiency or motivation of the staff, were largely dependent on the attitudes towards performance-based

funding. Faculty members that were in favour of performance-based funding found it likely that it would have positive impacts on efficiency and motivation, whereas faculty members opposing performance-based funding were skeptical about positive impacts (Liefner, 2003). However, both groups believed that performance-based funding would produce more research that can be utilised in marketable innovation and products (Liefner, 2003).

Employing less qualified or experienced teachers could be a way to decrease the cost of salaries since as mentioned, more senior teachers and professors have higher salary expenses (Archibald & Feldman, 2008; Middaugh et al., 2003). However, studies have found that the most important factor to universities' long-term success is the quality and capabilities of their academic personnel, and that no teaching qualifications has negative impacts on teaching efficiency (Lee & Johnes, 2022; Liefner, 2003). So even though employing less qualified teachers could be perceived as an easy way to save costs, it might not result in the desired outcome. Similarly, when measuring labour hours, experience and qualifications should be considered to detect their impact on learning outcomes (Räty & Harava, 2008). Interestingly, Liefner (2003) also found that more qualified personnel respond less to incentives.

Another significant cost to a university is the non-academic personnel, such as learning support services and administrative staff. Already in the 1990s it was visible that the growth in personnel in universities happened in support personnel, not academic personnel (Rhoades, 2001). This means that the role of support professionals in educational production has grown and become more significant (Rhoades, 2001). For this reason, universities should consider the amount and allocation of these resources as a factor when measuring productivity, not merely the academic personnel's cost (Rhoades, 2001). Some studies have even found that the growing number of administrative staff is one of the significant reasons behind rising costs in higher education (Archibald & Feldman, 2008). In Finland, study conducted by Kuoppala (2005) found a link between external funding and recruiting more administrative staff, highlighting that fundraising also requires demands from universities.

2.5.2 Infrastructure

Another cost for a university that should be considered as input, relates to infrastructure which can be seen to include facilities and supporting services, such as software that the university utilises as well as provides to its students and faculty. Facilities include buildings and different purposes they serve such classrooms, laboratories, and libraries. Qualities of buildings have been found to impact students' wellbeing due to aspects such as health, comfort, and safety (Muhammad et al., 2014). Related to comfort, Roelofsen (2002) found that from a productivity perspective, an ideal thermal environment can be defined. The topic of higher education buildings and architecture and their

impact on the surrounding society have been studied in some earlier research (Van Heur, 2010). But in this thesis, buildings are mostly perceived in a rather straightforward way; through their direct financial impact.

Technological infrastructure is also important for higher education institutes. Technological infrastructure includes services such as registry for credits and grades, e-learning platforms, and internet on the campus area. Big data infrastructures are of growing importance to universities as data is aimed to be utilised more in decision-making (Williamson, 2018). The cost of computer-related equipment was recognised as major expenditure for universities already 20 years ago, and costs have grown in the recent years in, for example, Europe, the United States, and Latin America where governments have invested heavily in technology for education (Okoye et al., 2023; Layzell & Caruthers, 2002).

The COVID-19 pandemic further accelerated the role of technology in education as online teaching became necessary in many countries (Abu Talib et al., 2021; Pather et al., 2020; Teräs et al., 2020). Some universities that only introduced e-learning when ‘forced’ by the pandemic perceived that some aspects of e-learning could supplement practical classes even after the pandemic and social distancing (Pather et al., 2020).

Technology is also seen as an opportunity to increase productivity in higher education, as already mentioned in chapter 2.4. Online teaching can be a way to utilise the economies of scale in education by enabling a larger number of participants compared to traditional classroom teaching as well as automating some tasks through, for example, online quizzes. Studies have also found that students often have good feedback about e-learning classes (Abu Talib et al., 2021; Pather et al., 2020). However, to what extent online learning can be utilised as part of university education is highly dependent on the discipline as some fields require more hands-on training and experience (Abu Talib et al., 2021).

Introducing new technology in universities also requires new skills from the faculty and students to enable efficient and correct use of tools and systems (Okoye et al., 2023; Pather et al., 2020). Lack of skills can form a bottleneck for university’s technological development (Okoye et al., 2023). These skills are often not required only at university but also later in work life. Universities are expected to consider technology broadly as part of education, as the role of technology in the business sector and society has grown significantly (Heikkilä & Jokinen, 2015). The speed of technological innovation in the educational sector has also caused some concerns of inclusion and equity as not everyone has the same access to technology (Okoye et al., 2023). Researchers have also raised the importance of maintaining a critical attitude towards technologic innovation in the education sector to ensure technology is harnessed for the right reasons, not just due to the excitement (Teräs et al., 2020).

2.5.3 Students

Students are often taken into consideration in the productivity calculation as units, for example, by calculating how many full-time students there are per full-time faculty members (Räty & Harava, 2008; Kuoppala, 2005). However, many studies focusing on productivity of higher education do not mention the capabilities, motivation, or resources of students as significant factors. For example, in Räty's and Harava's (2008) report on total productivity in Finnish universities, they state that although students can be seen as a resource to certain extent, they are mainly the target of teaching and resource usage. In some studies, (i.e. Bartholomew, 2016), it has been acknowledged that it is merely an assumption, that teaching hours as inputs are a good indicator for learning outcomes. Professor Alexander W. Astin (1999) paid attention to this already in the 1980s when he published his theory capturing what student involvement means and stated that "the student is often treated as a kind of 'black box'".

There are some theories on educational productivity, such as Walberg's theory from 1981, that highlight student capabilities and motivation as factors that promote student learning (Bruinsma & Jansen, 2007). However, studies proving Walberg's theory have focused mostly on school-aged children, not higher education (Bruinsma & Jansen, 2007). Bruinsma & Jansen (2007) conducted a study on Walberg's theory's applicability to higher education and found previous achievement and motivation of students to be predictive factors of academic achievement. Astin (1999) promoted the importance of assessing the efforts that students are putting towards their studies. Aspects like motivation and effort can be difficult to measure but some research, such as a study conducted by Sharkness and DeAngelo (2011), have aimed at defining what kinds of metrics and surveys should be used to measure student involvement. Study conducted by Helms & Key (1994) also found that students would like to be involved in activities aiming to assure or improve the quality of teaching, highlighting their role as active participants in the production process.

Liefner (2003) found the capabilities of students to be a more important factor to a university's long-term success than performance-based funding allocation or other incentives. Lee and Johnes' (2022) study indicates that high tariff students, referring to students who have had high grades prior to entry, positively impact teaching efficiency. Study conducted by Kleemola et al. (2023) found that the grade in student's native language strongly predicted their critical thinking and writing skills.

As previously mentioned, Räty and Kivistö (2006) present as a possible educational productivity index "quality adjusted aggregate productivity index" that would take students' entry level capabilities into consideration. This would enable measuring not only attainment but also student growth that has taken place during studies (Kim & Lalancette, 2013). However, Räty and

Kivistö acknowledge that this kind of an index would require its own research to analyse the best way to gather such data (Räty & Kivistö, 2006).

Additionally, it is important to note that the subject of student capabilities, especially on an entry level, is a sensitive topic since it has close links to students' socioeconomic backgrounds. Added scrutiny at the entry level could on a societal level lead to inequality. Parents' educational background and family's socioeconomic status have been found to have strong correlations to how well children perform in school, their overall cognitive skills, and what professions they choose later on in life (e.g. Heiskala et al., 2021; Salmela-Aro & Chmielewski, 2019; Crosnoe & Muller, 2014; Hanushek, 2012). Measuring student growth instead of merely results in, for example, specific test, allows universities and policymakers assess the added value provided by the higher education institution to students with different backgrounds (Kim & Lalancette, 2013).

Table 1: Inputs mentioned in earlier research

Input	Considerations	References
Personnel (cost)	Higher education is labour-intensive sector, and personnel cost make up a large part of universities' budgets. Personnel include teaching staff and non-academic personnel. Student-teacher-ratio is a way to quantify this input.	Rhoades, 2001; Middaugh et al., 2003; Rhoades & Slaughter, 1997; Barthomolew, 2016; Räty & Harava, 2008; Kuoppala, 2005; Gannaway et al., 2018; Archibald & Feldman, 2008; Räty & Kivistö, 2006
Personnel (qualifications)	Seniority and qualifications of faculty have been found to impact both teaching quality and the salary costs.	Lee & Johnes, 2022; Archibald & Feldman, 2008; Liefner, 2003; Middaugh et al., 2003
Personnel (working time)	Different teaching activities, how personnel are using their working time	Kallioinen, 2019; Delello et al., 2018; Rhoades, 2001
Infrastructure (facilities and services)	Facilities and services. Technology's significance has increased, requiring also skills from staff and students. Technology can enable economies of scale through e-learning.	Okoye et al., 2023; Abu Talib et al., 2021; Pather et al., 2020; Teräs et al., 2020; Williamson, 2018; Heikkilä & Jokinen, 2015; Räty & Kivistö, 2006; Layzell & Caruthers, 2002
Students	Students are often perceived as the target of resource usage instead of input. There are researchers critical of this perception, emphasising the role	Lee & Johnes, 2022; Räty & Harava, 2008; Räty & Kivistö, 2006; Kuoppala, 2005; Liefner, 2003; Bruinsma & Jansen, 2007;

	of students in the value creation process.	Astin, 1999; Helms & Key, 1994
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2.6 Value creation process: learning

The value creation process in higher education is the learning itself. Again, the similarity of higher education to other services is highlighted; value is co-created with the customer and service provider, here assuming that student is the customer and university faculty are the service providers (Lau et al., 2011). Inputs for the production process are comprised efforts of multiple stakeholders; the academic personnel, students themselves, and the infrastructure provided by the university. As already mentioned in the previous chapter, it is important to recognise the students' role as active participators in this value creation process, as has been highlighted in numerous studies and theories (Liefner, 2003; Bruinsma & Jansen, 2007; Helms & Key, 1994; Astin, 1999). Since teachers are at the center of educational productivity, it is important to understand how teaching quality and practices impact the value added in education (Chetty et al., 2011). Additionally, when measuring learning, it is critically important to pay attention to the quality and accuracy of the data collected (Pascarella, 2006).

As there is limited research focusing on teachers in universities, I reviewed some studies on teacher in other educational levels to get an understanding of how “good teaching” and its impact have been evaluated overall. A commonly used method is the “value-added” (VA) method, aiming to assess teachers impact on grades and test results excluding other factors, such as socio-economic background (Chetty et al., 2011). Hanushek (2012; 1971) has long examined how characteristics of teachers impact learning outcomes, aiming to pinpoint what predicts the added value. Even though the VA methods aim to measure only the impact of the teaching itself, it has been debated whether success is truly determined by teacher qualifications or by the backgrounds of students, and whether the quality of teaching can impact longer term success or only grades in the near future (Chetty et al., 2011). Additionally, VA methods have been criticised for measuring quality numerically, as it is perceived as a neoliberal attitude towards education where value is added through economic implications (Brown et al., 2016). The availability of suitable data can be a challenge in implementing VA methods in higher education, as students often do not take part in similar standardised tests but there are models developed for higher education purposes too (Kim & Lalancette, 2013). Even in higher education institutions where standardised tests have been implemented, there are questions on how seriously students are taking them if the tests are not directly impacting their grades (Liu, 2011).

Another challenge is measuring the long-term implications of the experiences that took place in a university. There is a large number of studies that have looked into how higher education indicates career progression, health,

and salary progression, but it is more difficult to trace back those positive impacts to individual university experiences and isolate what parts of the education produced the most value for graduates later on in life (Hanushek, 2012; Liu, 2012; Pascarella, 2006). This is especially important since as stated previously, most of the value-add is only realised after graduation (Quinn et al., 2009; Rätty & Harava, 2008). Chetty et al. (2011) managed to showcase in their study that being taught by high value-added teachers in childhood predicted higher earnings in later life. Higher education degrees have been found to predict higher earnings and even better quality of life even though it remains difficult to pinpoint what are the most determining factors (Hanushek, 2012). Hanushek (2012) has emphasised that the level of observation is an important consideration; is the aim to measure the impacts on an individual level or on a societal level.

There are various studies conducted both on a global and national level on how much university students are learning during their studies (Ursin et al., 2021; Arum & Roksa, 2011; Pascarella, 2006). Some studies (e.g. Ursin et al., 2021; Arum & Roksa, 2011) have focused especially on “generic skills” that are considered core capabilities for all university students and graduates, despite their major. To some extent, the results have been concerning: in a large study conducted in Finland 2018-2022, for almost 60 percent of the higher education students, capabilities in areas such as problem-solving or argumentative writing were found to be at a satisfactory or lower level, and good or higher only for 40 percent (Ursin et al., 2021). Arum and Roksa (2011) had even more concerning findings, where they concluded that improvement in skills such as critical thinking and reasoning was insignificantly small or even non-existing for 45 percent of the students. However, some peer reviews of Arum and Roksa’s study found the analysis to have methodological shortcomings that might have impacted their results (Pascarella et al., 2011). This yet again emphasises the complexity of measuring learning.

As measuring quality of education can be complex, some studies focusing on educational productivity have chosen to exclude it from the scope of review, such as report conducted by Rätty and Harava in 2008. It was however acknowledged that assessing universities should include quality measurements (Rätty & Harava, 2008). Overall, research suggests that combining multiple methods, both quantitative and qualitative are likely to result with the most reliable findings (Kim & Lalancette, 2013; Rätty & Harava, 2008). Acknowledging the influence of other factors, such as background and place of residence, is especially important when assessing long-term impacts of education (Hanushek, 2012; Chetty et al., 2011; Lockwood & McCaffrey, 2007).

2.7 Outputs and outcomes

When considering the outputs and outcomes that Finnish universities are aiming towards, the performance-based funding model gives some indication on what is considered important.

As mentioned in chapter 2.2, the most significant individual metrics in the performance agreement are master's degrees and research publications, and other metrics include, for example, bachelor's degrees, employment after graduation, and student feedback (Ministry of Education, 2024b). Student feedback considered in the funding model includes questions like "My education met my expectations", and "There has been sufficient support available to plan the studies" (Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024). Interestingly, the well-being of students is also included in the survey which would indicate that well-being is considered an output of a successful study environment created by the university. Graduate feedback on employment and how the degree prepared for work life is also considered (Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024).

Some of the funds (9 %) are granted based on national assignments placed upon each university: for example, for the University of Helsinki those assignments include, for example, an animal hospital and the national library, and for the Lappeenranta-Lahti University of Technology the safety of nuclear power. (Ministry of Education and Culture, 2024a; Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024.)

Employment after graduation is considered a meaningful outcome of a degree, recognised in the national performance agreements as well as global university rankings. As discussed in chapter 2.1, universities have moved closer to the business sector in the recent decades (Niiniluoto, 2015; Kuoppala, 2005). This can be seen reflected in the metrics followed by the Ministry of Education, as aspects such as life-long learning and employing oneself through entrepreneurship are considered (Raerinne, 2025). Employment rates have been part of the model in previous years as well but in the latest model for 2025-2028, entrepreneurship is rated higher than other means of employment (Raerinne, 2025). On the research side, the importance of collaboration with the business sector is reflected in a metric monitoring research funding: higher coefficient is given to funding received from the business sector (Raerinne, 2025; Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024; Rätty & Kivistö, 2006).

The funding model for universities can be seen to reflect the strategic goals of Ministry of Education, as is intended (Kuoppala, 2005). For example, as already mentioned, Finland is aiming to grow the proportion of adults with higher education degrees as part of the Ministry's vision for 2030 (Ministry

of Education and Culture, 2017). This is visible in the funding model through the indicator focusing on new first-time higher education students, so students starting in a university that do not yet have an existing higher education degree (Raerinne, 2025). In similar way emphasised is the goal of universities being international through a metric following international funding separately (Raerinne, 2025; Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024; Ministry of Education and Culture, 2017). Overall, Raerinne found in his analysis (2025) that the current funding model covers different aspects related to research, education, and impact on society but emphasises overall the educational functions of universities.

If higher education is indeed perceived as part of the service sector and students are the customer, measuring customer feedback and interpreting it correctly can be useful tool for a university to find ways to improve its productivity (Hofmeister et al., 2024). In the context of business, it has been found that incorporating customer feedback increased the likelihood of increasing productivity (Hofmeister et al., 2024).

Table 2: Outputs and outcomes from earlier research and performance agreements

Output / outcome	Considerations	References
Gained competencies	University students' competencies have been studied broadly during the recent years. Methods such as "value-added method" are used to evaluate how much value teaching is adding to students. Some higher education institutions have also implemented standardised tests to measure gained skills.	Ursin et al., 2021; Kim & Lalancette, 2013; Hanushek, 2012; Arum & Roksa, 2011; Chetty et al., 2011; Liu, 2011; Pascarella, 2006; Hanushek, 1971
Degrees	Master's degrees are emphasised in the performance agreements of Finnish universities; bachelor's degrees are also considered.	Raerinne, 2025; Ministry of Education and Culture, 2024b; Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024; Rätty & Harava, 2008; Rätty & Kivistö, 2006
Research publications	Research publications are considered as part of performance agreements. Research also has links to teaching.	Ministry of Education and Culture, 2024b; Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen

		laskentakriteereistä, 170/2024; Rätty & Harava, 2008; Rätty & Kivistö, 2006; Rhoades, 2001
Student feedback	Student feedback is considered in performance agreements and can be used to measure teaching quality, especially if students are perceived as customers.	Hofmeister, 2024; Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024
Employment rate	Employability is considered an important metric both in national performance agreements and global university rankings. Employing oneself through entrepreneurship is rated higher in the Finnish funding model.	Raerinne, 2025; Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024

2.8 Indirect factors contributing to educational productivity

In productivity measurements, in addition to inputs and outputs there is also a third group of variables that can, and potentially should, be considered even though they do not directly take part in the production process (Rätty & Kivistö, 2006). When considering educational productivity, this third group includes factors such as operating conditions or the university's level of performance (Rätty & Kivistö, 2006).

According to the Finnish Universities Act (Yliopistolaki, 558/2009), universities must organise teaching that is based on scientific research. As already mentioned, when we look at the Finnish universities' funding model as a whole, number of publications is an important metric when measuring performance (Ministry of Education and Culture, 2024b; Opetus- ja kulttuuriministeriön asetus yliopistojen perusrahoituksen laskentakriteereistä, 170/2024).

Studies have found that there is a “symbiotic relationship” between teaching and research (Rhoades, 2001). This becomes visible, for example, when faculty members employ students as assistants in their research projects where there is a possibility to both progress research as well as give students informal contact outside classrooms that supports their educational outcomes (Rhoades, 2001). Overall, studies have found research-based teaching to have positive impacts on educational productivity and teaching quality (Artés et al., 2017; Rhoades, 2001). Some researchers have even framed

research as learning activity where faculty members conducting research are in fact the learners (Lechuga & Lechuga, 2012).

The connection between research and teaching at universities is also visible in, for example, Aalto University's tenure track guidelines that give aspiring professors instructions on how to divide the time between teaching and research (Aalto University, Tenure track career path). Globally the emphasis on whether all teaching faculty must be active also in the research field varies; for example, in Italy, it is stated by law that every university faculty member must conduct research (Cattaneo et al., 2016). Studies have found that research efforts are often valued more than teaching which may have negative impact on faculty's motivation to invest in improving teaching quality and methods (Wilkesmann & Lauer, 2020; Lechuga & Lechuga, 2012).

2.9 Competition, comparison, and accountability

As stated in chapter 2.1, universities today operate in a competitive environment. Universities are not only competing for funding, but also for students and academic personnel. Especially in countries where there are expensive tuition fees, students aim to select their universities carefully to ensure they are getting value in return for their investment (Beine et al., 2014; Hanushek, 2012). University's good reputation can be seen to form a positive loop: university that is considered to produce high quality research, attracts qualified faculty as well as more new students (Koskiaho, 2021; Liefner, 2003). For this reason, earning accreditations or positioning high on rankings is important for universities' reputation as well as future success. Additionally, accountability of universities in terms of value provided through higher education has gained more attention in recent years, possibly related to the rising costs of higher education (Kim & Lalancette, 2013; Liu et al., 2012; Liu, 2011). The challenge with assessment of learning outcomes is what different metrics indicate and what stakeholders are most interested in: students' learning attainment at the current moment or how that is reflected in their employment and career progression later in life (Liu, 2011).

The competitive environment has required universities to find ways to benchmark themselves to other institutions. One way to compare universities and their quality is through university rankings and accreditations. In general, rankings and accreditations act on somewhat different principles: rankings focus on comparing institutions whereas accreditation programs aim to set and control standards which institutions aiming for that accreditation must reach (Bartlett et al., 2013). Accreditations also emphasise continuous improvement, not merely reaching a static adequate level (Makhoul, 2019; Areen, 2010).

There are a wide range of global university rankings focusing on different measurements. Some of the most prestigious ones are Times Higher Education, Quacquarelli Symonds World University Rankings, and Shanghai

Rankings. For business schools, the Financial Times ranking stands out as a globally recognised ranking. University rankings began to gain importance in the 1980s and have diversified over time (Olcay & Bulu, 2017). Especially students applying for universities abroad often rely on rankings to decide their place of study (Beine et al., 2014). University rankings have faced criticism on their ranking criteria and used methodologies (Fauzi et al., 2020; Olcay & Bulu, 2017; Anowar et al., 2015; Rätty & Kivistö, 2006). One of the most widely accepted ranking systems, the Times Higher Education World University aims to measure all universities' core missions including, for example, teaching, research and acceptance (Anowar et al., 2015). Many other rankings are more specialised in terms of, for example, the discipline and fields they are focusing on or whether the focus is on teaching or research (Anowar et al., 2015).

Accreditation is a way to reassure that an institution meets a certain set of standards (Makhoul, 2019). As with rankings, the role of accreditations has grown over the past few decades, and more standardised methods have been developed (Kumar et al., 2020). Universities' accreditation systems echo back to 1800s when universities first started to compare the standards of their degrees to other, more established universities (Kumar et al., 2020). To this day, accreditations rely heavily on peer reviews, enforcing the idea that the professional within the higher education sector are the best to assess the quality of higher education institutes (Areen, 2010). Developing an accreditation system became crucially important in the United States in the early 1900s when European universities refused to recognise the degrees granted by a university in the United States that was not part of the Association of American Universities (AAU), forcing universities in the United States to re-instate the trust in their universities by ensuring more stable standards of higher education across the nation (Areen, 2010).

In the United States, the accreditation systems were left to the private sector to manage as the government, that historically has allowed universities great autonomy in managing themselves, did not want to own them (Areen, 2010). In many European countries, governments are at least in some ways involved with evaluating the quality of universities (Minelli et al., 2006). An important part of accreditations has been to drive continuous improvement in opposed to simply measuring the quality of the present (Makhoul, 2019; Areen, 2010). Many accreditations do not merely consider the students' success during their studies but also consider employment after graduation an important metric (Makhoul, 2019). In this way, some accreditation metrics could be utilised for productivity measurements as well.

2.10 Synthesis of literature perspectives

I have synthesised the main themes and observations related to them in tables 3 and 4 below. Firstly, the literature review provides a comprehensive

understanding of the university's operational environment, offering historical context to how universities have transformed. Main themes related to university's mission are captured in table 3.

Table 3: Synthesis of main themes, part 1

Theme	Observations	References
Universities' transition throughout history	Universities' mission has evolved throughout the years, starting from providing education to the few to educating the masses. This has meant changes in funding, form of teaching, and role of higher education in driving economic growth.	Välilmaa, 2023; Björn et al., 2017; Gunn & Mintrum, 2016; Niiniluoto, 2015; Ng & Forbes, 2009; Nybom, 2007; Tirronen, 2007; Kuoppala, 2005
New Public Management and academic capitalism	NPM refers to implementing processes common in the business sector, such as quality assurance, in the public sector. Academic capitalism describes a transition where universities are intertwined more with the logics of market.	Dougherty & Natow, 2019; Kaidesoja, 2018; Quinn et al., 2009; Owlia & Aspinwall, 1997; Rhoades & Slaughter, 1997
Universities' role today	Finnish universities are steered through performance agreements, made together with the universities and the Ministry of Education and Culture. Performance agreements can be seen to reflect the expectations of society.	Raerinne, 2025; Kaidesoja, 2018; Seuri & Vartiainen, 2018; Rinne et al., 2012; Kuoppala, 2005
Role of research	Echoing the Humboldtian tradition, teaching in Finnish universities is research-based. Research-based teaching has been found to improve teaching quality. However, it can be challenging to faculty to divide their time between teaching and research.	Wilkesmann & Lauer, 2020; Artés et al., 2017; Niiniluoto, 2015; Yliopistolaki, 558/2009; Rhoades, 2001
Reputation	Increasing competition and global environment has highlighted the importance of reputation for attracting students, personnel, and funding. Rankings and accreditations are used to compare universities and assure quality of education. However, rankings have been criticised for their methodological shortcomings.	Koskiahho, 2021; Fauzi et al., 2020; Kumar et al., 2020; Makhoul, 2019; Olcay & Bulu, 2017; Anowar et al., 2015; Areen, 2010; Rätty & Kivistö, 2006

Additionally, the literature review provided insights to how productivity is defined and measured in both the services sector in general and in education. Challenges faced in measuring quality in the services sector, are common in education too. However, finding ways to measure value added through learning is considered important by universities as well as researchers. Main themes related to productivity and learning are captured in table 4. Important insights on inputs, outputs, and outcomes considered as part of educational productivity were also found in the literature review. Those findings have been summarised in tables under chapters 2.5 and 2.7.

Table 4: Synthesis of main themes, part 2

Theme	Observations	References
Productivity of services	Productivity means the ratio of inputs and outputs of a production process. Measuring quality has been found challenging in the services sector, of which education is traditionally considered to be part of.	Fleischer, 2024; Hofmeister et al., 2024; Aspara et al., 2018; Larson, 2008; Steindel & Stiroh, 2001; Fuchs, 1965
Educational productivity	The goal of higher education is to produce value to society. Numerous ways are used to measure educational productivity, but defining the outcome has been found challenging. Determining who the customer is is difficult too, due to there being many stakeholders.	Makhoul, 2019; Huxley et al., 2018; Benneworth & Jongbloed, 2010; Quinn et al., 2009; Rätty & Harava, 2008; Rhoades, 2001 Helms & Key, 1994
Learning as the value creation process	Learning is difficult to measure due to its intangible nature. Most of the value-add is realised after graduation, making it difficult to pinpoint what in teaching or other learning practices provided most of the value. Research suggests that combining quantitative and qualitative methods in measuring learning is necessary, as well as considering long-term impacts.	Kim & Lalancette, 2013; Liu, 2012; Hanushek, 2012; Quinn et al., 2009; Rätty & Harava, 2008; Pascarella, 2006

3 Research material and methods

This thesis was conducted as qualitative research, relying mostly on grounded theory methodology. I found grounded theory principles suitable as the aim of this thesis was to find a new, comprehensive description of educational productivity. Grounded theory focuses on creating new theoretical frameworks that emerge from the gathered data, instead of aiming to fit the findings into existing theoretical frameworks (Charmaz & Thornberg, 2021; Stern, 2007). Charmaz and Thornberg (2021) argue that grounded theory has transformed from a strict research methodology to something that brings together researchers interested in, for example, reflexivity in the research process to discuss qualitative research methodologies.

As the purpose of this thesis was to define educational productivity as comprehensively as possible, I spent a lot of time defining the problem, or problems, and continued this discovery even after deciding on the initial research questions. This reflects the memo making process often utilised in grounded theory, where research makes continuous notes on the data and findings as part of the analysis process (Charmaz & Thornberg, 2021; Stern, 2007; Lempert, 2007). What I aimed to do was to go beyond simply describing educational productivity as it is understood in the university today; I wanted to also explore what educational productivity could or should capture and what should be measured. I also wanted to explore which perspectives are overlooked or excluded when reviewing the chosen aspects. Additionally, grounded theory allows a flexible data collection and analysis process where one can follow the lead of the data whilst simultaneously still collecting it (Charmaz, 2015; Lempert, 2007). This iterative process is seen to strengthen the conducted analysis (Charmaz & Thornberg, 2021).

3.1 Data collection

The main data for this thesis was collected as semi-structured interviews, data most typically utilised in grounded theory research (Charmaz & Thornberg, 2021; Stern, 2007). We applied for and received a research permit from the university to conduct the interviews. We conducted 11 interviews in total with 14 interviewees, as some were organised as group interviews. Interviewees included faculty, administrative staff, and persons not employed by the university but working closely with topics related to graduate employment and satisfaction. The interviews were held in collaboration with two other students working on this project. We conducted the interviews in three waves, starting to analyse the data simultaneously. The waves allowed us to first draw an overall picture of educational productivity as perceived by the interviewees, before focusing in more detail on specific topics, such as research productivity in the later waves.

The associate professor leading the project supported us in planning the list of interviewees, and we also utilised the snowball method where we asked suggestions for other suitable interviewees at the end of each interview. The snowball method is commonly used in qualitative research; researchers start with a limited number of initial contacts and expand the list of interviewees by asking the initial contacts for recommendations on who else to interview (Parker et al., 2019). The snowball method was especially helpful since it can be difficult to identify each person’s key responsibility areas and expertise simply by their title. The snowball method also supported us in estimating whether there were experts on the topic within the university that we had not yet spoken to. In grounded theory, expanding the sample through identifying missing perspectives is common (Stern, 2007).

Table 5: Interviews

Focus of the interview	Job title, place of work	Interview number	Interview length (in minutes)
Rankings, measuring quality	Business analyst, Aalto EE	1	72
	Learning service personnel, Aalto EE		
	Professor of practice, Aalto EE		
Productivity and re-research usage at Aalto BIZ, data availability	Professor of practice, Aalto BIZ	2	75
	Business analyst, Aalto BIZ		
Defining and measuring educational productivity	Head of a master's program, Aalto BIZ	3	55
Resource usage, gathering feedback	Learning service personnel, Aalto University	4	57
General perspectives on productivity	Professor of practice, Aalto BIZ	5	56
Defining the learning goals of program/courses, gathering feedback, productivity, resource usage	Head of a bachelor's program, Aalto BIZ	6	85
Relationship between research and teaching, tenure track, quality of teaching	Professor of practice, Aalto University	7	54

Defining learning goals, assessing quality	Professor of practice, Aalto BIZ	8	72
Rankings, accreditations, quality of education, process of gathering feedback	Research personnel, trade union	9	56
Rankings, reputation, strategy of the university	Learning service personnel, Aalto University	10	61
Productivity, assessment methods	Professor of practice, Aalto BIZ	11	57

The interviews were recorded, and transcripts were reviewed by all three students to ensure accuracy. We used the same interview guide as the base for all interviews but modified the questions based on the goal of a specific interview. A sample of the used interview guide can be found in the appendix. For example, when interviewing faculty members working closely with defining and evaluating program learning goals, we focused more on those subjects in the questions. The focus of each interview is captured in table 1. When interviewing personnel in charge of data gathering and related issues, the interview questions were formed suitably. This iterative process of collecting data and analysing it is common in grounded theory, as is modifying the interview questions as the research progresses (Charmaz, 2015). In the interview guides, we captured main themes as well as follow-up questions to allow us to delve deeper into the topics (Kallio et al., 2016). Interview guides were also revised based on earlier interviews as we learned which questions were understandable and relevant for interviewees and which might need further iterations and clarifications. Interviews were conducted in three waves. Before the first interview, the interview guide was also reviewed by the project lead, which enabled us to gather feedback from an experienced researcher. Expert assessments of interview guides have been found to be beneficial for assessing how the guide reflects the aims of the research (Kallio et al., 2016).

The facilitator's instructions, such as formally asking for the interviewees' consent for recording the interview and utilising this data in this research, were utilised across all interviews and documented as part of the interview guide. Additionally, we ensured to inform interviewees about the research topic and where the results would be published at the beginning of each interview. We conducted most interviews in pairs, so that the other interviewer acted as the facilitator, and the other could focus on the follow-up questions.

Other data sources utilised in this thesis were documentation provided by the university publicly, such as the tenure track guidelines, and some limited access documentation, such as anonymised reports and feedback data.

These were used as complementary sources supporting the information retained through the interviews.

3.2 Data analysis

Coding is the process through which data is turned into theory, and it has been defined as the core process of grounded theory research (Holton, 2007). There has been heated debate amongst grounded theory researchers on the role of literature reviews in grounded theory methodology (Dunne, 2011; Holton, 2007). It is one of the differing opinions that caused the original developers of grounded theory, Barney G. Glaser and Anselm L. Strauss later part ways (Dunne, 2011; Holton, 2007). Some grounded theory researchers have stated very strong opposing opinions on conducting extensive literature review before coding (Holton, 2007). The risk in studying existing literature extensively before starting coding presents the risk of limiting the creative process of forming categories based on existing theory (Lempert, 2007; Holton, 2007). This is why some grounded theory researchers recommend studying existing literature only after the coding process and compare what new themes emerged from the data (Stern, 2007).

As someone fairly new to qualitative research, I found it important to do a broad literature review to understand the overall discussion around educational productivity and related topics. This is a view shared by some experienced researchers as well, who have recognised that their perspective on what is considered new is limited by their current understanding of the discussion and can only be extended through exploring existing literature (Lempert, 2007). Lempert (2007) also highlights that as researchers are human, there is always an element of subjectivity involved in research which cannot be avoided by distancing oneself from existing literature. I aimed to review existing literature critically and not take them as the whole truth, as advised by some grounded theory researchers today (Charmaz & Thornberg, 2021). I did, however, keep in mind the notion of not limiting coding because of my own presumptions and let the data lead me towards topics I had not initially thought to explore, such as university rankings. Additionally, I compared the preliminary findings to earlier research that I discuss during the literature review, to see how the findings align with earlier research and whether there are new perspectives emerging from this data (Gioia et al., 2013).

As the purpose of this project was to find a purposeful definition for educational productivity in this context, I decided to conduct coding in a way commonly used in grounded theory research where codes are created during the analysis as opposed to preset codes (Adeoye-Olatunde & Olenik, 2021; Charmaz; 2015, Gioia et al., 2013; Holton, 2007). I used ATLAS.ti software for coding. Additionally, I kept separate notes and drafts of process maps to collect my thoughts as the analysis progressed. This is similar to the already

mentioned memo making process, often utilised in grounded theory (Charmaz & Thornberg, 2021; Stern, 2007; Lempert, 2007).

How I approached coding was to code everything that I believed to somehow describe educational productivity; its measurement, its inputs and outputs, opinions and perspectives on the topic and so forth. With most of the interviews, this resulted in coding almost the entire data set and disregarding some codes later that turned out to be less relevant for the themes that emerged from the data and the research questions. As recognised by grounded theory researchers, excluding data and codes not relevant for the research can be challenging (Holton, 2007). I will discuss the excluded codes and categories more later in this chapter.

A common theme that was clearly notable in the early interviews was the importance of perspective: from whose perspective are we perceiving and defining educational productivity? Because of this notion being present in both interviews and literature, I started by keeping track of the different perspectives as I was doing the 1st order coding, aiming to identify which perspectives arise from the data. I found four distinctive perspectives on educational productivity: student's, employer's, society's, and university's. I also created a category called 'conflicts' under which I placed quotes that indicated a conflict between the different parties' interests. The university's perspective was emphasised in this research as we interviewed mainly university faculty, and I wanted to make the relevance of chosen perspective visible.

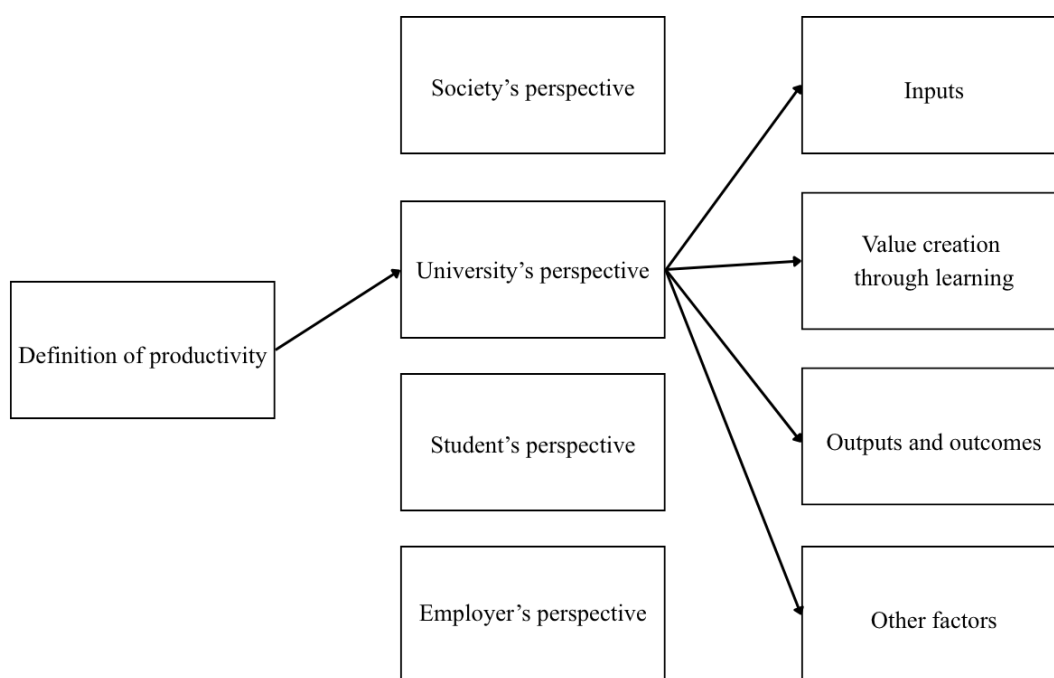


Figure 1: Different perspectives

As the coding progressed, I was able to validate that most of the quotations aligned with university's perspective. Thus, I continued to group the codes into separate categories within the 'university's perspective' category, to create 2nd order categories within that category. This way I worked my way down from the dozens of 1st order categories to a more manageable level and from there, aimed to create the 3rd order categories (Gioia et al., 2013). Figure 1 presents an early mapping of the categories, utilising the different perspectives.

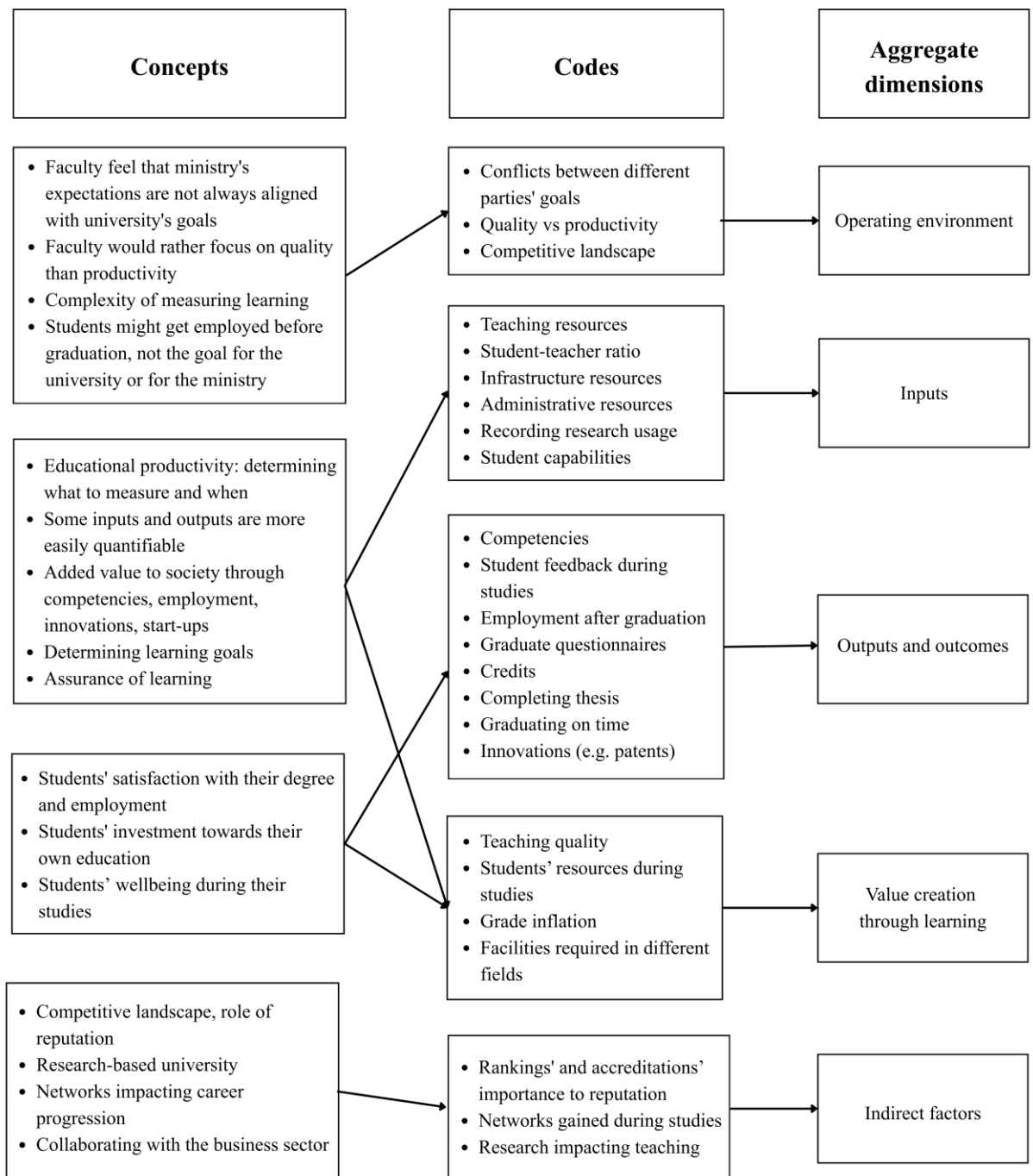


Figure 2: Data structure

Figure 2 represents the data structure after concluding that in this research, we are focusing on the university's perspective. The data structure has been formed based on a model provided by Gioia et al. (2013). Concepts on the left can be seen as snippets arising from the interview data, not direct quotes, but observations gathered from the data. Those were then captured

using different codes, presented in the middle. On the right, the aggregate dimensions through which the findings are presented can be seen.

I made the decision to use overlapping codes as it made sense with many of my codes and categories. By doing so, I determined that overlapping codes are an indication of something in themselves, and not a sign of faults in the coding process (Elliott, 2018).

As the nature of coding can include the risk of interpreting the data otherwise than the interviewee had intended, some researchers recommend keeping the collected data visible during the analysis process (Lempert, 2007). I wanted to also depict some of the key statements that I draw conclusions from in this thesis, which is why I have included quotes quite extensively as part of discussing my findings in chapter 4. Transparency throughout the research process is emphasised as key in conducting reliable qualitative research (Charmaz & Thornberg, 2021).

3.3 Considerations regarding data validity and reliability

We aimed to ensure that interview data was collected and handled ethically, respecting the participants' privacy. As mentioned in the previous chapter, the interview guides included an introduction where we, for example, emphasised that any questions found unsuitable could be left unanswered and formally asked for interviewees' consent to record the interviews and use the data in this research. We made sure that we did not collect any personal data that was not relevant for this research, for example, we reviewed anonymised versions of some reports used by faculty members.

Regarding data reliability, it should be noted that the themes chosen to be covered in the interviews can influence the findings. As an example, when discussing outputs of higher education, only a few of the interviewees highlighted the intrinsic value of education, but this could be due to the framing of the interview questions. As we, the interviewers, raised the question of productivity, it is quite natural for the interviewees to focus on financial considerations. I acknowledge that even though grounded theory research aims to look at things from an unbiased perspective, the focus of the interviews is still decided by the interviewers and therefore cannot be entirely objective. The limitations related to the limited scope of this research are discussed further in chapter 5.3.

By planning and creating a detailed interview guide, we aimed to ensure the consistency of the interviews in how the main themes were approached even though we were not all present in every interview (Kallio et al., 2016). For example, we included some follow-up questions in each guide to guide the interviewees to share their experiences in more detail if necessary. Creating a thorough interview guide with a systematic approach has been found to add to the reliability of collecting data through semi-structured interviews (Kallio et al., 2016). It should be still noted that due to the nature of semi-

structured interviews, which allow interviewers flexibility to decide during the interview which topics to focus on more, the interview guides were not followed strictly (Kallio et al., 2016). In addition to the planned follow-up questions, verbal probes were used when interviewers wanted to discuss topics raised by the interviewees further.

To add to the reliability of this research, I have aimed to present transparently in this chapter how the data was collected and analysed (Charmaz & Thornberg, 2021; Gioia et al., 2013). This includes early categories and a more thorough data structure presented in figures 1 and 2 in chapter 3.2. Working in a research group allowed us to reflect on our observations throughout the data collection process which required us to justify our perceptions already early on, creating a strong base for documenting the methods and analysis process continuously. This kind of member checking has been found in earlier research helpful for finding out whether the initial findings resonate with other members of the research group (Adeoye-Olatunde & Olenik, 2021).

As mentioned, I decided to start by coding most of the interview data. Later, when categorising the codes and reflecting the findings on my research questions, I found that some of the coded data fell outside of the scope of my thesis. As the other two students working on the same project are focusing more on data accessibility and data quality, I decided not to analyse those aspects further myself. Therefore, I also excluded from the data entirely a 12th interview conducted by one of the other thesis writers that focused on the practical accessibility of data from an end user's point of view. I focused more on what data the university is currently monitoring. I will include some general mentions about the data quality as I introduce the findings in chapter 4, but more insight into those can be found in other theses done as part of this project.

4 Findings

The findings provide answers to the four research questions presented in the introduction part. First, I present how interviewees defined educational productivity and how the importance of chosen perspective came up and was highlighted. I describe the production of learning as a dynamic process that transforms inputs to outputs and review the known challenges related to measuring it comprehensively. I then proceed to review the different parts of the learning process; inputs, outputs and outcomes, learning itself as well as indirect factors impacting the process. The connection of educational productivity and quality of teaching will be discussed throughout this chapter.

4.1 Defining educational productivity

The first research question was “How is educational productivity defined?”. Many of the interviewees defined educational productivity through traditionally used terms such as the ratio of inputs and outputs and outcomes. It became apparent that also the context of where this production takes place plays an important part. For these reasons, I expand the description of educational productivity to depict transforming inputs into outputs and outcomes through the act of learning. The outcome is the added value to students and surrounding society. At the core of this process is human capital, provided by both faculty and students. There are also indirect factors impacting educational productivity, such as research conducted in the university, emphasising the importance of reviewing the whole context, not merely separate parts of it.

“If you start from inputs and outputs, right? The input at the university is human capital, right? So basically, we are using professors and lecturers, postdocs, PhD students to deliver some sort of education and conduct research. Of course, there’s this third sort of... impact to society as well. But basically, you can kind of think that, okay, we have a certain amount of labour hours. And then again, the question is, what is the output of those labour hours? And then we can count how many students we get out from these universities as degree students. We can count how many student credits or something like that we can actually produce.” (Faculty member, Aalto University)

The challenge of measuring learning outcomes was a conundrum most interviewees brought up when asked about educational productivity. Measuring the correct thing at the correct time was perceived to be a difficult task

since most of the added value is only actualised after graduation. It was also recognised that the main goals, added value to students and societal impact are easier to assess than measure. However, due to the nature of performance-based funding, the university requires metrics that are more quantifiable and measurable already at the time of studies or graduation.

What also came up during some of the interviews was reluctance to review education in the framework of productivity, as visible in the quotes above. Many interviewees preferred to emphasise the quality of education over the efficiency or productivity of it whilst acknowledging that the performance-based funding from the government requires universities to measure output-oriented key performance indicators.

“So we see the pressures coming from the ministries for this but otherwise I have not been thinking about it so much as productivity per se because I would like to see, I’m more interested in the quality. And I see quality coming from the possibility to interact with students.” (Head of a master’s program, Aalto BIZ)

“We don’t really talk about productivity as a term. And I think our focus is perhaps primarily on the quality. Let’s call it assurance of learning. So the primary target is to make sure that the students that we admit that they graduate, and not only graduate, but achieve the learning goals that we set for the degrees.” (Learning services personnel, Aalto University)

4.1.1 Different perspectives on educational productivity

A topic we also discussed with the interviewees was the importance of perspective; from whose perspective are we perceiving educational productivity?

“But then again, are we looking into the productivity from the university perspective or the overall productivity? So that’s, of course, what you need to decide.” (Learning services personnel, Aalto University)

The interviews depicted how universities are continuously aiming to balance the expectations and requirements of different parties. I aspired to make that visible during the coding process, as explained in chapter 4. Pressures coming from the ministry which I have categorised as **society's perspective**, are emphasised most as public funding forms a significant part of university's funding. Student feedback, so **student's perspective** also came up numerous times, especially as a way of assessing the quality of teaching. **Employers' perspective** comes known through networks, advisory boards including external stakeholders as well as indirectly through graduate feedback where graduates assess how well their studies prepared them for worklife. **University's own perspective** stems from its own strategy, as well as the Universities Act.

“But I do think this whole issue of productivity, it reflects value. So what is valued? And there are very formal KPIs that reflect values. Ministry of Education is all about producing degrees.” (Head of a bachelor's program, Aalto BIZ)

One interviewee described how all these parties take part in defining the learning goals of different programs. Society offers guidance in the form of law and regulations on what a university should contain. Based on the law, regulations, and its own mission, the university defines the learning goals of degrees, programs, and courses. They also take into consideration the opinions of the business sector and employers: what skills are needed in work life. Students' experiences are also considered.

At times, the goals of different parties are conflicting. One aspect that came up numerous times was graduating on time. Ontime graduation is an important metric for the university since it has direct implications on university's funding: universities get more money from degrees that were finalised within the planned timeframe. At the same time, for students, progressing in their career might be more important than graduating in five or six years. Based on graduate surveys, getting a full-time job is the biggest explaining factor in delayed graduation times and this was recognised by our

interviewees as well. Employers too might prefer to get the required workforce sooner rather than later and might see less value in a finished degree.

“Now it's perhaps a little different but for us, this has been a problem that the job situation has been so good that it has actually slowed the throughput. That people take more than two years because all of them are in full-time jobs, or nearly all of them are in full-time jobs. But for us, it's very important, and also the kind of Ministry of Education counts it, how you... how you gain the jobs afterwards. But for us, it would be better if we could get you first through and then to job, but it's perfectly okay. I see why people want to work before, but that's what we follow.” (Head of a master's program, Aalto BIZ)

Another aspect that causes conflict is the ministry's pressure towards universities to produce more degrees. Some interviewees felt that the ministry emphasises speed and quantities to the detriment of quality.

4.2 Inputs

The most mentioned input was money; especially money spent on teaching resources but also money spent on supportive factors, such as infrastructure and governance. I have split the 'money' input into these three categories: teaching resources, administrative resources, and infrastructure resources. In addition to this, students' efforts and capabilities form a part of the input. Based on this research, the input side of the production process is easier to define than the output side apart from measuring the input from the students.

“I think productivity and efficiency are partly overlapping, but little bit different things and it's good to have that discussion of course in the measurements. But there are various ways: like degrees per faculty number or personnel, you name it. But what is kind of one comparable factor always is money, budget.” (Professor of practice, Aalto University)

Teaching resources were named as the most significant input, referring to the cost of labour. One often mentioned measurement was student to teacher ratio. Student to teacher ratio is commonly used internationally as an indicator of the quality of teaching in many university rankings. The ratio can be measured at university level, school level, program level, or per course. Due to the pressure from the ministry to take in more students without increasing the teaching resources, the ratio of student to teacher has been increasing in Finland meaning that there are less teachers compared to the growing

number of students. This change requires the university to find ways to make teaching more efficient and impactful.

Another measurement is the amount of labour hours different teaching personnel, such as professors, teaching assistants, and PhD students, are using on teaching and how much of their time is dedicated to research and other activities. The challenge of not knowing exactly how faculty use their time came up in relation to measuring teaching resources on a more granular level. The time management system Halli is not used daily and some interviewees stated that they do not trust the data quality captured in Halli. The faculty struggles to see the value in keeping detailed track of their working hours and how they are divided between different tasks. Only some programs within the university are able to provide detailed data on how teachers use their time, and this is due to outsourcing the resource which requires, but also enables, more detailed records. One way to assess the labour hour division between teaching activities and research is captured within the tenure track guidelines that offer guidance on how much research is expected of personnel pursuing tenure. I discuss the role of research as an indirect factor on productivity further later in this chapter.

Administrative resources include aspects such as leadership, learning services, and finance. In other words, non-academic personnel of the university. Infrastructure resources include facilities, licences (such as software licences provided to personnel and students), and buildings. These are monitored in the framework of the wider cost structure; how much money is spent on administration and infrastructure compared to teaching.

Students' resources were mentioned as well but not nearly as frequently as other resources. Students' resources are something that the university does not have direct control over, but there are ways to influence students' participation in the learning process. For example, creating a safe, supporting environment can prevent the risk of burnout. Burn out risk was an aspect one interviewee brought up as a wellness aspect that also has implications on productivity. Summary of the inputs can be found in table 4.

Table 6: Inputs of educational productivity

Inputs	Metrics	Considerations
Teaching resources	Labour hours, student to teacher ratio, workload, class size	Recording resource usage; what are teachers spending their time on, who are doing different tasks (professors, PhD students...), expectations and demands of different disciplines, supervising theses
Administrative resources	Labour hours	Cost structure, how much money is spent on administration versus teaching. Administrative resources include services, such as learning services.
Infrastructure resources	Cost of facilities, buildings, licences	Cost structure, how much money is required for facilities and licences.
Students' resources	Labour hours, wellbeing	Students are active participants in the learning process. For example, burnout risk will have implications on productivity.
Students' entry level competencies and capabilities	Previous GPA, entry examination results	The entry level requirements are already high due to the high number of applicants.

One of the interviewees, head of a bachelor's program, emphasised the importance of strict teaching practices, such as not allowing too many attempts per exam. In this particular bachelor's program the on time graduation rate is better than in other programs, and the head suspected that the strict schedules and class-like structure, where students form a closeknit community, support this.

Students' competencies and capabilities are acknowledged to impact the learning process. A way that the university can assess the start level competencies of students is through the GPA at the time of entry. There have even been discussions within the university about whether the entry requirements are strict enough when in fact, the competition between the applicants is increasing, which is visible through higher entry level GPA results than earlier.

“And we have had like, inside the department, we have had discussion about whether we are now letting people in with too low grading. And I'm saying that, by the way, it is tighter. The GPAs are higher than previously.” (Head of a master's program, Aalto University)

The path to having a master's in business has transformed in Finland over the past decade or so since there are now increasingly more students applying separately to study in a master's program, instead of continuing to it directly from the same university's bachelor's program. The impact of varying study backgrounds on how graduates perceive the degree is monitored through the graduate survey.

4.3 Outputs and outcomes

The second research question was “What do different productivity measurements indicate?”. This could be answered by analysing how interviewees described the outputs and outcomes of educational productivity, and the challenges related to them. Challenges also relate to the third research question: what do productivity measurements overlook? The most mentioned outputs were study credits and bachelor's and master's degrees which are relatively easily measured and quantifiable. From the perspective of funding, degrees completed on time are the most important metrics to the university. The university gets the largest amount of funding for degrees completed in the target time, and less money when graduation is delayed. Related to this output, dropout rates are also monitored. Delays in completing studies are a well-known challenge to the university; they are most often related to students working either part-time or full-time.

“What we see very clearly is people do on average something like 55 study points in the first year which is as expected, but then in the second year it slows down because people go to work. And we try to follow these, but this has been consistent, we try all kinds of things with that but...” (Head of a master's program, Aalto University)

Other outputs that the university considers are grades, especially from theses and Capstone courses aiming to measure the overall learning goals of a specific program. Outputs can be seen captured in table 5. However, quantifiable metrics in the context of learning can raise concerns about quality. ‘How to ensure that we are not merely producing degrees like a degree factory if that is what brings us funding’ was a question that many of the interviewees had pondered about. The university is concerned about grade inflation since they have noticed that the proportion of high grades has increased significantly during the past decade. This highlights the importance of quality assurance. I will discuss the challenges related to focusing on quantifiable outputs more in the next part.

Table 7: Outputs of educational productivity

Outputs	Considerations
Study credits	Whether credits are always comparable in terms of resources and competencies required should be considered.
Grades	Grades allow university to monitor how well students are performing. Grade inflation is a concern for the university, so quality assurance is vital.
Degrees	Bachelor's and master's degrees, and doctorates. With degrees as well, quality assurance is important. Closely related to this is measuring dropout rates.
Bachelor's/master's theses	Theses' evaluations aim to capture the overall learning goals of a degree. Quality assurance is equally important with this output.

Measuring outcomes, such as gained competencies, is even more challenging than monitoring the direct outputs produced during students' time at the university. Outcomes are captured in table 6. When to measure is one of the key questions since one could say that for most graduates, the value of education is only realised after graduation. The university aims to measure the impact and effectiveness of teaching through student and graduate surveys in which there are questions on, for example, which skills taught during their studies have the students found most relevant after graduation. Employability is another key metric the university monitors.

“And I think one of the perhaps issues in assessing whether we are doing a good job in education is that when should you really measure and ask? If you measure it when you are graduating, typically students have very little work experience and they don't know what was valuable So maybe only five years or 10 years after the graduation, they know that, oh, it turned out that actually the most valuable lesson from the business school for me has been the training in teamwork and communication or the business analytics bit.” (Learning services personnel, Aalto University)

Another outcome aspect is value to society. I suggest value to society at least partly overlaps with employability since one could argue that for society, one of the goals is ensuring that all citizens find suitable jobs or become entrepreneurs. Innovations and patents are other examples that came up in the interviews as ways of measuring the impact on society.

*“And the outcome is not just the knowledge a graduate has, but also their value. And this might sound a bit harsh, but their value to the society. I don’t think their value as a human being is dependent on their education but their value to society and to companies is partly part of the productivity of education.”
(Learning services personnel, Aalto University)*

Table 8: Outcomes of educational productivity

Outcomes	Metrics	Considerations
Competences	Mainly qualitative metrics, such as feedback surveys	Competences are currently measured mainly through graduate surveys. To measure the gained competencies directly after graduation and more precisely, placement and final tests would be required.
Employability	Employment rate	Employability and career progression are also dependent on other factors, such as the job market. In addition to the employment rate, satisfaction with job placement could also be considered.
Innovations	Patents, start ups	Innovations can be a way to measure the impact on society. Like employability, this is not only dependent on the quality of teaching or a direct implication of learning, but other factors as well.

4.4 Learning as the value creation process

As already stated, learning is an integral part of educational productivity: it is the value creation process that turns inputs into outputs. Measuring outputs and outcomes of learning is a way to monitor the impact of learning as learning itself is intangible. In addition to that, the importance of assessing the quality of learning was discussed with many interviewees. This provided answers on the fourth research question: How does educational productivity link to the quality of teaching?

The high quality of the education provided by Aalto Business School was emphasised by many interviewees to be one of the most important goals, if not the most important goal, of the university. The quality of teaching relies

on multiple factors such as competencies of teachers, teaching facilities, and size of the class.

However, if the quality of teaching is not held to a high standard, it can mean that seemingly more outputs, such as credits and degrees, are produced. What I mean by this is that if suddenly there are less requirements, less work required, for earning credits, more and more credits could be produced with the same inputs. Which in turn would mean that productivity would seemingly increase, but it would be at the cost of the quality of education provided. This is the risk with output-orientated productivity measurements acknowledged by many of the interviewees as well. Thus, many interviewees emphasised that the quality of teaching should be measured simultaneously while monitoring inputs and outputs.

“You have looked at productivity or quality measures that you know that there are ways of cheating in these, that teachers can do things that have nothing to do with learning that help them get good results, good grades in these. We have actually been worried about grade inflation. Giving everybody a good grade is one of the easiest ways of getting little better teaching quality reviews.” (Head of a master’s program, Aalto BIZ)

When assessing the quality of teaching in the university, student feedback plays a vital role. Student feedback is gathered mainly in the form of surveys, both on course level and program level and monitored closely by the heads of programs and other management at the university. Conducting feedback surveys is common practice in most, if not all universities in Finland. Feedback is also gathered after graduation. Especially the graduate feedback has shown that in general, graduates of the business schools in Finland value their degrees highly and consider the education valuable.

Some interviewees mentioned the drawbacks of these surveys such as low response rates. Some interviewees also found that at times, students give feedback more based on whether they liked the teacher in opposed to how well they learned. As seen in the quote above, the university recognises that teachers may be tempted to aim for better teaching reviews by lowering the standards of grades. Heads of the programs aim to tackle these shortcomings by having conversations amongst the faculty on the feedback received by students. These observations raise interesting questions about the reliability of student feedback as a measurement tool which I discuss more in chapter 5.

Peer reviews are utilised for assessing the quality of teaching only when a promotion is considered as part of the tenure track. Personnel aiming for a promotion give a ‘promotion lecture’ which is then assessed by the teaching assessment committee. However, based on the interviews, quality of teaching is not measured through peer reviews more consistently than that.

4.5 Factors that impact educational productivity indirectly

There were factors that were mentioned in the interviews that cannot be placed directly as inputs, outputs or outcomes but can still be considered to impact the overall educational productivity in an indirect way and add context to its definition. This highlights how learning as a process is impacted by multiple different factors both directly and indirectly, making it even more challenging to measure all aspects of educational productivity. I identified three significant indirect factors: research, reputation, and networks.

4.5.1 Research

Productivity of research per se was not in the scope of this thesis, but the impact of research on the overall productivity equation is still an important consideration. In many interviews it was emphasised that teaching at the university is research-based and that the goal of a university is to also produce new knowledge, so it could be stated that research forms an important foundation for education provided by the university. Research also has strong links to the indirect factor that is to be discussed next, reputation. The quality of research produced by a university is an important metric in many international university rankings, measured often in the number of publications. Teachers and professors utilise the latest research, their own and others', in their teaching.

“And I mean Aalto is a research-oriented university, and the School of Business is a research-oriented school. And I think that kind of dictates that we want to put a lot of resources into research. And that is, for instance, kind of reflected on the expectation in the working load for the academics. So, most of their time should go to research. And education is an important part of it. But we are not expecting professors to spend more than a certain amount of their time on education.” (Learning services personnel, Aalto University)

Conducting research is also a requirement of the university's tenure track highlighting that the professors at the university are expected to conduct high-quality research. It can even be argued that research is more important in terms of getting tenure at the university than teaching as explained by one of the interviewees.

“Our tenure track system is so that you need to have at least either research or teaching as excellent and the other one very good. It is very difficult to be rated as excellent teacher, at least

in the initial tenure process. So usually candidates don't get their associate professorships based on teaching alone. So yes, research is, because this is a research university.” (Professor of practice, Aalto University)

Measuring academic success is more straightforward than measuring teaching excellence. Thus, I would argue that research can be seen to impact the competencies of the faculty members and to provide material for teaching. However, one could wonder whether dedicating more time to research can mean time away from teaching activities. Some of the interviewees pointed out that the faculty’s working hours on average are higher than reported, which indicates that the faculty members are finding it difficult to manage all their tasks within their working hours.

4.5.2 Reputation

As the operating environment of universities becomes more competitive, the role of reputation increases. I consider reputation as an indirect factor impacting educational productivity. Reputation was recognised in the interviews as an important way for universities to be able to attract academic personnel, students, and funding. In that way, reputation has an impact on the inputs of educational productivity. It seems that the importance of reputation has increased over the past two decades, and some notable rankings are not even much older than that.

Universities are looking for ways to benchmark and compare themselves to other universities. This is done especially through rankings and accreditations. The university monitors its placement on the rankings mainly for their impact on the university’s reputation; rankings were not considered to be a reliable source of information when assessing the quality of teaching of a university. The shortcomings of rankings were commonly agreed amongst the interviewees; rankings were seen to lack scientific methodologies and rely on at times arbitrary criteria. For example, Nobel prizes are considered in the Shanghai ranking as an indicator of the quality of teaching. During the interviews it was also highlighted that the role of accreditations and rankings has increased during the past couple of decades with more and more universities in Finland aiming towards certain accreditations.

It was emphasised by the faculty members that the university is not considering rankings when determining its strategic goals. As the university recognises the limitations of rankings’ ability to measure the ‘correct’ aspects that indicate quality of teaching, it does not want to give it too much role in determining the goals of the university’s internal development. However, rankings were seen to bring the university ‘PR value’ indicating the positive impact of high rankings on the university’s reputation. Additionally, the

university monitors its performance in the rankings to be able to detect if they suddenly score worse in some areas to be able to notice and investigate any potential issues.

“So it's been sort of difficult for us in the sense that we can be critical about the methodologies and all those things, but a lot of stakeholders and important collaboration partners and societal actors look at the ranking results only and see all its top results and are not interested in our explanations. So it's important to do well in those rankings from certain point of view.”
(Learning services personnel, Aalto University)

Rankings can also have implications on the employability and salary of graduates, which explains the role of rankings in countries where university education is expensive. When choosing their university, people are referring to the rankings aiming to ensure the return of their investment. At the same time, graduating from a highly ranked university can increase the chances of getting a good job or a high salary, so it can impact outcomes as well. One of the interviewees assessed that the role rankings play in selecting a university becomes more important once students must pay a tuition fee meaning that in Aalto Business School, the role of rankings is likely to be less important for students coming from Finland for whom the tuition is free.

4.5.3 Networks

Networks can refer to academic connections as well as university's connections to the business sector. From graduate surveys and other student feedback, it has become apparent to the university and other stakeholders that students find value in networking opportunities that they have during their studies. For some, networking has provided chances to find trainee programs or summer jobs and has thus aided them in progressing their degree. If and when employability is considered an important key performance indicator by the university and other stakeholders, providing opportunities for networking seems like an important, even though indirect factor on the outcomes of learning.

“It's good to consider that broadly, the work experience during studies and a sort of portfolio of one's own competencies and what I want to do when I grow up. And first and foremost, contacts are often very important.” (Head of research, trade union)

For some students, collaborating with employers during their studies through, for example, Capstone-courses, can help with identifying what

competencies are relevant in work life. Networks also support universities in determining learning goals of programs to ensure that the gained competencies are relevant for students when they enter work life. This has been measured previously through employer surveys as mentioned by one of the interviewees. Currently the university collaborates with the employers on an advisory level when determining the direction of the university, and its focus. In these ways networks can also impact the learning process itself. Additionally, networks formed at university amongst peers can support students during their studies.

4.6 Summary of key findings

The interviews provided an overall picture of the operational landscape of Finnish universities, building the context for educational productivity and what is behind the increasing need to measure productivity. Through the interviews, an image of higher education as a process where multiple different aspects must be considered was drawn. It felt that simply defining the correct inputs and outputs was not sufficient to capture the phenomenon. Therefore, I expanded the description of educational productivity to depict transforming inputs into outputs and outcomes through the act of learning as the value creation process to capture it as an interactive process influenced by many factors.

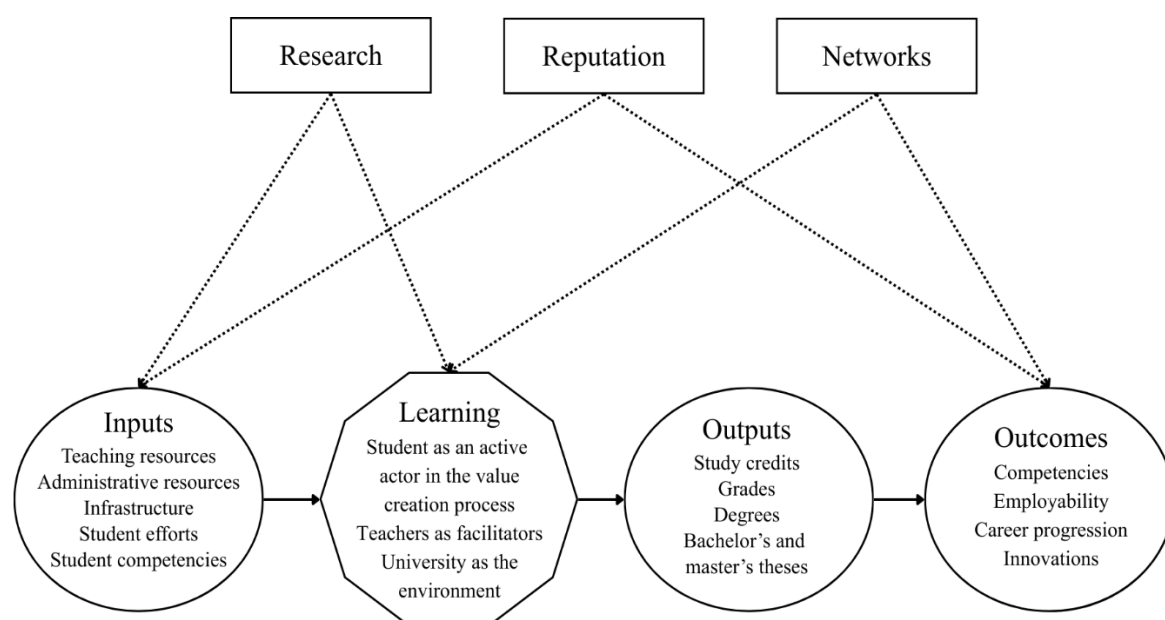


Figure 3: Educational production process

In figure 3, I have depicted the different parts of the value creation process that came up during the interviews in a process map. Inputs, outputs,

and outcomes were discussed in more detail in chapters 4.2 and 4.3. Learning as the value creation process can be seen between the inputs and outputs and is discussed in more detail in chapter 4.4. Factors impacting learning indirectly are captured at the top. Indirect factors are removed from the direct process of turning inputs into outputs and outcomes, but their links to different aspects, such as reputation's link to employability as discussed in chapter 4.5, have been presented with dotted lines.

Universities in Finland are balancing the demands and expectations of multiple different stakeholders: the society (referring mostly to the Ministry of Culture and Education in this context), the students, and the business sector. Universities nowadays operate in a global, competitive environment where there is a sense of limited resources such as competent academic staff, international students, and of course, money.

When measuring educational productivity, the key input is the labour of the university personnel, especially teaching personnel. Additionally, university spends resources on providing the teaching and learning environment including buildings, services, and technology. Students invest their own efforts and competencies to the value creation of learning. Learning is the value creation process in education, and the quality of teaching is highlighted as an important factor.

Key outputs are study credits, grades, master's and bachelor's theses, and most importantly, degrees. These can be measured numerically, although keeping in mind that lowering the standards or expectations of these outputs can lead to decreased quality of teaching. Outputs in turn are reflected in the outcomes of higher education: gained competencies, employability, and career progression. The direct impact of universities' activities is more difficult to measure when looking at the long-term outcomes, such as career progression as there are other influencing factors too. Additionally, as part of universities' third mission, producing innovations can also be seen as an important outcome, stemming from the teaching and learning taking place in university.

Research, reputation, and networks can be seen to influence the value creation process although they are not part of the direct inputs, outputs or outcomes. As Aalto University is a research-based university, research forms the basis of teaching. Simultaneously, as the role of professors is divided between teaching and research, research can also take away resources from teaching. Reputation impacts the external funding of universities which is emphasised more in the current funding model. Good reputation has the potential to draw especially international students and faculty to the university. Reputation can also impact the outcomes of higher education as employers may value some universities over others based on their reputation. Networks provide an opportunity for the university and students to collaborate with external stakeholders, namely the business sector,

impacting the content of their studies and providing opportunities of employment after graduation.

5 Discussion

5.1 Theoretical contributions

This study found that educational productivity is often defined through input and output measures which supports the findings of earlier research (e.g. Bartholomew, 2016; Rätty & Harava, 2008; Middaugh et al., 2003). Commonly used outputs are completed degrees and study credits. Many measurements used, such as student to teacher ratio have been mentioned in earlier research as well (Bartholomew, 2016; Rätty & Harava, 2008; Kuoppala, 2005; Middaugh et al., 2003; Rhoades, 2001). This study found that the outcome is defined as added value to the learners, students and to the surrounding society. This definition of the outcome also aligns with earlier research (Björn et al, 2017; Rätty & Harava, 2008; Helms & Key, 1994).

The findings of this thesis and earlier research conclude that the seemingly simple definition of educational productivity is in practice difficult to measure because of the intangible nature of learning (e.g. Massy et al., 2012; Hanushek & Ettema, 2017; Rätty & Kivistö, 2006). Even if the input side can be adequately defined, metrics aiming to measure the outputs lack sufficient depth to be able to capture the implications of these outputs. Capturing educational productivity comprehensively requires considering multiple metrics and considering the chosen perspective carefully. Therefore, in this thesis, educational productivity is captured through a value creation process map, highlighting learning as an interactive process influenced by multiple different factors. Based on the literature review, this is a novel approach to describing higher education.

Additionally, this thesis shed light on the different perspectives to educational productivity, highlighting that what is considered important varies based on the chosen perspective. Relevance of perspective has been discussed in earlier research, but often the trade-offs of focusing on aspect x over y are not discussed in more detail (e.g. Hanushek, 2012; Rhoades, 2001). This study adds to existing research by detailing what the different perspectives are and discussing educational productivity in more detail through the lens of one of those perspectives, university's.

In this thesis, I also described the operating environment of Finnish universities today to give context to educational productivity. This study found the demands and expectations of university's stakeholders at times conflicting. The pressures of the competitive landscape and decreasing public funding were emphasised as important considerations for the university. This changing operating environment where there is increasing pressure to produce more due to the performance agreements was described by the interviewees very similarly to views in earlier research from Finland and globally (Brunila, 2019; Ewell 1993, as cited in Quinn et al., 2009). Defined outcomes

such as innovations and employability highlight the university's role as an important driver of economic growth for the society as have been found in earlier research too (Björn et al., 2017; Gunn & Mintrum, 2016; Liefner, 2003).

It seems that the change brought by the introduction of New Public Management and academic capitalism is present in modern universities in Finland, as aspects such as efficiency, cost savings, and growing focus on quality measurement are something that especially the executive level of a university must now consider, maybe more so than earlier (Seuri & Vartiainen, 2018; Kaidesoja, 2018; Kuoppala, 2005). This study found that university personnel prioritise quality of education rather than productivity and are even reluctant to view university teaching in terms of productivity. Even though the term educational productivity was something that university personnel might not have defined before, considering the compromises that might need to be made to balance between high-quality teaching and cost savings, seemed to be part of the everyday life at the university. Quality assurance, referring to the quality of education, was also highlighted as a common practice in the university.

Moreover, many findings of this thesis are supported by earlier research. For example, the challenges of measuring productivity and quality of education have been widely acknowledged in earlier research, and the faculty members of Aalto University shared this general notion (e.g. Massy et al., 2012; Hanushek & Ettema, 2017; Rätty & Kivistö, 2006). Another example is university faculty's scepticism towards business-orientated processes, that too has been widely recognised in earlier research (Brunila, 2019; Ng & Forbes, 2009; Ewell 1993, as cited in Quinn et al., 2009).

5.2 Practical implications

As the nature of education is intangible and difficult to grasp, monitoring the productivity and quality of education needs to utilise both quantitative and qualitative methods. Additionally, impacts must be reviewed from different perspectives and for varying time horizons. Combining quantitative and qualitative methods has been recommended in earlier research too (Kim & Lalancette, 2013; Rätty & Harava, 2008). Continuing to monitor trends of aspects such as teacher to student ratio and employment rate is wise, as even though single, standalone metrics are unlikely to meaningfully capture educational productivity, sudden changes or continuing trends of metrics can be revealing. One thing that was clearly indicated through the interviews was that the quality of teaching is vitally important for the university. Thus, ensuring sufficient quality of teaching when aiming for greater productivity should be considered. Defining what high quality teaching means should be defined more precisely to be able to monitor that despite the efforts to save costs, quality of teaching remains high.

The reliability of the feedback data should be assessed in further research, and I would suggest the university to explore other methods for assessing the quality of teaching such as peer reviews. Even though students can be seen to be the best party to assess the quality of teaching, some interviewees pointed out that students' perspective on teaching quality may be impacted by whether they like the teacher or not. Research on how students respond to feedback and interpret quality of teaching could shed light on how to assess quality going forward.

As resources are scarce, there is growing pressure to make the learning process itself more efficient. This could be achieved by relying more on independent learning or e-learning. Astin (1999) encouraged educators to focus more on what the students are doing instead of focusing on what the teachers themselves are doing. In the student feedback surveys, even more emphasis could be put in questions aiming to understand how students are studying and what kind of involvement would support their learning. If the role of student involvement is overlooked, the role of learners as active participants in the learning process is neglected. Simultaneously, an opportunity for productivity gains through more efficient learning is lost.

For example, many of the interviewees mentioned that working during studies postpones graduation. If studies were structured more so that active participation and involvement in campus is required, it might encourage students to dedicate more of their time to studying during their university years and aiming to graduate faster, instead of having to split their time between studying and working. This was in fact partly the perspective of one of the heads of programs that we interviewed, who found that the quite strict structure and pace at that specific program supported the goal of students graduating on time. However, here we come across the conflicting aspirations of

different parties again; for students it might very well make more sense to work during their studies and delay graduation which is the opposite of what the university would like them to do.

As Rätty and Kivistö found in their study (2006), there are numerous possible ways of measuring educational productivity, all of which might overlook certain aspects. Implementing numerous different metrics requiring new kinds of data might not be realistic. However, qualitative, periodic assessments and analyses reviewing the topic from new perspectives could bring valuable insights. Based on how challenging educational productivity is to sum into certain numeric values, I would argue that not all that is relevant can be measured in ratios or simple statistics. To tackle some of these challenges, I suggest that universities must look at educational productivity from a wider perspective that includes quality assurance methods as well as indirect factors impacting education. Even though a more comprehensive model for measuring learning can be difficult to build, it would be a worthwhile goal.

5.3 Limitations and suggestions for further research

One limitation of this research was the focus on the perspective of the university, as we mainly interviewed university faculty. As discussed in chapter 3, there are multiple perspectives on educational productivity. We did not have the opportunity to dive deeper into the perspectives of students, the society, or employers, I could mainly present perceptions only from the university's perspective. Students', society's, and to some extent employers', opinions are captured in this research indirectly through the supportive documentation, such as graduate surveys and regulations and legislation guiding the universities and determining their funding. Students' voices are also heard through the experience of interviewees working with them.

Even concerning the university's perspective, the scope of this thesis is limited as we conducted 11 interviews with 14 interviewees mostly within the Aalto Business School. As acknowledged in the interviews, different disciplines require different resources. This thesis focused mostly on the business school, and further research should be conducted to look at the productivity of other disciplines to understand their perspective on educational productivity as well as any possible differences that may rise from, for example, how teaching is conducted and what kind of facilities are required. Additionally, expanding the scope to include other institutions outside of Aalto University would be beneficial.

Furthermore, on expanding on the scope of the interviews and the perspectives they bring: the conflicting goals of different parties might look different if they are perceived from the ministry's point of view. Based on these interviews I cannot conclusively claim that the ministry is aiming to push universities towards producing more degrees. I can only present the requirements coming from the official funding model documents and the perceptions of the university on this topic. As described during the literature review, the goals of universities have always been closely intertwined with the ideals of the surrounding societies. To study this topic more closely and more objectively, both sides would need to be heard and the motives behind encouraging universities to increase their productivity studied more carefully.

The lack of students' voices can be seen as a limitation of this research because students are acknowledged to be active participants in the learning process and even perhaps the customers of the university. Any presented ideas about the students' perspective, such as prioritising getting a job over completing studies intime, are coming from secondary sources. Students' perspective on, for example, their involvement and how it can be supported and encouraged, could provide important insights to universities as increased effort from students could result in productivity gains.

Additionally, students' wellbeing's impact on their studies and how the university can support in that, would be an interesting and topical area of further research. To not fall into the same situation that Astin (1999) stated

when publishing his theory on student involvement where students are seen as a black box, effort must be put into ensuring students' voices are heard. Earlier research has also found that students themselves consider that they should be involved with efforts to increase productivity (Helms & Keys, 1994).

This thesis discussed the quality of teaching to some extent through concepts such as quality assurance methods and by emphasising the importance of quality to the university that came apparent through the interviews, but quality assurance of higher education is a wide topic that should be studied further separately. Questions that would be interesting to explore in further research include perspectives such as how accurate student feedback is in describing quality of teaching, and what other ways of measuring exist and are utilised or could be utilised.

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Appendix: Interview guide

GOALS of this interview

- General perspective on developing education and teaching in the interviewee's department & role
 - How are the goals for teaching and education set? (Scope: BIZ school)
- How is quality (of teaching or education) determined and assessed? (Scope: BIZ school)
- Productivity/Resource usage
 - How would you define productivity of teaching? What aspects to consider?
- Data sources
 - (D1) Availability: How is data collected? What kind of data? What data is easily available, and what is not?
 - (D2) Usage/purpose:
 - How is the data used?
 - How is this data currently analyzed to provide actionable insights?
 - Trend analysis? Statistical analysis? Comparison against benchmarks?
 - (D3) Accessibility: Who has access to the data, and how is the access managed? Can the data source be accessed programmatically? How?
 - (D4) Challenges: What are the challenges with obtaining/using the data?
 - Legal restrictions, privacy concerns: Is there any legal or privacy concerns when using data and accessibility related to educational availability
 - Usability (e.g. reliability/ cleanliness)
 - (5) Peers: Any connections or possible contacts from our peers (e.g CBS ETH)

What is the status for other peers of Aalto BIZ (do they work on the same measurement of educational productivity or different)?

BEFORE INTERVIEW

Hello we are XXX. We are students in MSc ISM. We are conducting research at Aalto University about assessing the educational productivity of Aalto University and its peers. Professor Max Finne is supervising our research.

Thank you for your participation in this interview. The interview will be recorded and later transcribed to enable the use of systematic data analysis methods. The findings of the research will be reported in scientific publications, such as papers and presentations at conferences and articles in academic journals. The identity of individual interviewees will not be revealed in the reports, even though some readers may be able to identify individuals based on their roles and organizations.

This is voluntary to participate in the interview. Therefore, please feel free to end the interview any time or not answer any question that you find unsuitable. During the interview, should you find any question unclear, please do not hesitate to ask.

*Do you have any questions before we start?
If everything is clear, could we start recording now?*

Q: Could you please start introducing yourself and for the recording purpose, could you please state your consent whether we could use your data for research purposes or not?

DURING INTERVIEW

WARM UP QUESTIONS

Q: What has been your engagement with measuring and assessing productivity in different organizations? Have you come across measuring educational productivity?

MAIN DISCUSSION QUESTIONS

Let's start with discussing productivity of universities and ways to assess it.

- 1. What aspects would you consider when assessing the productivity of the program?
- 2. How would you define productivity of teaching? (Or what different possible definitions come to mind?)
 - What aspects would you consider when measuring the productivity of teaching?
- 3. What types of data are typically collected to evaluate the productivity of a university, particularly teaching? (D1)
 - What about in Aalto?
 - And its peers?
 - *Do you know whether they work on the same measurement of educational productivity or different?*

- (depending on the answers of previous question) Do you have/know any connections or possible contacts from our peers?
- 4. What kind of challenges do you see with measuring the productivity of teaching?
 - (D4) If data is mentioned, ask:
 - How trustworthy/reliable is the data?
- 5. In what ways could we measure the resource usage?
 - (D1-2) What kind of data is collected/analyzed to assess the resource usage in your program?
 - (D3) If there is existing data/dashboards, who has access to the data? Who owns the data?
 - How is this data currently analyzed to provide actionable insights?
 - Are you using some key indicators to assess the resource usage in your program?
 - (D4) What kind of challenges/shortcomings are there with often-used assessment methods and with existing data sources?
- 6. In what ways do you measure and analyze the quality of teaching within the program?
 - In your experience, is there anything you do differently compared to the “main” Aalto university?
 - (D1-2) What kind of data is collected? How is this data currently analyzed to provide actionable insights?
 - Do the measurements differ between different programmes or departments? How?
 - (D4) What kind of challenges/shortcomings are there with measurements and with existing data sources?

In our project, we're also looking into determining and assessing learning goals as part of measuring the quality of teaching.

- 7. What does the process of determining learning goals for degrees & courses look like in your program? Do you follow the same assurance of learning method as the rest of the university?
 - How is the quality of teaching determined/assessed?
 - If data/data source is mentioned in the answer, ask:
 - What type of data is currently used in the process of measuring the quality of teaching?
 - How is this data currently analyzed to provide actionable insights?
 - What additional data would you find most valuable to support this process further?
 - How is achieving learning goals being measured?

- If data/data source is mentioned in the answer, ask:
 - What type of data is used to measure the achievement of learning goals?
 - How is this data currently analyzed to provide actionable insights?
 - What additional data would you find most valuable to support this process further?

CLOSING QUESTIONS

- Before we end, is there anything else you would like to add or comment on? Or do you have any questions for us?
- Could you name anyone in your organization and/or in Aalto University that you believe we may wish to interview?
- If we have extra questions, can we contact you?

Those are all of the questions we have for you today, thank you so much for taking the time to speak with us! Have a great rest of your day!