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Master's Program in Work Integrated Political Studies (WIPS)

The Impact of a Digital Regime on Academic Knowledge Production

*- Implications of learning and practicing knowledge production through a digital
regime in Work-integrated Political Studies (WIPS) 2019-2021*

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Abstract

This autoethnographic case study explores the experience of the digital regime on learning and knowledge production brought about by merging university study and research practice within a single digital regime in Work Integrated Political Studies (WIPS) during 2019-2021. The study provides a detailed account of the nature of learning and producing knowledge through this common digital regime, and its political implications. To explain the possibility and impacts of the digital regime, the study employed the concept of digital pharmakon by French philosopher Bernard Stiegler. In the analysis, I have operationalized the concept to the empirical materials I generated in the form of autoethnographic notes taken during the internship in the political science unit of University West, Trollhättan.

Based on the analysis of these notes, the study postulates three features of the digital regime in learning knowledge production, which is: 1) to supplement human memory without memorization, 2) the provision of tools with various powerful technics, and 3) as a medium for communication and individuation. Additionally, the regime brought forth some consequences for learning and practice, for instance, the dangers of forgetting, accelerating dependence on the computational memory and process, weakening thinking for oneself, and short-circuiting the process of individuation. The political implications would be eliminating diverse, negentropic, improbable, and incalculable parts of knowledge, so the knowledge left to be produced is based on computational reasoning, universal, data-driven, negotium, entropic nature of knowledge, lacking the local specialties, and subjective experiences.

Keywords: *WIL, WIPS, digital regime, Bernard Stiegler, autoethnography, digital pharmakon*

Appended Studies

Study 1

Profile versus Performance of 9th-grade Schools in Trollhättan: A Descriptive Comparative Report Based on the Profile and Performance of 9th-grade schools in Trollhättan Municipality.

Study 2

Residential segregation, school performance, and the closure of the Kronan (4-9): An Exploratory Study on the municipal reasons and motivations behind the closing decision to Kronan school in Trollhättan municipality.

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1. Background

The research tasks look crystal-clear on paper [on the digital screens] nonetheless what kinds of research processes I will go through and skills I shall learn throughout the research internship are almost impossible to grasp right now, particularly, what things should be done without having any physical presence at the internship. Yeah, it might be reading, thinking, writing, and thinking again but wait! How, where, and in what forms? (FN, 08/09/2020)

A short paragraph from my Field Notes (FN) illustrates an early phase of my experience in the research internship. I am filled with some questions, and curiosity, but also confusion because this all happened in the midst of the global health crisis caused by COVID-19. Digital technologies (hereinafter the digital regime) comprised of digital systems (e.g., operating systems, software), and apparatuses (e.g., computer) with high-speed internet (network) came to play an essential role in both my learning and performing my research tasks. If the digital regime is not there to support me, then it would otherwise have been impossible to learn and perform research skills in these difficult circumstances.

The situation, mentioned above in the field note, is about how one can learn and perform practical skills in a digital regime that lacks a conventional collective learning sphere (internship site or university classrooms), as one never needs to attend a classroom or a practice site in person. As a matter of course, how one can learn and practice knowledge production remotely in the digital regime? That led me to wonder how I would learn, where I am learning, and in what forms I shall learn, as I was situated in the digital regime. This became the sole medium of learning and practicing knowledge production in the domains of both university study and research internship.

Furthermore, this compilation thesis (kappa) is made possible for me as a master's degree student (2019-2021) in the Work Integrated Political Studies (WIPS) at the University West (UW) to produce, thanks to a research internship at UW's political science unit between 31/08/2020 to 04/06/2021. The research project was co-hosted by UW and

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WIPS is a 2-year master's degree program at UW, introduced in the Fall of 2020, it strives for "knowledge production, combined with learning and experiences," aiming to "influence societal change through applied studies of societal challenges", writes Assmo (UW, 2020). He mentions that to achieve such goals, the program combines research internships in collaboration with local organizations by offering the "work-integrated applied research approach".

In the domain of practice, I produced two different research reports (see Appended studies 1 & 2) that were made possible by learning knowledge production skills in the project with the help of supervisors. To produce those reports, I had regular contact with the supervisors to get feedback on the draft reports and to discuss the various difficulties and ideas that emerged during the research process. All forms of contact with professors and other peers occurred in the digital regime. Additionally, all the tasks i.e., from collecting research materials; previous studies, data, and statistics to writing reports have relied on digital technology. The regime includes various digital apparatus, networks, and systems, for instance, computers, cellphones, Zoom Rooms, Canvas- an online learning platform, MS Outlook email, Dropbox- cloud service, high-speed internet service, and so on. As a matter of fact, it was this dependence on the digital regime that compelled me to explore the implications that it has for learning and producing academic knowledge. In such a scenario, I have no other alternative than exploring the basic notion of 'machine' to unfold the features and paradoxes of the digital machines I had been relying on throughout the process of knowledge production in the internship.

2. Introduction

Machine is not only a form of matter but an agency for accomplishing certain definite purposes. And self-propagation is not merely the creation of a tangible replica; it is the creation of a replica capable of the same functions. – Norbert Winner

Winner (1948: 177-178) in his book, *Cybernetics: or control and communication in the animal and the machine*, distinguishes the capacity of the machine in replicating and reproducing actions as surpassing the formal materiality of the machine. The machine exists in terms of an agency fulfilling certain goals set by humans, argues Winner. Moreover, it maintains the original functionality after replicating itself by *self-propagation*. In this manner, a mechanical operation can go without human intervention so the machine can function autonomously and independently for fulfilling the tasks e.g., production, creation, management, etc.

Canguilhem (2008: 76) in his book, *Knowledge of Life*, defines the machine in the matter of “... as an artificial construct, a work of man, whose essential function depends on mechanisms.” The mechanism within the machine is, accordingly “a configuration of solids in motion such that the motion does not abolish the configuration”. Canguilhem’s notion of the machine as involving mechanisms is evident in the early invention of the digital machine that has since evolved into the latest forms of digital technology, i.e., smartphones, computers, software, algorithms, Artificial Intelligence (AI), and so on. So, today the digital machine is a sophisticated set of mechanisms that can collect and process enormous amounts of data, images, videos, and information in real-time for different purposes, for instance, e.g., solving problems, optimizing resource utilization, etc.

In this thesis, the notion of the digital machine will be applied through the concept of a digital regime. This concept is used to characterize learning the knowledge production in a digital regime. The regime is characterized not only by the mechanical performance of digital technology, but also by its multiplicity, ranging from the physical to the vector of human memory, and so on. The main title of this thesis begs a few essential clarifications before starting the main inquiry here. So far, I would unpack the title before putting it into the two different assemblages. The first part, ‘the digital regime’ combines the words

‘digital’ and ‘regime’. Specifically, ‘the digital’ is the digital automata that are called digital technology nowadays, thus, ‘regime’ entails what Cambridge Lexico defines, as “... the conditions under which a scientific or industrial process occurs”. Hence, ‘the digital regime’, means the digital conditions for the conduct of the scientific process. The second part of the title, i.e., ‘academic knowledge production’, is defined as a scientific process of creating new knowledge that occurred within the academic regime conditioned by digital technology. This opens the questions of the impacts and possibilities that the digital regime entails for academic knowledge production. This is a core interest that this thesis seeks to explore.

The task of academic knowledge production is characterized by rigorous, objective, and methodologically optimized intellectual exercises, excluding the researcher’s personal beliefs, prejudices, political biases, etc. At the same time, producing academic knowledge in such conditions can have various shortcomings. For example, as Pestre (2003: 246) argues, sometimes it is “too general in approach”, it misinterprets “the local or emerging phenomena as universal”, and can be guilty of “ignoring countertendencies”, or not seeing the “unintended negative effects of positive moves”. In such a position, the researcher might not have succeeded in producing the academic knowledge that would be otherwise free from personal biases and prejudices, open to all kinds of results, or unpolitical in nature.

Knowledge production has gone through several stages since the first printing machine was invented by the Gutenberg press in 1440, so today, the digital era brings a new way of publishing, distributing, and re-producing knowledge across time and space (Epstein 2008). If it is possible to escape from all the shortcomings in the knowledge production process that Pestre mentions above, it is nevertheless the case that knowledge production has been facing other challenges and shortcomings in the digital age. Digital technology is not only of growing importance for research and knowledge production today but might also be having a deeply transformative impact on contemporary knowledge production.

McGinity et al. (2022) find that in the decades between the 1970s to the 1990s, education-leadership research produced a large amount of knowledge based on statistical analysis,

while, between the 2000s to 2010s, it employed different kinds of methods, e.g., thematic coding and discourse analysis. The authors also state, in the decade of the 2010s, the education-leadership research employed mostly thematic coding in their site of knowledge production. Antonijević (2016: 1) points out in line with the paradoxes of social science researchers, having a techno-blindness attitude by unrecognized the role of technology in their research tasks, the author states, it is “considered detached from technology”, even though, the modern technology is embodied in the research objects. Nevertheless, the term “digital scholarship” has been often used to refer to “virtual knowledge, e-search, e-science,” etc. in the various academic research fields, not least, is a part of practices of knowledge production (2016: 2). Antonijević argues, knowledge production in the social science field, involves the digital technology in “finding, organizing, and analyzing research data and materials, writing up, annotating, and citing research data and materials”, even the tasks of “... reflecting upon, sharing, communicating, and archiving research data and materials” have been depending on the digital technology (2016: 27). Whether the study is qualitative or quantitative in nature, digital technology offers the researchers various kinds of advantages and possibilities in their knowledge production work.

The (*non*) spatiotemporal circumstance I was in during the internship is worth mentioning here to provide the motivation behind writing this thesis. I add a prefix (*non*) to the spatiotemporal, therefore, by relating the very aspect of absenting myself physically from the internship site. At the same time, I have been participating in a research project with supervisors and peers online, that occurred outside of conventional circumstances of co-presence in reality. In that sense, learning theoretical knowledge in the classroom and developing practical skills in the internship shifted to the digital regime. As a result, I faced different possibilities and limitations concerning the aim and goal of learning knowledge production skills in the internship as this was blurred with learning at the university in the digital regime. Consequently, I began to ask myself, what negative and positive features digital technology held for me when I was involved in the process of developing research skills in the regime. So, the question to investigate in the following chapters will be about the role and position of the digital regime to the human agency

(me) in learning and producing knowledge. Here, the thesis aims to explore what impacts and possibilities the digital regime holds for learning in knowledge production.

To fulfill the objectives of the internship, aligned with the aims and visions of WIPS, this thesis aims to describe and reflect upon my quest for learning knowledge production skills in the internship in relation to the omnipresence of the digital regime throughout the process of exercising intellectual tasks. Moreover, it would examine what role and position the digital regime had during my internship. Apart from attaining the aims of the thesis, I applied the autoethnographic method for collecting the empirical materials in the internship. The method has been based on my observations, participations, reflections, and the tasks of knowledge production itself that had a greater reliance on the digital regime.

The structure of this thesis follows in this manner, in the literature review section, three important lines of the scholarship will be included to identify the research questions. Firstly, the literature review provides the definitions and classifications of different forms of knowledge. After that, it outlines the role of digital technology from the perspective of producing knowledge. The third line of scholarship describes the objectives and understandings of WIL and WIPS in relation to knowledge production and digital technology. Then in the theory section, I will cover Stiegler's theoretical contributions to the process of grammatization, retention, and the process of individuation, thus, the notions of digital tertiary retention, and digital pharmakon in the respect of learning, and its implications in knowledge production. After that follows the specified aim and research questions section of this thesis, and then the method section outlines the advantages and pitfalls of employing autoethnography to collect empirical materials for the analysis. There will be summaries of appended studies 1 & 2 and then finally come to the findings and analysis, thereafter a conclusion.

3. Theoretical Perspectives

First, the chapter covers three essential lines of scholarship related to the topic of this thesis in the literature review. It then describes the theory to be used, and the last part outlines an illustration of an analytical tool based on my reading of digital pharmakon, coined by French philosopher Bernard Stiegler.

3.1 Literature Review

The first line of scholarship focuses on the different forms of knowledge in human life, including the academic sphere. The second line discusses the general anatomy of digital technology and its relation to knowledge production in academia. The third part discusses the aims, notions, and practice of WIL and WIPS, not least, their relation to digital technology and again to knowledge production. Covering these three main lines of literature below will bring us clarity on what and how digital technology is defined, understood, and illustrated in the process of academic knowledge production.

3.1.1 Knowledge in different forms

Nickols (2000: 3) explains that explicit knowledge in the academic sense "in the form of text, tables, diagrams" is articulated in a "formal and systematic" way, such as a scientific theory, scientific paper, or a well-documented praxis. In this manner, Nickols exemplifies how explicit knowledge is possible to produce by gathering and compiling data, afterward analyzing, and synthesizing it to produce an academic report (ibid.: 6). This kind of explicit knowledge can be termed *Episteme*, following Aristotle, or in more popular terminology, scientific knowledge.

Aristotle (1999: 95) in his book, *Nicomachean Ethics VI* defines *Episteme* in this manner. It "is judgment about things that are universal and necessary," nevertheless, which is "a state of capacity to demonstrate", that which cannot be otherwise. Further, Aristotle argues that scientific knowledge "is thought to be capable of being taught, and its object of being learned" (ibid). Additionally, Aristotle classifies another kind of knowledge of a more contingent nature, *Techne*, which he also calls practical knowledge, in contrast to epistemic knowledge. *Techne*, in more popular terms 'technology,' is the main

investigation of this thesis. Aristotle lays some conditions to claim one is acquiring *Epistemic* knowledge. Firstly, it is to flesh out the main interest of this thesis, in which sense the digital machine will be explored here, is rather a form of digital regime, how it can affect the tasks of learning knowledge production expected to be carried out in a digital environment. The regime is characterized not only by the mechanical performativity of digital technology, but also by its multiplicity, ranging from the physical to the vector of human memory, and so on. Learning should not occur accidentally, in other words, prior to attaining scientific knowledge, the person needs to be self-conscious that they are learning. According to Aristotle, a conscious choice to acquire scientific knowledge means that it becomes known to the person, rather it arises unwittingly within a person (Rawlins 1950).

It would be rather unsatisfying to claim all knowledge exists within these two categories of *Episteme* and *Techne*. In this regard, Phye (1997) takes a different path by describing two forms of knowledge: declarative and procedural. The former kind of knowledge involves theories, facts, concepts, vocabulary, or any pieces of information contained in human memory. Additionally, Nickols (2000: 4) mentions, such knowledge also contains “methods and procedures” to describe the facts or things that have been explicated in the forms of text, numbers, etc. Berge and Hezewijk (1999: 608) describe declarative knowledge as the “storage of facts and events” in human cerebral organs, attained during his/her lifetime. Such knowledge contains, according to the authors, “information in propositions” that is also possible to be “altered under the influence of new memories”. So, an individual can express such knowledge by a required “directed attention”, which means it does not come out from the individual per-automatic without having the intention to express it, such as our “expression of skills” (ibid).

Further, Phye (1997) argues, that procedural knowledge concerns the process of performing certain kinds of activities as generic skills that would be based on declarative knowledge. For example, according to Phye, procedural knowledge requires knowing the process of deciding or solving a problem, and in this way reasoning through incorporating the learned declarative knowledge into this process. In a similar fashion, Berge, and Hezewijk (1999: 607) describe procedural knowledge as Phye does above, it is containing

“how to do things” in the practical sense. For instance, an individual can perform certain physical activities like “cycling or swimming”, and “partially” perform intellectual skills such as “speaking in public” or writing academic text (ibid). Hence, the expression of practical skills or procedural knowledge is often difficult to verbalize, it rather makes possible “by means of performance”. Finally, learning such knowledge “takes place by performance” while not sufficient to just observe the performance of others, one must need to execute the tasks (ibid).

Polanyi (1966: 4) in his book *The Tacit Dimension*, outlines different forms of knowledge. One of them is tacit knowledge which he defines in this manner: “I shall reconsider human knowledge by starting from the fact that we can know more than we can tell.” Polanyi identifies tacit knowledge by observing the process of facial recognition common to all humans, noting that “This very act of communication displays a knowledge that we cannot tell” (1966: 5). The less the possibility of fully communicating and demonstrating the precise form of the tacit knowledge also brings a difficulty to teach it. Polanyi argues that “we can do so only by relying on the pupil's intelligent co-operation for catching the meaning of the demonstration” (ibid). Thus, human *intelligent cooperation* needs a good receptive capacity to take in the meaning of a demonstration of tacit knowledge so it can be able to be knowable, although Polanyi argues it is still not possible to fully demonstrate and transfer the tacit knowledge to each other.

3.1.2 Digital technology and knowledge production

This line of scholarship presents a short description of the nature, role, and position of digital technology in our human lives. At the same time, it avoids giving any pure technological or theoretical connotations of such a technology. It rather provides an account of the nature and features of digital technology in relation to human actions, practice, and learning, which will guide us to identify and answer the main aims of the thesis.

Bensoussan et al. (2018) compare the 18th century’s knowledge production practices with the current stage in characterizing the involvement of digital technology. The publication

of the first Encyclopedia in 1750 shares some similarities with today's "almost innumerable amount of knowledge is collected, indexed and linked, by references" (2018: 105). However, the contrast is profound. Modern digital technology in the 21st century creates whole new conditions and relations between the process of knowledge production, the roles of scholars, and science. For instance, Fabre and Bensoussan (2018: 106) mention that existing various digital platforms offer "the extreme mobility of associations of ideas and possible data, in the speed of execution of correlations" close to the speed of light. Furthermore, scholars can explore even the "many 'layers' of by-products of knowledge: discovery, metadata, and meta-knowledge". In this manner, the task of knowledge production using digital technology includes the possibility of various kinds of *surplus knowledge*. All of this demonstrates the importance and centrality of digital technology to contemporary processes of knowledge production.

Fuchs and Chandler (2019: 4) note that the digital revolution manifests in "computing devices [cellphones, personal computers, etc.] as we know them today go back to Alan Turing's concept of the Turing Machine", the machine invented in 1936. Now in the age of Big Data and Artificial Intelligence (AI), Fuchs and Chandler (2019: 5) describe further how algorithmic knowledge can help us "to identify and analyze patterns of occurrences that enable new understandings and ways of seeing the world". This is because Big Data can be "produced, circulated, and acted upon in real-time, and at very high speed". Big Data and AI are essential elements of contemporary digital technology, but it would be a mistake to reduce digital technology to only Big Data and AI, as there are other parts that are worth mentioning, for example, notions of digital objects and the semantic web. These notions of digital technology help to clarify further how and at what level digital technology can impact the process of knowledge production, without taking it for granted in terms of defining with loose definitions.

In this regard, Hui (2012: 387) explains the existence of digital objects not by contrasting natural and technical objects, but rather in terms of their appearance and actual material content. He states that they appear "as colorful and visible beings. At the level of programming, they are text files; further down the operating system they are binary codes". The layers of a digital object's appearance do not stop here. Hui adds that it is also "at the level of circuit boards they are nothing, but signals generated by the values of

voltage and the operation of logic gates” (ibid). For Hui, these electronic forms lack a specific physical structure, as digital objects cannot be only categorized within a frame of their material appearances. That leads us to the next question, that is, if digital objects contain language, numbers, and signs beyond their appearance, then what is the possibility of creating, distributing, and memorizing data, information, and knowledge in a way that can affect the human ability to learn and produce knowledge across time and space.

In this regard, it is useful to consider the semantic web. According to Berners-Lee et al. (2001; W3C 2001) this "provides a common framework that allows data to be shared and reused across application, enterprise, and community boundaries". In other words, these forms of digital objects make it possible for people to create and share knowledge in the form of data across web communities (e.g., Google, YouTube videos, Dropbox, images, and text in digital devices, etc.). As Alač (2011) observes, the semantic web involves two dimensions: material and immaterial technology. Alač (ibid: 121) states, a practitioner experiences digital technology as the “objects of their practice”, in the form of “hybrid phenomena enacted at the junction between the digital world of technology and the physical world of corporeal action”. Hence, digital technology is “not only what happens on the other side of the screen but also concerns the bodies in front of the screen”, and hence is about “abstract procedures but also about digits and hands” (ibid). In that sense, digital objects are not merely readymade tools for the user to perform her intentional tasks. Moreover, the very way of user involvement matters, especially in terms of the numbers and signs that the user’s gestures can produce, not least by employing the hands. Frey (2019: 301) mentions ‘we can now program computers to “learn” from samples of data or “experience”’. Hence, a digital machine can even construct the rules of tasks. Frey adds, ‘we can apply statistics and inductive reasoning to let the machine learn by itself.’ Hence, with the help of Big Data, digital machines can accomplish tasks that were not even in the human imagination (Faulkner & Runde, 2019).

In summary, the digital regime contains, as a matter of fact, manifold aspects from its physical appearance to ‘digital’ object forms, i.e., data, images, codes, or signs, rules, commands, and so on. More importantly, producing knowledge in the digital regime needs to be explored, because human interaction with the digital regime leaves different

digital traces and artifacts, and the very act of human interaction with such a regime produces data, information, symbols, etc. that can be a source of knowledge production. So, it is crucial to explore WIPS's notion of theory-practice respecting the domain of knowledge production in relation to digital technology before some relevant studies in WIL are needed to present to conceptualize the concepts of learning in knowledge production. In doing so, the aim and research questions this thesis poses will be possible to answer by exploring them.

3.1.3 Work-Integrated Learning and Work-Integrated Political Studies

It would be insufficient to cover the important research in work-integrated learning (WIL), therefore the master's in work-integrated political studies (WIPS) has been the main source, motivation, and idea behind writing this thesis, so it is important to give a glimpse of WIPS after describing WIL to relate why this study is significant for the WIPS program.

3.1.3.a Work Integrated Learning

WIL is commonly understood as an approach to learning in higher education through a combination of the conventional classroom learning experience with the experience of learning through doing tasks in the workplace (UW, 2022). To achieve this, WIL requires that the university collaborates with non-academic stakeholders such as the government, private companies, and the surrounding community to co-construct a learning process (Fong & Sims 2010 & Patrick et. al. 2008). Haskell (2001) describes the main aim of WIL as transforming the learning experience through, as Bryman and Somerville (2004: 309) state it, requiring that "individuals engage agentially in and learn through workplace practices, and in ways that transform work". The belief is that Hence, the individual as an active agent can even cope with the eventual technical and societal change, to a precise point, the authors add, the "individuals' engagement with and transformation of the existing practices that constitutes change (2001: 324).

Björck (2019: 38) in his doctoral thesis, *Learning 'theory' at university and 'practice' in the workplace* gives a short overview of the role of hybrid/virtual sites as the space for

WIL activities. He finds that the hybrid space avoids repeating the negative presuppositions on the division between learning theory at university, and practice outside the university domain. Björck outlines these two usual domains often inscribed, nonetheless, third places whether it is “physical and/or virtual sites”, that can be able to “merged into one or more practices” (2019: 51). Björck provides a few examples of hybrid/virtual site inscribing in the third places, such as “Facebook, Instagram, and one could also argue the internet, in general, is a usual place in contemporary society” (2019: 51). The ideal is that WIL happens in a “single physical and/or virtual places that exist in relation to yet outside two usual places”, situating outside the university as well as working-life domain (ibid). Notably, Björck gives an ambiguous, nonetheless narrow account of digital technology that he sees as a neutral tool to create third spaces, and that, moreover, can be a place to bridge the gap between the theory-practice dichotomy. The idea of bridging the gap with the help of social media and the internet provides not a detailed account of digital technology that is merely the social media platforms and the internet.

Hult (2021) in her Ph.D. dissertation, *Digital Work: Coping with Contradictions in Changing Healthcare* explores how digital technology allows physicians to interact, share knowledge, and coordinate with their patients. Hult’s study sheds light on the basic concepts of digital technology in the spheres of learning and practice in the workplace. Hult portrays the rise of *digital work* in the medical profession as something that must be tamed by doctors so that digital technology does not derail doctors' most important duties of treating patients. In these terms, Hult’s understanding of digital technology is quite pragmatic, and she suggests that it is necessary and possible to tame digital technology in favor of carrying out the professional work of doctors. However, Hult takes a cautious stance here to warn that doctors should be aware of how digital technology affects their work in counseling and treating patients.

There is some literature that examines the possibilities and pitfalls of replacing traditional WIL models during the COVID-19 global pandemic (Zegwaard et al. 2020; Andrews, and Ramji 2021). A key insight is that the use of digital technology during the pandemic opened up working possibilities for WIL students. The studies find that digital platforms (e.g., Microsoft Edge) have played a key role for the students in building both invaluable

skills, and building resilience, that is, in helping students adapt to the difficult circumstance of the global pandemic. Kay et al. (2020) examined the impacts of COVID-19 on WIL programs in the Canadian and Australian contexts and found that while WIL programs experienced various disruptions, digital technology contributed to continued virtual and online learning. Dean and Campbell (2020) also noted how digital technology allowed WIL programs disrupted by COVID-19 to open new online spaces for learning as conventional physical places closed. Furthermore, the literature notes that it was nevertheless challenging for the existing WIL models to adjust to this new relationship between humans and technology. Furthermore, they see the need for the reinterpretation of human-technology relations, and their impact on students' learning and practice.

3.1.3.b Work-Integrated Political Studies (WIPS)

Sunnemark (2019: 4) outlined a core value, vision, and idea of building the WIPS by giving “focus on a praxis” as part of producing advanced knowledge as the learning outcomes in a close partnership with surrounding local actors. The program vision, according to Sunnemark, is “an approach of applied knowledge and competence”, with the goal of producing graduates well prepared for the job market (ibid). At the same time, WIPS also facilitates applied research into burning social challenges so helping address wider social goals. Sunnemark does not clarify the role of digital technology in this applied social research approach or in advancing higher knowledge. Assmo (2021) develops further Sunnemark's description, by describing how relating WIL knowledge production to the realm of politics. Assmo notes that students will do placements in political organizations that cover all kinds of political topics including “migration, segregation, human rights, equality, environment, poverty, democracy, and conflicts”, which are of political nature (ibid). Despite highlighting the aims of WIPS, Assmo does not mention the role of digital technology in any aspect of the program. Finally, Piper et al. (draft/forthcoming: 10) shed light on how the WIPS would develop a further conventional approach to WIL by “seizing the opportunity to fill an applied gap in Political Studies offerings”. Aligned to this, they define WIPS as “reflective practice on research-intensive political work” that aims would aim to fill the gap in political studies around forms of “applied knowledge and knower” (ibid). Again, no mention is made of digital technology in the program.

From the three lines of scholarship identified above, the following insights emerge. First, is the importance of new digital technology systems to contemporary knowledge production, and the kinds of explicit and implicit knowledge involved in all forms of learning and knowing. Second, is that digital technology brings with it more than new artifacts and processes, but also changes human relationships in ways that require new knowledge to understand. Third, is that WIPS attempts to apply the principles of work-integrated learning to Political Studies such that students learn through doing in the workplace as well as through teaching on campus (UW, 2020). However, there is currently no reflection of the impact of digital technology on this learning process, even though WIPS was introduced during the covid-19 pandemic forced new ways of reaching and working using digital technology. Therefore, it leads me to ask a crucial question, namely what impact did digital technology have on the knowledge production in WIPS during the COVID-19 pandemic?

3.2 Theory

The section highlights the trajectory of Barnard Stiegler's (2012a; 2013a, 2014, 2016b, 2020a, 2020b, etc.) theoretical connotation of digital 'pharmakon', and postulates the three integral parts of the trajectory, namely, the processes of grammatization, individuation, and primary and secondary retention.

3.2.1 Invention of alphabetic writing qua Grammatization

Stiegler (2013a) recalls the history of the human invention of alphabetic writing, a symbolic process of 'grammatization', that happened all the way back in the Upper Paleolithic era. Initially, Stiegler borrowed the term grammatization from Jacques Derrida's (1998) interpretation of Plato's Phaedrus in his book, *Plato's Pharmacy*. Grammatization is also related to Georges Canguilhem's (2008) notion of 'technical life', that it is possible to form through the process of materialization ('exteriorizing') of the "mental and behavioral flows to made discrete" (Stiegler, 2013a: 33). The very process of exteriorizing (e.g., discretizing) human thoughts and behaviors through grammatization sets forth the possibility of "mental and behavioral models to be created"

(ibid) The latter possibility is that grammatization retroactively influences the creation of human thoughts and behavioral models, that Stiegler calls technics (ibid).

Stiegler (1998, 2011) mentions paleoanthropologist Andre Leroi-Gourhan's (1993) observation of human exteriorization of memories inside the cave, which expedites the formation of collective memories (through 'hypomnesic' tertiary retentions). Moreover, it had allowed humans to accumulate individual experiences (in the form of grammatized gestures, signs, and speech), thereby transforming them across the generations by practicing it. Furthermore, describing the human-modern-machine relationship, Leroi-Gourhan (1993: 238) writes "both tool and gesture are now embodied in the machine, operational memory in automatic devices, and programming itself in electronic equipment." The modern machine can program, remember, run, and manage itself with limited human intervention.

Stiegler (2011: 33) states that grammatization is a process of alphabetic writing ('hymptomata') and is a very act of exteriorizing knowledge, which also called 'hypomnesic' tertiary retentions i.e., holds the "lists of finite, analyzable and calculable elements, are modified in return" which can be found in identifiable artifacts in written inscriptions on bronze or a piece of flint, in terms of technical objects, practices, culture, etc. In this way, Stiegler describes the process of grammatization as one that "continues to spread and accelerate, and it transforms all forms of knowledge" which presupposes of human's ability to "learn from neurophysiology that cerebral plasticity – and the transformation" that is based on "the introduction of tertiary retentions" (2011: 37).

Stiegler (2011: 43) relates grammatization to the act of rational thinking. He states that writing "...is also the condition of possibility of the forms of knowledge that we call rational." So, thinking, according to Stiegler, nevertheless can even occur parallel beyond our imaginations, with the support of artificial tools, through the written form of our thoughts by materializing them whether on paper or digital screens. Stiegler epitomizes a byproduct of writing in relation to negative 'pharmakon', that "... enables individual mnesic activity [logos] to be short-circuited: instead of memorizing and in this sense learning—to count." (2011: 45-46). So, the destruction of individual *anamnesis* can decay the analytical ability of human noetic life. If the memories that need to conceptualize the

world fade off, then the human can no longer think for oneself, Stiegler reinforces that “the foundation of the capacity to think for oneself—that is, of the capacity to think full stop” to be an impossible task for the psychic individual on the background of a lack of sufficient memories (ibid).

Stiegler (2013b: 2) invokes further Plato’s (1999) attack on writing, human’s creation of artificial memories (‘hypomnesis’), has toxic effects to be counteracted by “for thinking one-self”, in terms of the “autonomy of thought”. In that manner, Stiegler (2012a: 7) conceptualizes the process of grammatization in the Platonic notion of ‘pharmakon’, by relating what Socrates in *Meno* tells us. According to Plato, the therapeutic nature of alphabetical writing (a hypomnesic technique) is to archive and transmit knowledge across time and space beyond the finitude of human memory. On the contrary, the poisonous nature of writing is associated with the sophists who misused such a technique (‘logography’) for the private (destructive) purpose of gaining power in the ancient city-state of Athens (Stiegler 2012a). Writing in the digital age, argues Stiegler (2019), can be referred to as producing digital ‘hymptomata’, that is images, videos, and texts, in terms of data, algorithms, and information, considered valuable sources to make huge profits for tech-giants e.g., Google, Amazon, Facebook, Microsoft, Apple, (GAFMA), etc. by organizing, preserving, and monetizing those digital objects (Lindberg, 2020).

3.2.2 Primary, secondary, and digital tertiary retention

Stiegler (2015) advances the Husserlian phenomenological concept of internal time-consciousness within an individual; primary and secondary retention, and then ‘protention’ by extending this to the notion of ‘digital tertiary retention’. According to Stiegler, primary retention is “a temporal fabric of all perception” that an individual perceives based on her temporal flows in real-time, while secondary retention is made possible by the memories that she produced based on her primary retentions (2015: 237). What Husserl (1964) did not see, according to Stiegler, is a crucial link between primary and secondary retentions to anticipate [*Project*] the future. In a Husserlian sense, this projection or ‘protention’ is a source of ‘epiphylogenesis’, or an artificial source of memories (ibid).

With the advent of digital technology, Stiegler (2015: 274-275) reports, a new kind of electronic writing is made possible by digital machines. Thus, protention or digital tertiary retentions are made possible by imprinting into the silicon-based memory that consists of e.g., HTTP, HTML, and XML in the forms of the protocols and languages “where symbols circulate at the speed of light on digital networks, passing through circuits printed at the microelectronic level.” Stiegler (2010) postulates on how digital tertiary retentions serve as “a mnemotechnical exteriorization of secondary retentions which are themselves engendered by primary retentions.” These can precede the primary and secondary retentions, such that “the spatialization of individual time becoming thereby collective time, tertiary retention is an original exteriorization of the mind [spirit]” (2010: 9).

Additionally, Stiegler argues that the systems of digital writing and enumeration have become increasingly analytical recordings of primary and secondary retentions that are supposed to occur through the “retentional flows and fluxes” of primary and secondary retention within individuals. In this way, the individual in the digital age does not necessarily employ her logos (reasoning) to retain her primary and secondary retention, which is rather provided by analyzed forms of digital tertiary retentions (e.g., texts, numbers, images, and videos) on her digital screen. Moreover, Stiegler goes even further to relate how the process of psychic and collective individuation by Simondon, can be jeopardized by technology if that overpowers the process the individuation. More on this in the next section.

3.2.3 Psychic, collective, and technical individuation

Stiegler (2012a: 2) notes that the process of psychic individuation (coined by Gilbert Simondon in his book, *On the Mode of Existence of Technical Objects*, published in 1958), is “neither a stable nor an identity but a phase in a process through which she never ceases to transform herself”. In other words, psychic individuation is an ongoing process and furthermore psychic individuation “is truly accomplished to the extent that it is inscribed in a process of collective individuation”. Additionally, ‘trans-individuation’ can be a basis for inscribing the psychic individuation into the process of collective

individuation, so that “collective experience itself comes from what were once individual experiences that have become collective through a process of transindividuation’ (ibid).

Stiegler (2014) offers a third type of individuation, ‘technical individuation’, partly based on Simondon’s (1958: 68) notion of the technical individual. According to Simondon technical individuation requires “having an associated regime as a *sine qua* noncondition of its functioning”. Stiegler (2014: 48) modifies Simondon’s notion, stating that in the hyper-industrial age, the machine is the one who carries the tools, “and man is no longer the technical individual”. Indeed, humans only serve or assemble machines or retentional [digital] apparatuses. For example, Stiegler (2014) argues that the retentional [digital] apparatuses can organize the psychic ‘I’ and collective individuation ‘we’ within a single process, thanks to technical individuation. Stiegler writes that the process of technical individuation is about preserving human gestures, speech, texts, data, information, images, videos, and so on artificially in technical devices or systems without the need for a human to memorize and learn them (Lemmens, 2017).

Stiegler (2019: 7) follows Winnicott (2005) in noting the bypassing and deforming effects of literal technics, like writing, which can short-circuit the process of individuation as the person relies on the collective knowledge of the machine. Consequently, the possibility of a psychic individual (I) projecting into the process of collective individuation (we) is threatened. In other words, the psychic individual cannot go through a long circuit of individuation, so the process of forming a collective (we) can be an impossible task for the psychic individual (I).

3.2.4 Positive aspects of pharmakon

Stiegler (2011: 45) aims that the therapeutic or positive side of digital pharmakon is "the remedy for a living memory that is continuously being lost, is limited, a remedy that makes up for this flaw ... by adding a memory that is artificial, mnemotechnical". The latter term denotes the advanced stage of alphabetic writing in the digital age. Stiegler further uses the term positive pharmakon to denote those capacities that allow humans to accumulate and transmit knowledge across time and space. He postulates that "with

alphabetic writing, knowledge becomes deductive and demonstrative in the true sense, and transferable as such, that is, literally to letter." (ibid)

There are three important points to note in respect of the therapeutic side of pharmakon Stiegler mentions above, the first is generally that the process of grammatization has a curative potential to treat the erosive tendency of human memory and thereby preserve the memory artificially whether written on paper or in mnemotechnical devices, as digital. So, the preserved memory can supplement human memory to produce and transfer knowledge across time and space. The second point is that the process of grammatization is deductive and demonstrative in nature. In other words, according to Stiegler, it universalizes, generalizes, de-noetizes, and decontextualizes human knowledge by deducing to alphabets, numbers, signs, etc. Thanks to knowledge in deduced forms, when grammatized, the possibility of demonstrating through and with the various technologies was opened. This, according to Stiegler, was the prerequisite for preserving the enormous amount of knowledge (e.g., collective memories) from the physical library of books to contemporary digital cloud services. The third point, according to Stiegler, is that preserving human memory artificially in digital devices allows the transmission of such memory across time and space, so the artificial memory can be de-territorialized to create new memories for other people. For example, the knowledge that humans produce in externalized forms based on their experiences from different times and places can be re-examined and remembered by individuals in other times and places so that the knowledge can be transformed and thereby recreated (ibid).

3.2.5 Negative aspects of pharmakon

Stiegler (2011: 45-46) highlights the negative aspects of pharmakon including the observation that it "... enables individual mnesic activity to be short-circuited: instead of memorizing and in this sense learning—to count". This weakens the individual's memory by relying on the technological exteriorization of memory, possibly leading "eventually to the destruction of this psychic memory that is the foundation of the capacity to think for oneself—that is, of the capacity to think full stop." In sum, there are three crucial negative aspects that Stiegler points out: the first is that technology can erode human

memory, in terms of short-circuiting it by relying on technological exteriorizations, for example, individuals prefer not to learn to count, instead delegating this task to the calculator for example. Secondly, our increasing dependence on technological exteriorizations can endanger learning. In other words, humans no longer see the necessity to learn calculation by memorizing, as memorizing is exteriorized to technological systems. Thirdly, Stiegler argues that the pharmakon may even threaten the foundation of the capacity of human thinking for oneself.

3.2.6 The Digital pharmakon, the University, and Knowledge Production

Stiegler (2016a: 158-159) depicts the positive side of the pharmakon in the university sphere as a potential space that can be “the vehicle of a process of deproletarianization, a reconstruction of the process of psychic and collective individuation” (2016a:160). The possibility exists to achieve a context “where subjects recover their place as subjects—as ‘subjects’ not only undergoing processes of subjection but also actually taking over the system” (2016a:159). To restore the place of the subject, digital technology must be rearticulated to capture the incalculable and improbable (‘negentropic’) elements of knowledge based on subjective experience through the process of ‘transindividuation’.

Stiegler (2016a: 162) designates the incalculable and calculable parts of knowledge by the terms ‘otium’ and ‘negotium’. Where the former “embraces the incalculable, what has no price, what cannot be measured by accounting”, the former can be captured, framed, and articulated by digital technology, through being translated “into a more formal language”, that is, the process of grammatization (ibid). The reason that digital technology tends to be entropic is that it “is grounded in the calculation, and calculation relies on the elimination of the improbable, that is, the suppression of singularities. And singularities *are* unpredictable” (163). On the contrary, the negentropy of digital technology makes it difficult to be open to subjective experiences, improbability, and the incalculable parts of knowledge. Hence the entropic feature of digital technology often destroys or excludes the incalculable or improbable elements of knowledge (ibid).

Stiegler (2013b: 9) alludes to the negative uses of pharmakon in the current industrial digital age when it is used to generate “weapons that destroy ecosystems, social structures, and psychic apparatuses.” The root cause of this is that individuals subordinate themselves “to the service of machines, that is, completing their proletarianization” (15). The proletarianization of individuals means that industrial digital technology destroys knowledge of how to work for workers, how to live for each individual, and how to conceptualize knowledge for researchers qua noodiversity. Stiegler highlights the political consequences of bypassing or short-circuiting human knowledge by totally mechanizing human gestures, thoughts, and speech into a digital machine that deprives the “souls of citizens of that knowledge at the foundation of all citizenship (all autonomy)” (19). So, citizens will have less autonomy over themselves due to the lack of knowledge about how to live, *how-to-work* and how to theorize.

Stiegler (2020a: 335) identifies the negative outcomes of the digital pharmakon as “based not on libraries but on data centers, in which markets, ... and where proletarianization and denoetization, too, have become general and widespread.” Here knowledge production is generalized to the extent that it lacks subjective experiences, and thus diversity, which he calls ‘noodiversity’. Stiegler adds that markets set the baseline and need for specific kinds of knowledge to be produced based on the data captured and processed by digital technologies.

To address this challenge, Stiegler (2012b: 15) argues that digital grammatization must be rearticulated by matching "the social web and the semantic web, and where these two must not be opposed, but rather composed - through social and educational organizations." To achieve the positive possibilities of pharmakon, knowledge production should draw on contributory research, and be a technology of transindividuation in forming, transforming, and preserving knowledge. Stiegler adds that "automation enables digitization, increases the power of the mind (such as rationalization) while destroying the knowledge of human minds (the way of rational thinking)" (14-15). This can be remedied by engaging in thinking through the process of digital grammatization.

Importantly, Stiegler (2017 & 2020a) postulates that the university can be a promising organization for engendering positive pharmakon, to “struggle against the dis-apprenticeship and disindividuation generated by the hegemonic appropriation of ... digital tertiary retention” (2020a: 247). Through creating a long circuit of transindividuation, based on “rational epistemic inclination... which is rational only in that it tries to unify the diversity of experience accumulated by the discipline” (ibid.)

Stiegler (2012b: 15) suggests rearticulating the process of the digital grammatization, to create a common ground “... between psychosomatic organs, technological organs, and social organizations while ensuring that the technological layer does not short-circuit the psychosomatic and social layers.” Technical individuation should aim to preserve the psychic (subject as I) and the collective (a part of collective being as we) to maintain the process of transindividuation. If the technical organs overpower the process of psychic and collective individuation by short-circuiting the process, the consequences are the proletarianization and denoetization of knowledge to the digital automata (Algorithms, AI, and data), so the possibility of producing knowledge with noodiversity will be foreclosed.

Bypassing the incalculable and improbable (otium) parts of knowledge through the process of categorization, ranking, schematization, and computational reasoning increases human dependence on digital technology. Consequently, knowledge production would be based on digitally extracted data, information, statistics, calculations, and schemas without subjective experiences, and the improbable and incalculable aspects of our social world. Therefore, humans have less need to rely on their ability to memorize, understand, think, and decide independently without being affected by the algorithms, and data. In such a state, a person experiences being proletarianized by the digital machine, which means that the psychic and collective individuation process never fully takes place (Stiegler, 2016b & Ross, 2021).

3.3 Analytical framework

The analytical framework I am presenting below illustrates a simplified sketch of the digital regime I have been situated in while learning knowledge production in WIPS. The framework is constructed based on my reading of Stiegler's theoretical juxtaposition of digital technology, thus, it outlines also what actual characteristics and features of the digital technology I experienced and practiced during the internship. So, the most important, human element (*I*) is always presented in each feature of the digital regime, although, it might not precisely be explicated with the right connotation below. Some limitations and implications are presented below.

	Concept	Definition
1.	Digital regime	The digital regime is the sum of digital apparatuses (computers, mobiles, etc.), networks (Internet, for text-image, audio-video, and animation transmission, telecommunication), and systems (Microsoft Windows, Cloud computing, MacOS, etc.) used in WIPS learning and knowledge production processes.
2.	Digital pharmakon	Digital pharmakon connotes both the therapeutic and toxic properties of digital technology. The therapeutic or positive pharmakon is considered to be a remedy against the eroding tendency of human memory, thereby creating and preserving artificial memories in the digital regime, i.e., the mnemotechnical one. On the contrary, the toxic aspects of digital pharmakon, i.e., dependence on digital technology, weakens human memorization, thinking at a full stop which can endanger learning.
3.	Psychic, Collective and Transindividuation	A phase of the transformation process that is neither an identity nor a stable condition of an individual, rather a psychic individual (<i>I</i>) goes through a process of collective (<i>we</i>) individuation. Collective individuation is the collective experience of each psychic individual, while the individual

		experience cannot be attained without, <i>I</i> go through the process of collective individuation. The process of psychic and collective individuation is also called transindividuation, and the notion of ‘trans’ denotes to the transformation of psychic and collective experiences through the process of individuation.
4.	Technical Individuation	Technical individuation is an associated regime that can organize the process of psychic and collective individuation, i.e., digital apparatus can combine the process of psychic and collective in a single process, so organizing, preserving, and transforming the human experiences, artifacts, and knowledge.
5.	Grammatization	A process of exteriorizing or discretizing the mental and behavioral flows e.g., speech, signs, gesture, and thoughts into the identifiable written artifacts with readable, analyzable, and calculable elements, which call knowledge.
5.	Primary and Secondary Retention	Primary retention is a flow of temporal objects in human consciousness in real-time, while secondary retention is the memorized form of primary retention that is stored as lived experiences in memory.
6.	Digital Tertiary Retention	It is also called the third kind of digital form of memory beyond living organs, the retention preserved in artificial organs, such as digital regime.
7.	Entropic/Negentropic knowledge	Practicing knowledge collectively is the main source of renewing and diversifying the knowledge about our culture and social world. So that the Negentropic potential of knowledge can be achieved, that is, the dangers of producing the entropic knowledge can be minimized. Entropic knowledge is a form of mechanized, uniformed, calculated, quantified, absence of unexpected knowledge that is reduced to automata qua digitalized. Additionally, the Entropic

		knowledge tends to eliminate the complex aspects of our social world, and local know-how.
8.	Proletarianization	Proletarianization is a process of depriving persons and communities of their knowledge means a proletarianized person cannot re-appropriate or re-internalize the knowledge, rather knowledge is automated into mechanical devices or systems so that the persons have to depend on/proletarianize themselves to the artificial technical support.
9.	Phase shift	Through the noetic transformation of knowledge that has been transindividuated between psychic and collective individuals, thus supported by the technical (exosomatic organs) individuation. The phase shift occurs through the conversion process of sublimating the psychic and collective individuation so that individual and collective consciousness can be transformed into the next phase.
10.	Otium/negotium	The otium denotes to incalculable part of human noetic life, is possible to realize through dis-automatization of thinking, the negotium to the calculative one.
11.	Improbable/probable	The improbable is that element of knowledge about the social world that is diverse, uncaptured, unexpected, incalculable, and unforeseen by digital technology. On the contrary, the probable is a kind of knowledge about the social world, which can be extracted, categorized, numbered, and reduced to the specific model to explain within the digital regime.
12.	Noodiversity	A negentropic form of improbable and incalculable knowledge inscribes to the local diversity, singularity, and specificities, and contents several variations and fundamental ones, making it possible to generate social, techno- and biodiversity, etc. Formal knowledge is created

		<p>by rational minds rather than solely by the digital automata, such as communities, peers, and scholars through the practice of knowledge to achieve noodiversity, so it would preserve localities, singularities, and specificities with a varied and fundamental knowledge of the social, technological, and biological world.</p>
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Figure 1. *The analytical framework*

Some crucial points to mention in order to avoid misinterpretation about the analytical framework I presented above are that the relation between these different concepts of the digital regime should not be considered independent of each other. The regime is thus interconnected, for example, the ‘tools’ i.e., digital tertiary retentions aspect of regime may have a direct or indirect contingent on the ‘the process of individuations’ and so on.

Further, the digital apparatus can invoke human memory with its capacity to preserve memory artificially, or it can cause the destruction of memory when the human no longer needs to learn how to memorize knowledge. Another example is how the ‘communication’ features of the digital regime have supported me to engage in producing knowledge in the form of digital tertiary retentions, and further enable me to individuate through the process of transindividuation within a digital regime.

4. Aim and research questions

The aim of this thesis is *to explore the impacts and possibilities of the digital regime for learning academic knowledge production in Work-Integrated Political Studies, including possible political implications*. To fulfill the aim, I pose the following research questions to answer.

1. What was my experience of using the digital regime (pharmakon) to learn through producing knowledge in the WIPS degree?
 - 1a. What was the experience of using the digital regime to produce knowledge in the internship versus in the degree?
 - 1b. What were the positive and negative aspects of this experience for my learning?
 - 1c. What are the broader implications of my experience for using the digital regime in the future?

5. Method and Research Design

The chapter describes and justifies the qualitative nature of this thesis based on a case study research design, The data collection method is primarily autoethnographic, and the data analysis is thematic using the analytical framework. The section concludes with ethical reflections.

5.1 A qualitative study

Bryman (2016) highlights that a qualitative study is one that emphasizes understanding the meaning behind words, rather than counting the quantitative aspects of the social world in order to find a correlation or cause and effect. Bryman identifies some features of qualitative study, for example, that qualitative research aims to understand the social world by exploring the different interpretations provided by participants. Furthermore, these meanings are important because they form the basis of actions by individuals, and from these interactions, social phenomena are produced. Hence a qualitative study emphasizes the interpretation of experiences and perspectives of social phenomena to generate knowledge about our social world.

Bryman (2008:13) further adds that philosophically speaking, a qualitative study is an approach of an "interpretive and constructionist" nature. What this means is that social facts are not naturally given but socially constructed. Further, we come to understand these facts by interpreting them through a common framework of understanding in language. Thus, accessing the social world is accessing a world of meaning constructed in language. In this case, as a student, I had been engaged in learning to create knowledge by interpreting and constructing the experiences and perceptions I have gained through active participation in the digital environment. The activity I was involved in learning knowledge production highlighted the different kinds of possibilities, obstacles, and paradoxes that made me ask the question, reflect, and produce knowledge that I would otherwise never have been able to formulate into meanings. In conclusion, I engaged as an active learner in the practice of knowledge production by consciously interpreting and constructing the meanings I found in information, data, and statistics about the research tasks.

5.2 Case-study research design

The research design is a case study, more specifically the case was my experience of doing the WIPS masters through a digital regime. Given that my experience was largely the same as other students on masters I believe it can also be characterized as a typical case study (Bryman 2016: 62-63). Mabry (2008) points out that the case study research design focuses on the experiences and perceptions of the participants to develop a deep understanding of the impacts and effects of certain phenomena on individuals. This goes beyond counting the characteristics of individuals or treating the participants as numerical units. In this regard, I did not aim to count or quantify what kinds of digital technology I employed, or how many hours I spent in the digital regime to produce research reports as such questions have been irrelevant in relation to the object of study. Rather my focus was to explore the experiences I had during the process of knowledge production in the digital regime.

With case study research design, the location or organization functions as a crucial backdrop to the site of data collection. In some ways, the location of this case study is of minimal importance as the focus is more on the role of digital technology in knowledge production at the university site, rather than the university site per se. The representative or typical case study is a type of qualitative case study employed to bring forth a deep and multifaceted understanding of a complex issue in a real-world setting (Crowe et al. 2011). In this case, I seek to explore the implications of digital technology in the learning and development of knowledge production skills that have been based on some theoretical premises, for example, what negative and positive impacts digital technology brings to the practice of knowledge production and exploring further the political implications of such knowledge (Halperin & Heath, 2020). In this term, the case is rather about exploring my own quest to learn 'practical work' knowledge produced under the regime of the UW, which has been conditioned by the digital regime.

5.3 Data collection through autoethnography

The purpose of applying autoethnography is, according to Adam et al. (2017: 1) to describe and interpret "personal experience and perception" with the help of exploring

the "process of self-engagement in practice" through questioning the prevailing norms and standards in the larger social context. Thus, Adam et al mention that the autoethnographic individual's account is "infused with political/cultural norms and expectations, and they engage in rigorous self-reflection" (ibid). Here, it is evident that, for the autoethnographer to reflect upon how they experience or perceive the phenomenon they inure these personal accounts with broader "norms and expectations" in society (ibid). Wall (2006) suggests that those who employ this method would need to think critically before adopting the new approaches to understanding and explaining the social world because the ranges of choices and principles the (auto)-ethnographers would take can have a significant role in understanding and interpreting the social phenomenon.

Through such a process, the autoethnographer could find and materialize what kind/(s) of relationships it has beyond the self or, in other words, the social life by "offering accounts of the personal experience to complement" (ibid: 3). The autoethnographer makes it possible to demonstrate various processes that they go through during personally all-encompassing settings that might be "impractical to create such a study in a laboratory setting" (ibid: 4). In this sense, the autoethnographer could provide a rich account of their experiences and perceptions through observation and reflection. In the meantime, a careful and vivid description of objects or actions during the observation is an essential part of auto ethnographer for making meaning with self to relate to the larger socio-political phenomenon.

According to Winkler (2018: 236), nevertheless, the autoethnographic method presents researchers with a chance to get a "rich, insightful, and thick" study, meanwhile, it is up to the researchers who are continuously required to make critical judgments on choosing to write retroactively and selectively their perceptions and experiences according to what influences on that specific research question. Memory is crucial for doing ethnography, argus Winkler, using the memory signifies a researcher's personal accounts of "events, conversations, feelings, and experiences" that contribute to creating data that would not be necessarily similar to hardcore facts with scientific evidence (238).

Chang (2008: 54) cautions the autoethnographic method users with the five possible pitfalls that the method users should be aware of: they become (i) excessively self-centering in isolation; (ii) they narrate the events without reflecting upon them; (iii) they relying on memory, and call it a data source; (iv) they neglect the ethical aspect of other-regarding thought for the sake of doing self-narration, and finally, they (v) use autoethnography in the inappropriate contexts.

In respect of the first pitfall, Winkler (2018: 243) notes that autoethnographers might lead researchers to be in extreme “self-reflexive” and “vulnerable” positions I had to some extent experienced vulnerability during the process of learning in my virtual digital internship, which was about the difficult circumstances created by the Covid-19 health crisis. In such a situation, when I reflect on my everyday progress in learning skills or limited contact with the outside world, I sometimes felt unproductive and isolated in those reflective moments. That would make an autoethnographer vulnerable, even so, self-reflectivity and vulnerability created a new way of thinking and reexamining own actions. In respect of the second pitfall, the process of reflecting on my experiences in relation to theoretical literature and in conversation with my supervisors helped me address this issue.

In respect of pitfall three, external sources such as artifacts, official data, and written documents can complement, as well as increase the validity and accuracy of the data extracted from applying the method. I will discuss pitfall four below in the ethics section. Finally, in respect of pitfall five, the case for the use of the method in this study rests on the significance of the individual experience of learning in a digitally mediated knowledge production process, as outlined above.

Practically, I used a personal journal to mark down my observations and reflections at key moments in the research process. This formed the bulk of the primary data that was analyzed in this study. Importantly, the method I applied to collect empirical data did have a greater reliance on the digital regime. In other words, during and after participating in each online meeting in the internship, again, I had to depend on the digital regime, for instance, regarding what I had observed and thought during the online meetings will be

written down (in the form of field notes) on the digital screens, that has saved in the digital apparatuses and systems. So, it is crucial to mention this aspect for the reader to know that I not only have the internship online but even used it to write down my observations and reflections.

5.4 Data analysis

To analyze the empirical data, in this case, the field notes, the collected field notes were carefully read several times and then coded according to using the analytical framework to relate them to the research questions. As noted above, prior to analyzing field notes, I constructed an analytical framework based on Stiegler's theory of digital *pharmakon* characterizes the negative and positive effects of digital technology in human life. The framework operates as a triangular prism of glass that functions as a lens to organize the data into larger categories. As outlined below, the analytical toolbox yielded a triangular prism in the sense that my experience of the digital regime can be characterized along three dimensions: 1) as a supplemented form of memory, 2) as tools with a diversity of technics, and 3) as a means of communication. Thus, the digital regime was a crucial sphere for preserving memory, learning, and creating knowledge through the process of grammatization and individuation, and a space for communication.

To find the relevant components and meanings in the field notes, related to these important features of digital technology, I not only read the field notes several times, again, but I also read and re-read Stiegler's theoretical contributions to understand how the human relationship with technology constitutes and vice versa, it goes beyond seeing it as a pure means or instrument.

5.3.1 Ethics and autoethnography

Swedish Research Council (Vetenskapsrådet, 2017: 40-41) presents in its report, Good Research Practice, four key concepts for achieving ethical research practice, namely: secrecy, professional secrecy, anonymity, and confidentiality. In the context of conducting an autoethnographic study of this nature, the observance of anonymity and confidentiality have the important ethical aspects of presenting results in analysis.

Therefore, in order to maintain anonymity, I have used fictitious names for all participants (e.g., supervisors, peers, etc.) in the field notes. Moreover, I have maintained the confidentiality of the participants in the study, thereby not mentioning the personal information or protecting their integrity (2017: 41). The two previous concepts of secrecy and professional secrecy have been less relevant here because the empirical data (publicly accessible information and documents) I analyze is based on the experiences and perceptions I have gained during the knowledge production process in WIPS, which is nevertheless a collection of reflections and thoughts from myself, while no from some secret source. So, there is no need to maintain secrecy, indeed must discuss the crucial aspects of sources and the nature of such documents and information. At the same time, keeping professional secrecy is also irrelevant in this context since those mentioned in the study do not have to be needed to work undercover or within the intelligence agency.

Maintaining ethical codes in applying the autoethnographic method can be a different type of undertaking than a researcher using other methods, e.g., conducting in-depth and semi-structured interviews or participant observation. Different in this sense, as Edwards (2021: 1) says that a researcher uses the autoethnographic method “to investigate self-experience in relation to life events, and also situated experiences in cultural and institutional contexts”. In this way describing the personal experience that is related to the specific event that occurred within given social circumstances can be tricky in order to interpret other persons' actions, thoughts, and behaviors. The possibility of arising a few tricky situations can be, according to Edwards, interpreting the actions, gestures, and speech by another person in the autoethnographic report might cause psychological distress or causing reputation damage to those mentioned persons if such interpretations do not match with what those persons wished to be portrayed, represented, and seen by others. Edwards argues that the autoethnographic method needs to apply by emphasizing “the value of respectful relationships, and the careful use of words to reflect this respect.” To the participants (2021: 5). To avoid such situations, besides maintaining anonymity and confidentiality in presenting data in analysis, I not only read, but also hear, listen, and understand what actual things other participants said and meant, moreover I reflected upon those words and meanings came out from the participants to avoid misinterpretation and exaggeration. Moreover, it requires according to Edwards, “deep reflection, a

responsibility of integrity and self-interrogation”, so the field notes were carefully read several times to interpret the results of the study, to avoid the dangers of causing any kind of personal distress of the mentioned people or damaging their reputation is avoided with a highest possible manner (2021: 3).

Edwards further mentions that the method of autoethnography is ‘an ethics of the Self’, meaning that “the researcher has an obligation to describe and investigate their own experience authentically.” This is a process that can unearth my weaknesses and identify a lack of professional qualities in myself (2021: 3-4). So, I can consequently put myself in a vulnerable situation. I had no other alternative but to mention and reflect on these weaknesses and lacking aspects of myself in the field notes in order to understand myself in relation to interpreting the socio-cultural and organizational circumstances to achieve the learning objectives.

6. Summaries of Individual Studies

Study 1

The first research report describes with statistics the demographic profiles and academic performances of primary schools in the Trollhättan municipality. We extracted relevant data on Trollhättan schools' from Skolverket (Siris) and Trollhättan Municipality to infer the statistical computer program, namely Microsoft Excel. In that way, we have succeeded in describing and comparing the demographic profiles and academic performance of 9th-grades in the city. The study finds that the three primary schools, Kronan, Sylteskolan, and Slättbergsskolan have a higher number of students with a foreign background, and a lower number of parents with post-secondary education. These three schools lay in the city's poorer residential areas, moreover, these schools have the lowest pass rates compared to other school units (grades 7-9) in the city.

Study 2

The second research report explores residential segregation, and the academic performance of certain segregated schools in the city to examine the Trollhättan municipality's closure proposal for a school in the Kronogården residential area (4-9). The report focuses on the consequences of urban segregation on the academic performance of pupils in the Kronan school, summarizing the national picture of school segregation and taking a few examples from other parts of Sweden of schools that have been closed. Most importantly, the study employed the major findings of study 1 to illustrate and explore the municipal reasons and motives behind the closure decision. The study finds that there are three central arguments employed by the municipality for the closure: 1) to deal with the poor academic performance of pupils in the school, 2) to alter the uneven student composition as a result of residential segregation, free school choice, and socio-economic challenges in the suburb of Kronogården, and 3) to create multicultural classrooms in the city's schools.

7. Findings

As mentioned in the methodology chapter, I collected empirical materials in the form of field notes during the research internship at the political science unit in UW between 31/08/2020 to 04/06/2021. The field notes provide a rich account of individual experiences I gained throughout the process of academic knowledge production for the research project, that occurred in the digital regime. Based on these empirical materials, the field notes were analyzed and interpreted from the theory of the digital pharmakon coined by French philosopher Bernard Stiegler (2012a; 2013b, 2016b, 2020a, 2020b, etc.) to achieve the aim of this thesis by answering the research questions. During the research internship, I observed, perceived, experienced, and reflected on how peers, supervisors, and I were involved in the knowledge production process in the digital regime. These field notes are focused on the engagements around producing two main research reports. In outlining the findings, I will present the field notes in a chronological manner and relate them to the analytical framework.

In September 2020, I received an email (via MS-outlook) from the research project [all the program teachers worked as supervisors too], that contained a research job description of two separate research reports I was required to produce during the research internship. Report 1 was to include a comparison between academic performance and the demography of schools in Trollhättan city. The instruction for the report stated that it should be a descriptive report, focusing on statistics and data with a shorter reflecting analysis on the comparison.

Report 1, A comparative description and analysis of all schools in Trollhättan will include all private and public schools, from grade 1-9, and gymnasiums, their locations, number of pupils, time of establishment, number of qualified teachers, the pass rate of students in overall and specific subjects, also pass rates for the children with immigrant background with explain terms. (FN, 08/09/2020)

The descriptive content of report 1 required that a large part of the analysis required processing and producing through computational programs (e.g., MS Word, Excel, Google Sheets, etc.) to compare the demographic features and academic performances of schools in the city. In Stiegler's (2011) terms, digital tertiary retentions were a condition

for me to exercise rational thinking as I had to rely on these computational programs in various ways.

For instance, in order to produce the two reports, the digital regime supplemented me to realize my technical life (ibid). The technical life required me to materialize thoughts in a digital form of grammatization, for example, thinking and formulating thoughts in common symbolic systems. More specifically, computational programs such as Microsoft Office 365, Dropbox, and Google Drive enabled me to collect and process data, conduct certain kinds of reasoning, and write. Furthermore, I had to rely on external memories (epiphylogenesis) as sources of key data for the project like demographic data,

My initial fear of not being able to perform a conventional internship at the site (UW's political science unit) eventually diminished with time after I realized the possibility of doing an internship at a distance in such a challenging time. The fear looks imminent in the following piece of field note,

It feels like I might not be able to go to perform all the research tasks mentioned in the email in such a difficult circumstance (COVID-19), how may I interview the pupils and officials, in the meantime, I had expected to meet my peers and supervisors in-persons, but it seems we only meet digitally via Zoom. I am feeling anxious and a bit disappointed. (FN, 10/09/2020)

At the beginning of the internship, the movement restrictions issued by the authorities to control the spreading of the COVID-19 virus seemed to make some parts of the research task rather impossible. For example, how could I conduct interviews without one meeting in-person with interviewees, and how could I collect municipal data and reports without being able to go to the municipal offices?

Some of these challenges were overcome thanks to digital technology. Thus, the digital regime gave me an immense possibility of having real-time (synchronous communication) and sporadic email (asynchronous communication) contacts with peers, and supervisors. And, even more importantly in this regime, I extracted the school data, digital objects/artifacts (in the forms of digitalized memory, statistics, texts, schemas, etc.) through the official websites of the TM, Skolvaerket, SCB, etc. The smooth

experience of communication via asynchronous technology, e.g., MS-outlook, Dropbox, Canvas, and Gmail for contacting external actors, arranging meetings, submitting draft reports, and receiving comments and feedback, enabled, and occurred in the form of digital tertiary retentions. Moreover, when it comes to synchronous communication, digital technology such as Zoom rooms and cell phones helped me to share information with peers, exchange ideas, provide critique on peers' drafts, present papers to my supervisors as well as share reflections in the internship. Furthermore, the reports relied on a large amount of digitalized data and statistics (digital tertiary retentions), that were only possible to extract from the official sources (mainly from SCB, Skolverket, and TM) in the digital regime.

Considering the finite memory and information process capacity of a person compared with computational programs inscribed in the digital regime, it would have been impossible to analyze, categorize and present the first report without relying on programs like Excel and Google Sheets. Besides that, report 1 required a short analysis of the extracted data, statistics, and information, and therefore I then had less dependence on certain computational programs (ex. Excel, Google Sheets, etc.). Nonetheless, I had to be in a digital regime (ex. Dropbox, Google Drive, MS Word, Grammarly, etc.) to analyze the data and to produce the texts for the reports though. In short, the digital regime schematized and processed the data and information I had collected throughout the months of the internship for preparing report 1 writing. By this I mean that I had no choice but to rely on digital programs for categorizing, comparing, and synthesizing the different factors and variables, i.e., academic performances and demographic features of the schools in TM.

When it comes to analyzing the academic performances in relation to demographic characteristics of schools, then the requirements of 'thinking for myself' became palpable. By way of explanation, I had to explain the phenomenon of poor academic performance of certain schools in the city in relation to their demographic features (e.g., pupil's socio-economic background, number of pupils with foreign background, and so on). Moreover, the schematized and analyzed data might not contain all the important reasons for the poor academic performance of certain schools in Trollhättan. Hence, I had

the task of analyzing and interpreting the relationships between different variables to explore the alternative pictures of school segregation in Trollhättan beyond having the numerical findings and explanations produced by computational programs.

The initial idea of writing research reports as planned was delayed by a problem in September 2020:

Statistics Sweden (SCB) would no longer provide the statistics of each school by 1 September 2020, the reason is, the student composition and grades of private schools are going to be considered business secrets. The government is weighing changing the policy for solving the problem. Now, I am sitting at home and waiting to get when the data and statistics of schools will make available publicly online. (FN, 12-09-2020)

Statistics Sweden's decision not to make available the school data (e.g., digital artifacts/objects) for the public caused a difficult scenario because the first report needed a significant amount of data on municipal schools that would no longer be provided by the SCB. I had Zoom meetings with supervisors on several occasions to find an alternative path to accomplish the research task. This demonstrates how a clear prerequisite condition for writing the reports was the data stored in digital tertiary retentions. If it is not publicly available in the digital regime, then it reveals a total dependence on digital artifacts/objects to produce knowledge in such a situation. If the data did not become accessible at a later date, the possibility of writing report 1 would have been foreclosed. This dependence showed how vulnerable my role and position were, in other words, how I had become proletarianized myself to the service of digital artifacts/objects, inasmuch as digital tertiary retentions in the forms of digital literal 'anamnesis', so to speak, was a condition of me accomplishing the research task. Hence, it was also a condition of learning research knowledge production in my experience of the WIPS program.

Moreover, this situation exposed also how limited the roles primary and secondary retention play in producing/projecting (protention) knowledge of this kind. In other words, to complete my research task, I did not have to go through the process of memorizing the important components of data, information, and statistics. The main task of memorizing these data and statistics from schools was performed by the digital regime, indeed it would be an impossible task for me to remember all the names of schools with

their academic performances, level of student composition to other demographic features. Consequently, I had to rely on the digital regime to learn and produce knowledge otherwise it could have been a time-consuming never-ending task (Stiegler, 1998).

In such a precarious condition, one of the advisors had a different take on the Zoom meeting.

Amid discussion on school data, supervisor 3 said the statistics might not say much about segregation; instead, to understand the phenomena of school segregation, we must explore more qualitative aspects of school issues in Trollhättan. To cover these aspects, whether it is possible to stay home and explore these qualitative aspects in the report. How feasible it will be to meet in-person individuals so I would get the qualitative aspects of poor academic performance of certain segregated schools in the city (FN, 27-10-2020)?

Thus supervisor 3 highlights that the qualitative aspects ('otium'/improbable/incalculable) of the research subject cannot be ignored. Both the 'otium' and 'negotium' aspects of knowledge were required for report 1. Here, supervisor 3 did not mean that the calculable part of knowledge is less valuable than the incalculable one. However, if I re-produce only the entropic forms of knowledge then I have depended (proletarianized) fully on the digital automata, raising a crucial question of whether I as a researcher have any significant role in producing knowledge in such a situation (Stiegler 2011).

To produce negentropic knowledge in the digital regime, the incalculable/improbable knowledge (otium) that is not accountable, numerical, or not adjusted only to a formal language must be included. It is possible to conserve the "singularities, improbability, and incalculable parts of knowledge" (Stiegler, 2016) by preserving the negentropic potential of knowledge. In this case, most parts of the knowledge are going to be calculated, probable, generalized, and universalized within a frame of formal language in the digital regime. In other words, report 1 will be largely reduced to entropic forms of knowledge to a large extent by comparing demographic profiles and academic performances of schools in Trollhättan municipality in the numbers and charts. Importantly though, the report also includes otium or negentropic knowledge that is, incalculable and unpredictable parts of knowledge that cannot be measured by numbers or possibly presented in any numerical graph or chart (Stiegler, 2016).

In addition, such a reliance on digital technology demonstrates a growing proletarianization of research work in academic knowledge production. In my situation, I had a limited capacity to generate tables and graphs on paper without relying on specific software. Furthermore, I could not remember all the essential parts of information from those tables and graphs, therefore I had to store them in the digital regime to retrieve them later. This kind of dependency may not be unique in modern academic practice, although it is worth reconsidering from the perspective of knowledge production with the possible political implications that it brings forth in WIPS.

A different point to highlight is the possibility of experiencing the psychic, collective, and technical individuation in this Zoom meeting. As I mentioned in the field note above, the digital regime allowed us to have an online meeting where we could talk and discuss research questions in more than just a purely instrumental sense. Thanks to the advanced digital regime, I as a psychic individual could be able to individuate what the supervisors advised me, at the same time, the supervisors could also know what actually I have been doing in the internship. Meanwhile, technical individuation is also occurring in a different way as the digital regime functioned in such a way to support the communication between me and supervisors, and between me and my peers. In Stieger's terms, digital technology enabled psychic (me) and collective (supervisors/peers) individuation through the long circuit of individuation (transindividuation). The digital regime memorizes and transfers to all participants in the communication each time I write the drafts on the digital screen. In this sense, under difficult circumstances, the digital regime supported me to learn by individuating from other (collective actors) to produce knowledge.

Regarding the production of entropic knowledge, which is conditioned by the availability of statistics and data in the digital regime, the process of knowledge production is dependent on external sources of data, hypomnesic tertiary retentions. Then, I would say, I was in a proletarianized condition, because, without data and information from outside sources, I was unable to write, conceptualize or theorize the knowledge. In that manner, I had a sense of paralyzed conditions, that produced a feeling of meaninglessness with the research tasks (Stiegler, 2011).

At a regular weekly meeting via Zoom, I reported several aspects of the research tasks I was involved in, while the supervisor 1 & 2 emphasized I focus on school statistics because no one has conducted such a statistical analysis, while a lack of access to the data and statistics, made me feel disoriented and a sense of meaninglessness (FN, 27-10-2020).

Given my initial incapacity to collect and process the vast amount of school data, I had no other choice than just waiting and feeling disoriented and a sense of meaninglessness with the task. The existing hypomnesic digital tertiary retentions (data, statistics, reports) can only provide very limited details for further interpretations. Further, how can I produce new knowledge by going through the same procedure in the digital regime to produce a different finding? Here, I meant that the numbers, values, and indicators are the same as provided by the official sources of data and statistics (SCB, Skolverket, and so on), in other words, it has already been generalized, standardized, universalized, and grammaticalized for the purpose of producing and distributing it across the digital regime. (Stiegler, 2012b & 2015)

Additionally, I had a similar feeling toward the task of producing report 1.

I am questioning whether conducting a stats-based study would be fruitful for understanding the phenomena of school segregation in the municipality or whether it is going to be a useless copy of report 1, is it worthing to write a such report? How can it contribute to advancing knowledge when the data and statistics are digitally accessible to the public and exist already? What am I going to supposed to produce new knowledge then? (FN, 28-10-2020)

Furthermore, in the same email about my research internship tasks, the project stated that the second report would have a different research task compared to report 1:

Report 2, *School policies and action in relation to segregation* will describe and explain the public policies and actions taken by the politicians and education department at the municipality in the last 5 years while interviewing the pupil's views and perspectives on actions taken by the municipality and doing a case study to illustrate with a recent case of a closing decision of Kronan school and move pupils to other parts of city schools, as to enhance integration. (FN, 08/09/2020)

More specifically, I was asked to describe and explain a specific phenomenon, in other words, exploring the reasons and motivations behind the closing of the Kronan school. Further, the report will also explore the public policies and actions related to segregation exercised by the politicians and the education board of the municipality. By examining the municipality's school policies and actions concerning the growing problem of housing and school segregation with a concrete case of the decision to close the Kronan school, report 2 would analyze the different perspectives between the pupils and municipal officials. Here again, the task of understanding, collecting research materials, and comparing the perspective needs to employ the logos of thinking by one-self, simultaneously relying on the digital regime qua exosmotic organs. Clearly, digital schematization did not fit this task, and it would be doomed to fail if I tried to run the computational programs to explore the reasons and causes behind the closing decision of Kronan school.

Ok, while I am watching the recorded YouTube video of the 'citizen dialogue' regarding the schools, organized via digital platforms by the TM, I can hear the different reasons and motivations each political party is trying to give behind the closing decision of Kronan school, but most of the arguments made by them are based on the data and statistics of the Kronan school, that I can also see in the report 1. Wait a minute, although, their ideological viewpoints are different in other policies, why do they prefer to stay behind the closing decision of the Kronan? (FN, 01-04-2021)

The closing decision of Kronan school was of a political nature, which needs to be carefully studied without only quantifying the academic performance and demographic features of the school. If we just look at the statistics of Kronan school, it shows that, is the school with the poorest academic performance among other schools in the city, having the lowest percentage of qualified teachers and almost all pupils have a foreign background. Then, one can argue after looking at the ranks, scores, and profiles of the school produced by the data and make a strong argument for justifying the closing reasons of the school in advance.

However, it would be a mistake to reason by relying on the outcomes of the statistical comparison alone. It is essential to explore data that goes beyond the spheres of calculations, data, and statistics to examine in a normative manner questions like what

political constellation (conservative, center, or left) the municipality is governed by, and how the political parties and citizens see the problem and solution to the school segregation? What it means to go ‘beyond’ statistical reasoning would be first and foremost, that closing the Kronan school is a political decision that is related to the socio-political dynamics of the city. In this manner, I as a researcher, understand the municipal decision needed to be explored through reading, understanding, and analyzing the actual event with different perspectives from different stakeholders. So, the process of extracting the relevant materials, analyzing them afterward, and then writing report 2 also involved the digital regime. As I mentioned, I did not run any computational program to process the data for report 2, rather I intensively searched relevant news, information, interviews, citizen dialogue, municipal reports, etc. to extract the materials in the digital regime for writing report 2.

At a regular Tuesday Zoom meeting, I spoke first by giving a brief about report 2. I mentioned a few examples from the report. Supervisor 2 gave some important feedback, that shows his expertise in the research field. I get some kinds of affirmations from him. Meanwhile, supervisor 3 mentions, that report 2 sounds interesting because it covers other cases from different parts of Sweden. (FN, 06-04-2021)

In contrast, to report 1, report 2 engaged with a negentropic conception of knowledge informed by the qualitatively framed, political aspects of schools (e.g., school segregation, political decisions, reasons, and motivations, etc.). This included investigating what kinds of policies and actions the municipal council has taken, and what motivates the council to address the phenomena of school segregation, for instance, the decision to close the Kronan school. That demands a different way of making knowledge than what I have done for report 1.

In today’s Zoom meeting, supervisors 1 & 2 were actively discussing the issues of school segregation and Trollhättan municipality’s justifications behind the closing decision of Kronan school, the discussion made me attentive and gave an extra energy to engage more in the research topic, I feel, the supervisors have been engaging in that way, at least I can hope. (FN, 23-03-2021)

In a Zoom meeting with supervisor 1, I had several discussions regarding the data, statistics and constructing the graphs, and so on. I get individual time to talk with

supervisor 1, which felt more relaxed, less stressed, and less formal. After the meeting, I went through the graphs and charts again, I could there, how the schematization, categorization, and synthetization of raw data that I had extracted from the various official sources looked. In the Zoom meeting,

We discussed the data, which are essential and can be significant statistical parts of the report. Supervisor 1 presented a few constructed graphs and charts of the raw data (accessible to the public) I had collected from the websites of SCB, Skolverket, and Trollhättan municipality. He explained why and how a few data aspects are crucial to describe and explore further in the report, which I agree with him. Thus, I clarified some aspects of data that supervisor 1 needs to be cleared, and supervisor 1 asked me to search for additional data on some parts of segregated schools. (FN, 30-10-2020)

What produced that Zoom meeting was the possibility of having the process of psychic and collective individuation supported by technical individuation. Namely, I as a (psychic) person, and other individuals (collective) had a chance to discuss critique, and comment on the data, and information collected in the digital regime that is going to be included in report 1. Moreover, I (a psychic individual) need to reexamine and re-assess with other (transindividuate) psychic individuals (collective; supervisors), for instance, how the relevance and incompleteness of data and information might lead to misinterpreting the phenomenon of school segregation in the city. More importantly, the subjects (psychic, collective individuals) are able to engage in a process of individuation in such a circumstance, which had to be supported by technical individuation (i.e., artificial memory, computational programs with a capacity of processing and categorize the data and information), or digital regime.

I faced other challenges during the collection of data and statistics for report 1. One of the challenges was extracting the relevant data from the right sources. Choosing the relevant data and information was also a difficult task for me:

There are several official sources of data and statistics, for instance, SCB, Skolverket, and TM, meanwhile, some parts of the statistics are not included in any kinds of data sources, e.g., if the students with a foreign background are less than ten in any school class, then the data does not mention whether the numbers of such students or percentages in relation to majority students in any class. (FN, 05-10-2020)

I went through the official sources to collect essential data and statistics for the schools and captured them in Excel files. I sent the files to the supervisors, and supervisor 1 created different graphs and charts from the extracted data. We shared all these data and statistics via a group Dropbox account that is accessible to every member of the research team. After I saw the constructed graphs and charts, I got a sense of euphoria.

The graphs and charts are showing the complex pictures of schools in a simple way, what a nice tool if we don't make it, it will be quite hard for me to grasp and explain the raw data in textual forms. What an accomplishment, now I can at least see what the important categories and elements are in the data, as well as I can analyze the academic results of a specific group of students by relating it to other different factors (socio-economic, housing condition, etc.). (FN, 29-10-2020)

Meanwhile, the graphs and charts have been showing the picture of schools in a compressed and recursive manner, illustrating the correlation between different variables, specifically that the poor academic performances of segregated schools tend to have a majority of pupils with foreign backgrounds and parents without a post-secondary education. I did not need to employ my logos or reasoning to produce such a correlation, or synthesis, rather, it was produced by the computational program in the digital regime. The next step I had to take was to explain and interpret all variables that had a visible correlation with each other in the report. The task was namely to discretize the synthesis through reasoning in the form of grammatization by employing the English language. So, the process of grammatization has occurred in the digital regime that had supported by the digitally processed categories, and rankings among the samples or population.

Afterward, supervisor 1 provided feedback and comments on the first draft of report 1 via email (MS Outlook 24-11-2020). The supervisor mentions in the email,

“See attached with my - comments - I have given the structure and graphs - please can you write up in this way (just add the text if required.)”. After reading this email by Supervisor 1, I feel a kind of relief, while the task of rewriting looks proper. I understand what supervisor 1 means, meanwhile, I do not understand what supervisor 1 meant in some comments. I need to read the comments several times, as well as revise the draft. (FN, 25-11-2020)

After receiving the comments and feedback from supervisor 1 within a few hours, I felt that I have a long way to go. My field note shows that the textual and verbal critique, comments, and feedbacks verbal from peers and supervisors have a crucial role in internalizing and externalizing the knowledge I was producing during the process. When I internalize the information, data, and knowledge through reading and interpreting the research materials, though, the draft looks too messy and hard to follow for the supervisors. Moreover, the numbers and values included in the graphs were generalized, universalized, and grammaticalized so that even a person not involved in this knowledge production process can read and grasp the graphs, text, and charts, so, the knowledge is digitalized, at the same time, entropized.

In the meantime, it is crucial to mention the time taken in the process of my internalizing and externalizing knowledge in relation to the speed at which digital technology functions today. My point is not that supervisor 1 made me feel stressed, or that he pressured me to produce report 1 too fast. Here rather I would say that the speed offered by the digital regime is not possible to match the time required to learn through internalizing and externalizing the amount of knowledge and information mentioned in the graphs. Further, the task of rewriting the draft should be done before one knows what the missing points are or what needs to be removed. For these reasons, I had to go back to the original draft several times to understand what was lacking or needed to be removed according to the comments by supervisor 1. After that, again, I had to think again, for instance, why and how these comments made by supervisor 1 make sense or not. The whole process was an iterative, time-consuming, and lengthy process because I was not supposed to do the tasks just for the sake of doing them. Indeed, the objective of learning research knowledge production has been my main focus and aim in the internship. For these reasons, it took rather a long time. In contrast, the digital regime functions and delivers in a millisecond, and this unbalanced situation with the digital regime caused me sometimes to be stressed and less productive than I am supposed to be.

Hmm! wait a minute! I see so many mistakes in report 1, wrong choice of words, meanings without logical sense, grammar mistakes, and even the structure of the report does not look satisfactory, although, the text is processed through the grammar-checking software [e.g., editor of MS Word and Grammarly]. (FN, 29-11-2020)

On the one hand, my lack of skills in the English language led me to rely on the auto-grammar checkers in the digital regime, although they were not able to detect most of the grammatical mistakes I made in the drafts. Consequently, the last option to achieve grammatical perfection depended on me. Here, the human anamnesis (supervisor's knowledge of grammar) plays a crucial role in correcting grammatical mistakes in the draft. To achieve such grammatical perfections, the digital automata still have a long way to go to surpass human knowledge in grammatical rules in the writing.

Meeting over Zoom also did not always go as smoothly as I sometimes experienced technical malfunctions and was not able to present my thoughts, ideas, and questions. For example,

Again, it is time for another supervision meeting, when my turn came to speak, because of the technical problem, I freeze out, though I tried to answer a few questions raised by Supervisor 1. The meeting decided to dig deeper into the issues related to Report 1 in the next meeting. After the meeting, a feeling of the void was impossible to evade, because I had some important points to mention and ask about the crucial issues regarding report 1. Although I can have contact with the supervisors via email, I would like to discuss it with them via video chat, I think, I need to express it verbally. (FN, 23-10-2020)

While the digital regime did present an immense opportunity to connect, archive, communicate, and individuate with others in the research internship, as times I experienced the limitations of the regime for participants to present their ideas, thoughts, and explanations related to the tasks. For instance:

What a limited space! I felt after having a presentation in a reflection seminar via Zoom-Rooms, i.e., I had a feeling of expressing unfinished meanings, lack of active engagement, and a constrained space to express the fears of being misunderstood by others. (FN, 15-02-2021)

I experienced the digital regime as a constrained and limited space to express and observe, and it is impossible to rule out the possibility of being misinterpreted under such conditions. Consequently, making observations in the internship through digital means meant I had to rely on a space in which I already felt constrained and limited. So, communicating about the knowledge production process by another means would have

been preferable, but this was not possible. Indeed, without the digital regime, neither communication nor knowledge production would have been possible under Covid conditions.

For report 2, I went through some national-level research (quantitative in nature) reports by summarizing them, for the purpose of gaining a national-level picture of the relationship between academic performances, school segregation, and other crucial aspects of the demographic features of schools in Sweden. It helped me to gain an understanding of whether and to what degree the national-level trend of school segregation was reflected in the Kronan case. I learned what kinds of data and statistics have made it possible to put in the numbers, charts, and graphs in the study I was doing. Additionally, I submitted the summary of the national-level report to the supervisors and discussed it via email and Zoom meetings on several occasions. One of the discussions provided a fruitful suggestion by the supervisor that assisted in transindividuating important aspects of the research report.

I described the challenges and problems I am having regarding summarizing some national-level research reports (they applied mixed methods) on equivalence and school results. Supervisor 2 suggested that reading research reports needs to do in a critical manner and that the researchers selected a few areas for interpreting the data. I find it a very fruitful suggestion, specifically when I read national-level research reports on the schools that cannot include each class across the country. It needs to include or exclude some parts of elements to demonstrate the results. (FN, 23-02-2021)

Additionally, the Stieglerian notion of technical individuation is undoubtedly playing a primary role in the process of individuation. Without the process of technical individuation, the process of transindividuation would be unimaginable for me. Me (psychic) and we (collective) can only be able to reach a common understanding (transindividuation) by forming, reforming, and deforming the understandings of participating individuals. In turn, this will shift the phase of collective understanding in terms of transforming and creating new knowledge. Here, the phase shift could happen with a new piece of knowledge or information that is individuated by psychic and collective individuals in a digital regime. To achieve the process of transindividuation, the (I) psychic individual needs to be attentive during the process of transindividuation.

It feels like I had 15 minutes of a TV presenter a-like rant in Zoom-meeting today, I tried to argue if it is better to interview the policymakers and bureaucrats from Trollhättan Municipality and would like to explore the Kronan case even deeper from the economic, cultural, and political-ideological viewpoints. I heard only silence and ever more silence after the rant. (FN, 20-04-2021)

The field note below sheds light on the process of knowledge production with an incremental improvement in formulating the academic text, grammatization, a process of discretization, provided me to think “autonomously” and employ logos, which have been translated into the form of research reports. Moreover, the time and intellectual efforts needed to materialize report 2 were immense. Nonetheless, one needs to have the patience to learn the process of academic knowledge production. Through a long process of psychic and collective individuation supported by technical individuation I, along with other members of the research project, was able to produce report 2.

In addition, it is impossible to exclude the subjective experience of producing knowledge even in the digital regime. Below, I expressed my joy and positive feelings in this manner,

Feedback and comments on the latest draft [Report 2] by supervisor 1 shows that the text is much cleaner and more precise than the first draft of report 1. I see the meaning of practicing writing and structuring a research report. (FN, 22-04-2021)

Nevertheless, one of the comments by supervisor 1 on the draft of report 2 was that I need to relate the segregation and Kronan case with the findings of report 1. The supervisor also suggested that to make reports coherent and related, I need to provide a summary of report 1.

I am asking myself, what are the findings I had in report 1, I cannot remember properly without revisiting the report, then, why is it difficult to remember for me? It has been a while, and although, I wrote them, by myself, I cannot remember the important parts of report 1. Ok, it is impossible to remember all the numerical findings, but I still, do not remember the main findings. It causes me fear and anxiety. I can revisit the report, but if I again forget them after a few months. (FN, 25-04-2021)

The danger of forgetting the knowledge (individual psychic memory, anamnesis) that is generalized and automatized in the digital regime is apparent in this case. Report 1 seemed not to be memorized in my cerebral organ. If I would relate it to Stiegler's thesis on digital pharmakon, this reflects that the knowledge I produced in report 1 is not based on personalized experiences, but rather contains several kinds of digitally grammatized texts, signs, and numbers, digital tertiary retentions that are not required to be memorized by me because they are instead stored in the digital regime. In this way, although I took several months to write report 1 with help of supervisors, and had discussed it among peers, and tried to memorize the essential parts of knowledge, nonetheless significant memories of report 1 vanished.

At one level the consequence of forgetting important parts of the knowledge was not serious as I could go back at any time to retrieve report 1 and read it. If it was not the case, then I would not have been able to retrieve the forgotten knowledge to prepare the second report. At another level, my forgetting raised another concern about what knowledge of the project will be left in my brain in the future. Will I actually learn from this process? At a deeper level, this forgetfulness could endanger my capacity to think for myself (Stiegler, 2011).

Yeah, both reports are almost got prepared, then what next? How would the knowledge I produced contribute something positive to solving school segregation in the municipality? Or I might need to be satisfied in terms of whether I could accomplish the research tasks by learning knowledge production skills, rather, I should not expect further outcomes than the existing reports themselves.

(FN, 29-05-2021)

Finally, as the above fieldnote suggests, I grappled with questions regarding the purpose and meaning of knowledge that I have produced throughout the internship. What are the 'ends' of such knowledge other than producing reports or getting a degree? Certainly, I had a great opportunity to learn the process of academic knowledge production by involving myself with the experts. Further, the reports will be subsequently accessible (I hope) in the digital regime so that, consequently the fate of this knowledge will depend on the existence of the digital regime in the future. Meanwhile, the reports will be

presented to the Trollhättan municipality which will decide whether, and how, to act on them.

In summary then, in this section, I have presented my reflections on pertinent field notes taken during the internship I had at the UW's political science unit, with the help of Stiegler's theory of the digital pharmakon. In short, the analysis shows the process of knowledge production in the digital regime is a complex process of making knowledge in a context where we were never in each other's physical presence due to Covid-19. Clearly, this digital regime had a significant level of impact on learning and producing knowledge, as it mediated all my research-related actions including writing, communicating, collecting, reading, analyzing, and memorizing. In the next section, I develop a three-fold analysis of these findings that identify the emergent themes from these findings in terms of digital technology's role as memory, computational tool, and means of communication.

8. Analysis

In this section I identify three emergent themes from the above findings as to the main roles of digital technology in my knowledge production process: the digital regime serves as a form of memory, as a computational tool, and as means of communication. In what follows I unpack each of these in terms of the positive and negative aspects of digital technology for these roles.

8.1 Memory without memorization

The first contribution of the digital regime in my WIL internship process was in terms of supplementing or complementing my finite human memory. This is what Stiegler calls the third kind of memory or digital tertiary retention. In other words, the existence of digital objects or external memory meant that I and the supervisors practically did not have to remember all the information, data, statistics, and knowledge that was essential for knowledge production in the research project. The infinite capacity of digital tertiary retentions did not only replace the task of memorization, additionally, but its enormous speed and easy accessibility also allowed me to find the research materials within a millisecond online or in digital apparatuses that can be preserved in my terms, for example, I can save in my personal computer, and I do just only need to remember the title of the files or documents, without a precise content of those materials. So, I could go back and forth to those materials whenever I wanted. This shows the accessibility and availability of memory at lightning speed is one of the main features of the digital regime. In addition, the memory function of the digital regime opened up a new horizon to transform knowledge by allowing me to edit, remove, and add new knowledge in the digital domain.

This kind of memory was crucial for my learning, as the memories from primary and secondary retention would have been insufficient for my research tasks, especially given the spatiotemporal limitations I experienced amid the Covid-19 health crisis. Where primary retention refers to the information I could attain during the conversation with team members, and secondary retention refers to what I memorized from such

conversations. The third kind of memory, digital tertiary retention, supported me and my supervisors to share, comment, and reflect on the knowledge production that took place without necessarily meeting all team members physically or practically at the same place and time. Those artificially memorized digital objects had a profound and positive effect on knowledge production in my WIPS experience. There was a downside, however. This was because I had less need to remember the information, data, and knowledge I was supposed to, as it was mostly taken care of by the digital regime. In short, I had the luxury to forget, and I came to depend on the digital environment for memorization to a great extent.

Since I have had less need to memorize the knowledge, a depleting effect of digital technology in my noetic activity is nevertheless a thing caused by the high speed of the digital regime. The consequences have been that the reflection time would be short-circuited and overtaken by the high speed of digital technology that imitates my cognitive process with an enormous ability to memorize and process information. So, to speak, I no longer have to rely entirely on my ability to think, calculate, and reason because, in the case of producing Report 1, the digital regime made it possible to achieve a far better result with greater precision in producing knowledge. In this manner, my ability to think, memorize and rationalize is sometimes inadequate, incomplete, and slow, with a higher risk of failure than what the digital regime can offer me.

8.2 Technics within tools

The second role of the digital regime was as a set of computational tools, or more accurately, as 'technics within tools-'. Technics are, for instance, writing, thinking, and the very materiality of the digital regime that include mobile telephones, computers, software, and digital network (e.g., 4G internet) that transmit voices, speech, data, video, and other digital forms of objects. Computational tools are merely digital machines that can perform various tasks or schematization; thus, these tools are able to project in the process of grammatization. I frame the use of tools as a kind of co-projecting because the tools did not determine what words I was supposed to write in each sentence. Here, if I could not follow the grammatical rules then the tools (MS Word, Grammarly, Google

Drive, etc.) would indicate the possible fault thus suggesting I change or remove the word or part of the sentence.

To characterize the digital regime as including tools that can perform various tasks like calculation, processing information, and even writing would be impossible if the tools had not inscribed a different kind of technics that can imitate human gestures, speech, and even the way of reasoning (ranking, categorizing, etc.) to some extent. The latter task is precisely associated with the uncalculated or improbable (otium/negentropic) form of knowledge that would derive from the thinking (noesis) from the subjective experiences, so the concept of tools may not fully describe the way I should think and analyze information, data, statistics, and experience in the digital regime, to arrive at the knowledge that will be nevertheless a mixture of otium/negotium knowledge.

I had enormous opportunities to develop my intellectual capacity in the field of academic knowledge production, which would otherwise have been hard to achieve considering the spatial-temporal circumstances of the COVID-19 pandemic. Nevertheless, there were some downsides in the form of proletarianizing me ‘partially’ in the service of the digital regime. My ‘partial’ level of proletarianization means that the regime had arguably done a better job than I in collecting, processing, ranking, and categorizing the data and statistics for Report 1. If I had to perform these tasks with digital technology, then it would have been an endless process. In the end, the digital regime enabled co-relational and co-constitutive relationships in the production of knowledge.

My proletarianization was less pronounced for Report 2 than for Report 1. This was mainly because I had no other choice but to engage in noetic activity to read, understand, and reason in producing Report 2. I had to take a leading role in collecting information about the experiences and views of pupils and decision-makers and interpreting municipal policies and decisions by political parties. While these were digitally grammaticalized, they were not analyzed, schematized, or synthesized, because the digital regime still lacks the ability to process such kind of incalculable, improbable, and negentropic knowledge. Therefore, the digital regime has functioned in that restricted manner, since the demands of using my own noesis or thought process is nevertheless a central premise of Report 2.

The inadequacy of the digital regime to fulfill the goals of Report 2 had thus also been a key reason behind a "partial" proletarianization I experienced in relation to the digital regime.

8.3 External and internal communication

The third role of the digital regime was in communication, both synchronous and asynchronous, and this played an immense role in executing the research tasks. The process of individuation for me as a psychic individual relied on communicating images and words. Indeed, the digital regime opened the possibility of transindividuating between psychic (I) and collective individuals (we) to achieve collective knowledge too. These processes required both internalizing and externalizing my thoughts through different communication channels, for instance, writing an email, or expressing in a Zoom meeting, and through the Dropbox files sharing site.

Importantly, while communication, and thus knowledge production, would have been impossible under Covid conditions without digital technology, there is more to knowledge production than contained in the tasks of remembering, calculating, and communicating described above. If learning and knowledge production were only supposed to be about extracting and transmitting the data, statistics, and information through applying digital communication, then the knowledge it would come to produce will be totally mechanized and automatized. Further, it would create an even greater dependence on digital communication which in the meantime may bypass or short-circuit the process of individuation or individual learning. In this regard, it is important to note that I sometimes felt disempowered when it came to the limitations of conversations in Zoom meetings, or not being able to express myself fully in the mail conversations. Sometimes these limitations had negative effects on not being able to individuate, thus transindividuate the knowledge that I and we were supposed to have from conversations.

The digital regime proved to be a vehicle for organizing the process of individuation, not least the phase shift between individual and collective knowledge formation through transindividuation. In such a setup, the dangers of short-circuiting or bypassing the process of individuation between 'I' and 'We' have always been present. For instance, I

as a psychic individual could gain knowledge without even going through the process of collective individuation. However, the process of reconciling individual and collective knowledge-making is crucial to the phase shift required for my deeper learning in the process of knowledge production. Phase shift in this sense is a condition that is possible to achieve by each step the member of a psychic individual takes in a collective process to achieve a common understanding.

9. Conclusion

This thesis explores the impacts and possibilities of the digital regime for learning academic knowledge production. The examination of the digital regime is based on an analysis of my learning experiences in knowledge production tasks in two vital domains, one at the research internship and another at the university classroom. The most important aspect of these two domains is that both were mediated by a single digital, merging the internship and university study in the same artificial space. The main reason for this was the Covid-19 pandemic, and thus the digital regime supported, mediated, and supplemented the conventional setup of classroom and internship sites in a single artificial regime.

The impacts and possibilities of the digital regime on learning and practicing producing knowledge have yet to be properly addressed and thus form the focus of this thesis. Hence, the thesis aims to explore the ubiquitous nature of digital technology in learning and practice even though the researchers tend to take it for granted in their knowledge production work. Furthermore, I investigate the effects and possibilities of the digital regime, and to what extent the regime may have political consequences for the knowledge I produced. Digital technology with its pharmacological attributions, the prospect of such implications cannot be denied in this context.

To fulfill the aim, I have posed the following research questions in this thesis,

1. What was my experience of using the digital regime (pharmakon) to learn through producing knowledge in the WIPS degree?
 - 1a. What was the experience of using the digital regime to produce knowledge in the internship versus in the degree?
 - 1b. What were the positive and negative aspects of this experience for my learning?
 - 1c. What are the broader implications of my experience for using the digital regime in the future?

To answer the research questions, I present three main overarching findings, namely the impacts and possibilities of the digital regime in the academic knowledge production symbolize, 1) memory, 2) computation, and 3) communication.

a. Memory

The digital regime functioned in terms of the third kind of memory (exosomatic organ), that is digital tertiary retention, as a such artificial form of memory that is detached from the living organs. Furthermore, artificial memory can be stored, accessed, and transferred at high speed. Moreover, the knowledge stored in a digital regime is attainable, recoverable, and reinterpretable without it needing to be re-lived. The possibility to store, organize, and access artificial memories in a grammatized, calculated, and discretized form by digital regime become a prerequisite for engaging in learning activities during the difficult circumstance of COVID-19. Additionally, considering the finite memory I have, the digital regime surpasses the human ability to memorize at an unimaginable speed that is accurate and better compared to the weakness and limitations of human memory. By the same token, digital tertiary retention allowed me to create a new memory based on the knowledge and information I accessed from the artificial memories (accessed via the digital regime). That is allowing me to retain and reorganize the individual memory to discretize (project/exosomatize) it, i.e., to produce the research reports.

Moreover, other possibilities in terms of supplementing living memories were brought forth by the digital regime. For instance, it made possible the materialization of knowledge within exosomatic forms that is possible to store and transfer across time and space with peers and supervisors. In such a way, the new knowledge has made it possible to produce a process of psychic and collective individuation supported by technical individuation. Technical individuation is a crucial vector to attain transindividuation through such a process of the digital form of grammatization, psychic, and collective individuation between me and the other participants in the research project. The artificial digital artifacts in the grammatized form open the possibility to achieve the phase shift, i.e., all the participants could be able to read, understand, and comment on the shared drafts.

Performance of the digital regime with higher speed in storage, and transmission of information, data, and knowledge surpass the conventional human ways of functioning in noetic activities in a limited space and time. Regarding this, what I experienced on some occasions was that the digital regime not only created a positive and constructive condition to continue the learning activities, thus such a condition has also contributed to accelerating the forgetting of knowledge. Nevertheless, it is well-known doubt that one of the negative effects of digital technology expressed in general, here, specifically, the third type of memory gives me the luxury of forgetting what would otherwise have been necessary to further understand, analyze, synthesize, and produce knowledge of writing research reports. In short, memorizing the essential components of knowledge to build further and transform would be impossible without one being acquainted with them, paradoxically, such a task has been taken over by the digital regime to a greater extent.

The knowledge that I could produce without involving myself in the process of transindividuation can easily be forgotten. The main reason for this is that memorizing such knowledge would be more difficult and complicated. For instance, the knowledge I produced in the first research report has elements calculated and processed with the digital machine, so memorizing such knowledge in detail by myself without socializing and transindividuating it thoroughly made it me difficult to preserve it in memory. Thus, the knowledge contents in the first report show that I had to rely on the exosomatic organs to process, preserve and transform the data and information into a new form of knowledge. In this state, the digital regime had a superior functionality, performativity, and reliability in memorizing the knowledge than I, so the involvement of human memory has less significant to produce such knowledge, leading to humans tending to depend on digital technology, even more, the degree of a partial level of proletarianization.

Human noetic activities, i.e., memory, are an essential prerequisite for understanding, thinking, analyzing, synthesizing, and projecting information and data to form new knowledge. In this case, I delegated most of the memories enabled by the digital regime, or in other words, I did not see any necessity to memorize each and every piece of information and data during the learning activities as it was memorized by the digital

machine. The negative consequence of such actions resulted in my inability to recall the actual knowledge I had produced a few months ago. One negative impact I experienced in this situation was that I found it challenging to think and resonate with all aspects of knowledge I was being involved with. For instance, the loss of crucial parts of knowledge in my noetic memory caused a roadblock to thinking further and rationalizing based on the previous knowledge. So, I had to go back to the artificial memory I had preserved in the digital regime so that I could recall them to continue the knowledge production. To be able to think for myself, I had to rely on artificial memory, which is nevertheless an inorganic form of memory, paradoxically became pivotal for living memory.

b. Computation

The digital regime consists of various computational programs with devices that enabled me to perform calculations, and process raw data into categories, rankings, graphs, and alphabetical symbols that provide simplified, grammaticalized, generalized, and universalized expressions of a complex picture of the social reality. In this way, the digital regime had an enormous capacity to process the data and information at high speed so that I did not have to remember and calculate every number and value of different factors to produce the graphs, tables, etc. Instead, the regime had managed it with a tiny amount of time, otherwise, it could be a time-consuming and complex task for me. In the meantime, I relied on the digital regime to check the grammatical mistakes in the text, as well as the incalculable parts of knowledge that need to be discretized, generalized, and universalized. For instance, in writing the second research report, the digital regime implies different meanings than writing the first report. Namely, the content and nature of the second report demanded synthesizing of different non-numerical values and events so that the regime had supplemented to enhance and improve the semantic aspects of the report.

Nevertheless, the computational power of processing data and information at high speed had some cost to us humans, which means, I no longer need to calculate or process large quantities of numerical data. That creates a condition of being partially proletarianized or disempowered by the digital regime while producing quantitative parts of the knowledge.

Concretely, I had very limited insights into every element of data and statistics accessed through the digital regime, so I had no other choice than to trust the results and interpretations that the computational program produced. On the one hand, I lack deep knowledge of the specific computational program processes and what limitations they might have. So, I cannot simply reject the product (graphs, tables, words/suggestions of meaning, etc.) that the digital regime processes and presents in front of my screen other than accepting it as I myself had made it. In this fashion, I should have to rely on the digital regime to perform certain tasks without knowing how the regime actually works, so the learning in such a condition would be limited and rather resembles automated reasoning, which would not empower the very possibility of comprehending and analyzing all parts of knowledge that supposed to be coming from the human thinking and rationalizing.

Additionally, the process of knowledge production that the digital regime offered me was so rapid way that I had to take a break in the process of learning to memorize before I could be able to carry on with knowledge production. For instance, when I collected data and statistics from different official sources to construct the graphs and tables, the process of describing and interpreting the data would have been impossible for me without pushing a pause button first to understand and reflect on what is shown in the graphs and tables before describing them. The amount of time to collect quantitative materials and construct the graphs took so little time in comparison to understanding and interpreting the data. That shows the digital regime can override the human's ability to understand and analyze information and knowledge through thinking. Thus while the power of computation is hard to escape, the function of computation can exceed human cognition capabilities. For this reason, I had to take a break so as not to allow the computational process to overdetermine the learning of the improbable and incalculable aspects of knowledge. In other words, I had to work to establish a relationship with the digital regime that makes it possible to preserve the subjective experience at the same time as relying on its tremendous computational speed.

c. Communication

The digital regime has the sole responsibility to take care of the communication sphere during the covid-19 state in the internship. Whether it is synchronous (Zoom, mobile phone) or asynchronous (email, Dropbox) communication, it enabled knowledge formation collectively, as well as learning together with individual knowledge formation and production beyond a specific time and space. Although some limits to communicating have been inevitable in the digital regime, for example, in some tutoring sessions I have felt that I have been limited in expressing and articulating myself. Given its limited space [screen] with a monotonous background, each participant who appeared on the screen had almost nothing for me to observe. The lack of background details in the conversation has been a key issue that I found challenging in memorizing and learning the crucial aspects of synchronous communication.

Thus, in synchronous communication, the role of verbal language and the choice of words play a significant role in expressing thoughts and articulating problems and solutions, and so on. Moreover, body gestures can be used in a very limited amount, so verbalization is the main source of communication and articulation between the participants in Zoom meetings. If such limitations of asynchronous communication can have an impact on learning and knowledge production, then to some extent I would say, yes, if verbalizing in a foreign language [English] and articulating in a limited Zoom space is something you are not good at. So, I experienced difficulty in presenting the ideas and explaining the research issues on many occasions, the main factor behind such difficulty has been my own skill in the English language. Therefore, the information needs to be mediated through verbalizing in English, in that sense, it demands the participant has good language skills not least in writing and speaking.

In terms of asynchronous communication, the digital regime also demands a student needs to formulate the text in such a way that the supervisors can understand what you have written. For that reason, decent writing skills should be fundamental for communicating via email, Dropbox, or Google Drive. In short, the digital regime does not always complement human intellectual errors or shortcomings, and can also prevent students from learning, therefore, the students are required to become familiar with

language skills before communication can take place in the digital regime. Otherwise, the ability to improve learning experiences within a digital regime would be compromised.

In summary, the digital regime becomes pivotal to making it possible to learn knowledge production in difficult COVID-19 circumstances. Although learning skills and theories would have been conducted in two separate domains in the WIPS program, this was merged into a single digital regime. While this made achieving the goals and aims of the WIPS program possible, the digital regime functions not merely in terms of tools, or instruments, but also becomes a vector of supplementing and reinvigorating the human memory, thinking, and projecting thus, a space for communication that supports the process of individuation and experiencing the phenomenon at distance. The regime does not only mean creating audio-visual-textual communication with others to perform predetermined tasks. Moreover, it opened up the possibility of observing others through digital screens and presents immense opportunities to express, articulate, and reflect collectively. In this way, individuals can form a collective consensus based on calculable-incalculable, probable-improbable, grammatized, subjective experiences, etc. In short, the regime helps to preserve noodiversity with the negentropic potentials in the knowledge that would contribute to the broader development of society, especially to solve specific societal problems, such as school and housing segregation, and sociocultural challenges of a democratic society, as the WIPS aims.

The negative aspect of digital pharmakon can be traced in the process of memorizing, individuating, and processing to produce knowledge, which has been manifested on different occasions, so the political implications of knowledge that are produced in the digital regime, are worthing for mention here. For instance, academic knowledge is digitally grammatized, generalized, discretized, universalized, de-temporalized, and de-contextualized, so the knowledge has possibly to be traceable and retrievable in the future.

And in terms of further studies, I would like to suggest exploring the effects and possibilities of digital technologies in online learning platforms, which would include the

role of AI, algorithms, and digital media in individualizing and projecting knowledge. In doing so, Simondon and Stiegler's concepts of individuation can be employed to explore the political implications of learning and producing knowledge with the notions of subjectivity, alienation, and anthropocentricity in the digital regime.

9.1 Reflections

The machine regarding Winner and Canguilhem's definitions in this context has no longer a question of replicating itself by self-propagation or merely a mechanical function that never cedes its configuration when it is in motion. The digital regime pertains beyond these definitions, where the computational configurations, processes, and motions are neither accessible and observable with open eyes nor understandable for many individuals. Meanwhile, the self-propagation of the digital regime exceeded that level, and the users can no longer organize, and control the speed, and process of the digital machine, thus, it is rather configured, organized, and distributed by the tech-giants (GAFMA-Z). The users become consumers *per excellence* who always needs to reexamine, memorize, and reflect upon their learning and practice in the digital regime.

A few other aspects of political implications manifested in the knowledge I had produced in the digital regime could be interesting to mention referring to the GAFMA-Z, these tech giants are the main actors in creating, organizing, and owning the digital regime. Again, the digital regime I was situated in during knowledge production did not just appear by itself or emerged without being created and maintained by the big-tech companies. So, the digital regime is mainly created for the interests of profit-making, while I as a consumer, did have very limited influence and control over what qualities and features such a regime will have. It is tech companies that produce and provide within the frame of national rules and regulations. Therefore, the digital regime is determined in this way by what services and functions of digital devices I will have, to what degree I can maintain autonomy or heteronomy in a group, and so on.

In light of the new conditions of the pandemic, the immense possibilities that the digital regime brings forth in the sphere of academic knowledge production is demonstrated in

this study. By the same token, producing different forms of knowledge can be always challenging in the digital regime, i.e., the digital regime can accelerate proletarianizing individual knowledge to the machine which would lead to the acceleration of generalized, automated, and schematized forms of knowledge without a diversity, subjective experience, and nonetheless political implications of knowledge.

For instance, what would happen, if knowledge production in the digital regime is not legalized, accepted, and validated by the public, and political institutions e.g., the Education Ministry, The Swedish Board of Student Finance (CSN), Trollhättan Municipality, and the University West, and so on, then the possibility of producing knowledge in this manner would have been foreclosed for me. To have existing legal, financial, and technological foundations, these public institutions are shaped and function accordingly to the political decisions made by political institutions.

Then, how should one hesitate to ask the meaning of 'work' in knowledge production under the digital regime in the WIL and WIPs, what had they tried to define the meaning of 'work' in relation to learning theories in academia and practical skills in real-world, can be no longer about having these two domains physically, thus, these two domains can be inscribed to the digital regime. Additionally, the traditional notion of 'work' is no longer done in the real world, rather can be performed in the digital regime, that is de-territorialized, universalized, and proletarianized to some extent. In this condition, for the WIL and WIPs, the implications of learning theories and practical skills in the digital regime should be rather explored and investigated through the eyes of the digital regime. Because, if the knowledge that we produce in the digital regime is not fully understood by the producers, then how can we know whether the knowledge we have produced is actually new or advanced, and the benefits of such knowledge to society would be impossible to pertain.

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Appended studies

Study 1

Study 2



School of Business, Economics, and IT
Master Programme in Work Integrated Political Studies

Study 1

Profile versus Performance of 9th-grade Schools in Trollhättan

A Descriptive Comparative Report Based on the Profile and Performance
of 9th-grade schools in Trollhättan Municipality.

2021

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Summary

This report is a collaboration project between University West and Trollhättan Municipality. The project is funded by the Swedish Research Council for Sustainable Development (FORMAS). The report aims to provide a general comparative description of the demographic profile and academic performance of the eleven 9th-grade schools in Trollhättan municipality for the period 2015-2019. The statistics have mostly been accessed through the Swedish National Agency for Education (Skolverket) and the Trollhättan Municipality.

The report presents three forms of analysis. The first is a demographic profile of the 9th-grade schools in Trollhättan based on the available data. The second is a profile of the academic performance of students in these schools. The third is a preliminary exploration of the relationship between demographic profile and performance.

In respect of the demographic profile, the report identifies for each school the number of students, the gender composition, the number of teachers, the teacher-to-student ratio, the proportion of students with a foreign background (utländska bakgrund), and the proportion of students whose parents have post-secondary education (eftergymnasial utbildning). The key findings here are that the schools are similar in most respects except that those with a high proportion of students of foreign background also have a lower percentage of parents with post-secondary education. In addition, these schools are in the poorer residential areas of the city.

In respect of academic performance, the report identifies the proportion of 9th-grade students who achieved knowledge requirements in all subjects, the pass rate in Mathematics and English, the pass rates in Swedish as a second language, and the proportion of students who passed/failed the final exam in 9th grade. The key finding here is that student performance is quite good and consistent across the board, except for three schools, where performance is consistently lower.

Finally, when comparing the demographic profile with academic performance, it is clear that the three schools with a higher number of students with a foreign background and a lower number of parents with post-secondary education perform significantly worse than the rest, which is more consistent in their results. These three schools, Kronan, Sylteskolan, and Slättbergsskolan, are also in the poorer residential areas of the city.

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1. Introduction

The National Agency for Education, Skolverket (2020) finds in its survey for the years 1998-2016 that elementary schools have become increasingly segregated primarily based on students' socioeconomic and migration backgrounds. According to the agency, the socioeconomic background of students is defined by two types of variables, namely, the education level and the income levels of parents (SOU 2020:28). Moreover, the migration background of the student consists of three different variables, such as a student with a Swedish background, a foreign-born student, and a student born in Sweden with foreign-born parents.

A nationwide investigation of the equivalence¹ of schools (SOU 2020: 28) shows how the schools are increasingly divided in terms of student performance, which is based on migration and the socioeconomic background of the students and their parents. The investigation mentions that the increasing segregation of schools is due to housing segregation and parents' school choice.

Trollhättan is one of the educationally most segregated municipalities in Sweden with a reported eight out of ten elementary schools segregated in city² (Sveriges Radio, 2020).

¹ Equivalence in school has three dimensions; the first one is that every student has equal access to education regardless of where, when, and in what context the individual was born. The second one is that each student has equal access to the same quality education that other students get, and the third one is each student has an equal opportunity to succeed in their studies; if any individual needs additional help, then the school has a responsibility to deliver that supports. SOU (2020:28) *En mer likvärdig skola: minskad skolsegregation och förbättrad resurstilldelning.* URL <https://www.regeringen.se/498b68/contentassets/fcf0e59defe04870a39239f5bda331f4/en-mer-likvardig-skola--minskad-skolsegregation-och-forbattrad-resurstilldelning-sou-202028>

² To examine the school segregation in Trollhättan, Sveriges Radio investigates the student composition at each elementary school in Trollhättan between the years 2009/10-2019/20; the Radio looked at those schools where the proportion of students with a foreign background and the proportion of students with parents with post-secondary education differ by at least 20 percentage points of the total proportion in the municipality where the school is located. For instance, if a school is called segregated, then the proportion of students with a foreign background exceeds by at least 20 percent of the district's total population where

This is meant that the students who are like themselves, for instance, with a foreign background, go to the same school. Additionally, when it comes to students with parents who have a post-secondary education, they choose the same kind of school. In this way, segregated schools have more homogenous classes. Indeed, the review asserts that school segregation has more than doubled in Trollhättan in the years 2009-2019.

Trollhättan has four geographic planning areas, consisting of Central, Eastern, Western, and Southern, in Swedish *Centrala*, *Östra*, *Västra*, and *Södra*. These planning areas have various kinds of elementary schools, namely municipal-owned *Kommunala* and private *Friskolor*. According to the municipality, it has 23 *Kommunala* schools, including NÄL Hospital School (BUP) (Trollhättans Stad, 2020). The city also has four privately owned elementary schools; *friskolor*; Fridaskolan, Nya Skolan, Montessoriskolan Trilobiten, and Nordic International School. Nordic International is set up recently for the academic year 2019/20 (Trollhättans Stad, 2020).

This paper's structure will be as follows. The first section will deal with the context of schooling, including in a brief description of schooling in Trollhättan. This will be followed by the methodological section, and then the findings of the report. These findings are divided into three sections: the profile of the 9th-grade schools in the city; the performance of the 9th-grade schools; and finally, the comparison between the profile and performance of the schools.

2. Background

a. *Kommunaliseringen av skolan*: Municipalisation of the school 1991

In 1842, Sweden introduced compulsory school attendance. At this time schools were run primarily by the national government and included responsibilities for hiring and training the teachers, supplying the school budget, and maintaining the quality of education. In contrast, the municipalities had very limited responsibilities (Statskontoret, 2013). This relationship has changed significantly since 1991 as the principal responsibilities for preschools (*Förskolan*) and elementary schools (*Grundskolan*) have been transferred

the school is located, which is even applicable in parents' educational background. Sveriges Radio (2020) *Den Segregerade Skolan*, URL <https://sverigesradio.se/artikel/7557902>

national to the local level. The decentralization of responsibility for the different forms of schools took its shape following the new education act, *Om kommunalt huvudmannaskap för lärare, skolledare, biträdande skolledare och syofunktionärer (prop. 1989/90:41)* passed by the then the ruling party Social Democrats (S) in the Swedish parliament on 8th Dec 1989 (Skolvärlden, 2019).

Besides reducing the role of the national state to a regulator and policymaker of the school system, the new education act also allowed a municipality or an association to look after the school's provisions. More precisely, the act transferred economic responsibility to the municipal level. Thus, if an association runs a school, the municipality must supply financial aid for its activities. In Swedish, this is called *Skolpeng*. The term *Skolpeng* will be discussed below in the next section in *Friskolereformen*. Meanwhile, the decentralization of the schools did not mean that the municipality or an association can have unlimited power to shape schools. The local governance of schools takes place in terms of the national Act that strives to promote quality, equivalence, and legal certainty over all forms of schools regardless of their ownership or *Huvudman* (Skolverket, 2020). Meanwhile, the same Act has given the rector and teachers a more authoritative task for forming the teaching content without any influence from the municipality. The school act introduced other reforms to regulate and help this new school landscape including the national level tests in various grades, the formation of the office of school inspectorate; *Skolinspektionen* with a specific mission, provision of teaching license, and so on (Skolverket, 2020).

b. Friskolereformen: The independent school reform 1992

Three types of organizations have a provision to set up a *Friskola*: an independent form of school. One is a non-profit organization or *Förening*. The second type of organization is a profit-seeking company or *Aktiebolag*, and the third type of organization is a foundation or *Stiftelsen*. A foundation is a legal entity, which has neither owner nor members, but rather trustees who administer on behalf of the organization. In addition, non-profit organizations or *Föreningar* have members and those members elect a board to manage the school.

The so-called independent school reform in 1992 supplied the students and their parents with an opportunity to choose either the municipal, *Kommunal*, or independent school, *Friskola* systems. The main goals of this reform have been *to promote freedom of choice*

and quality of education (Ministry of Education, 2012). Additionally, the reform aimed to ensure the quality of education by opening the private sectors and associations to supply multiple choices for students and parents.

At the same time, the school reform of 1993 placed a financial burden, or *Skolpeng*, on the municipality to support the independent schools, which is calculated on the same basis as other schools. The reform restricted independent schools from collecting fees from their students. The reform had a few other motives. It intended to align with the different international conventions that Sweden had signed, in particular the fundamental *principle of a free society*. Another motive was to increase the quality of education by opening this sector for an independent actor, which was thought to be an outcome of a more cost-effective and competitive schooling environment. (Ministry of Education, 2012).

c. Schooling in Trollhättan

The section below outlines four geographical planning areas of Trollhättan Municipality. The education department of the municipality has divided its activities into the Central, Eastern, Western, and Southern planning areas (Trollhättans Stad, 2020).

Central planning area

The Central geographic planning area has four neighborhoods: Karlstorps, Kronogården, Frälsegården, and Hjortmossen. The area has four municipal elementary schools, among them, the Kronan F-9 and Slättbergsskolan 7-9 have upper levels (Trollhättans Stad, 2020).

Kronan is one of the schools that belong to a group of SSF³ (Särskilt Svåra Förutsättningar) schools with particularly difficult conditions, for instance, many students in these schools have a foreign background and unfavorable socio-economic conditions in their homes. It means those schools are subjected to special grants and support from the state. This help has been provided to the school leader, teachers, and senior teachers of the SSF schools (Skolverket, 2020). According to the municipality (2020), this area has an independent school, the Nordic International School. The municipal schools and pre-schools in this planning area have about 70% of children and students with a foreign

³ Skolverket defines the SSF schools are those schools, whether independent or municipal, that face a particularly difficult challenge and so can apply for the state subsidy. URL Statsbidrag för skollärare och extra karriärtjänster 2019/20 - Skolverket

background and about 34% of the pupils whose parents have a post-secondary education (Trollhättans Stad, 2020).

Eastern planning area

The Eastern geographic planning area has two neighborhoods and two other urban areas, the former consists of Stavre and Halvorstorp, and the latter consists of Åsaka and Norra Björke. The eastern part of the city has three municipal elementary schools among them, Lyrfågelskolan F-9, and Stavreskolan F-9 is the upper secondary school. According to the municipality, this area has two independent elementary schools, among them, Firdaskolan has grades F-9. According to the municipality, about 14% of the students and children from this area have a foreign background, while about 63% of the pupils whose parents have a post-secondary education (Trollhättans Stad, 2020).

Western planning area

The Western geographic planning area has five neighbourhoods, namely, Källstorp, Skogshöjden, Strömslund, Hälltorp, and Björndalen. The area has six municipal elementary schools, including Skogshöjdens skola 4-9, Strömslundsskolan F-9, and Paradisskolan F-9. At the same time, about 15% of children and students have a foreign background in this area. When it comes to the parents' level of education, about 75% of the students and children have parents with post-secondary education. (Trollhättans Stad, 2020).

Southern planning area

The Southern geographic planning area has three neighbourhoods and three urban areas. The former consists of Lextorps, Sylte, and Skoftebyn, and the latter consists of Veland, Sjuntorps, and Upphärad. This part of the city has six municipal elementary schools, including two upper secondary schools, Sjuntorpskolan and Sylteskolan (Trollhättans Stad, 2020). This area has two private schools that have grades F-9, among them the Nya Skolan. About 39% of pupils in this area have a foreign background, and about 45% have at least one guardian with post-secondary education (Trollhättans Stad, 2020).

According to the investigation municipality (2020) published, like in the Central geographic planning area, a few schools in the Southern area belong to a group of schools with a particularly difficult condition (SSF schools). The Sylteskolan F-9 and Lextorpsskolan F-6 are receiving grants from the Skolverket to their school leader, teacher, and senior teachers.

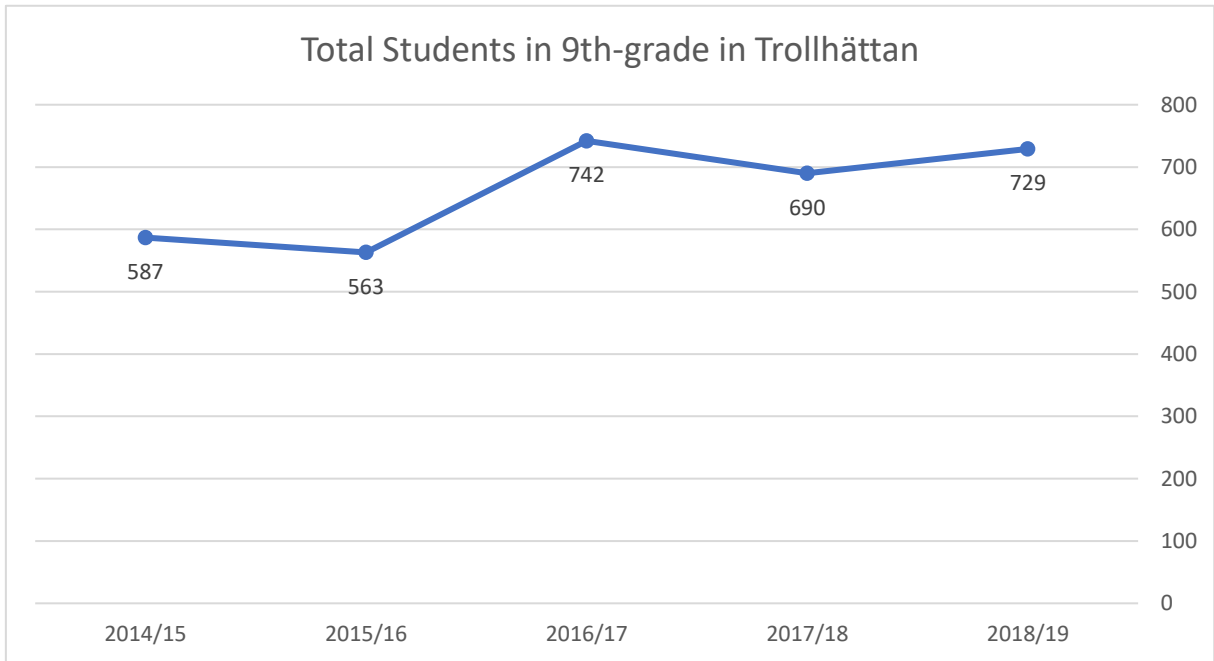
3. Method

The primary data of this report has been sourced from the official website of Skolverket (<https://www.skolverket.se/>). It was possible to access the enriched data of profiles and performance by every 9th-grade school in Trollhättan from the Skorverket website (Sirisdatabasen). In addition, data regarding the overall scenario of all schools in the municipality was found on the official website of the Trollhättan Municipality. For reasons of ease in presenting the data in chart form, Microsoft Excel was used. We have one sheet, one school profile, one on school performance, and one comparing profile and performance.

One limitation was encountered in data collection. This was the incomplete nature of the data on Kronan and Slättbergsskolan regarding the proportion of students with parents who obtain a post-secondary education. The data is presented by a double dot, which means the number is less than ten. Although not ideal, this limitation is not a serious one for this study, and we have treated the double dots as equivalent to 0.

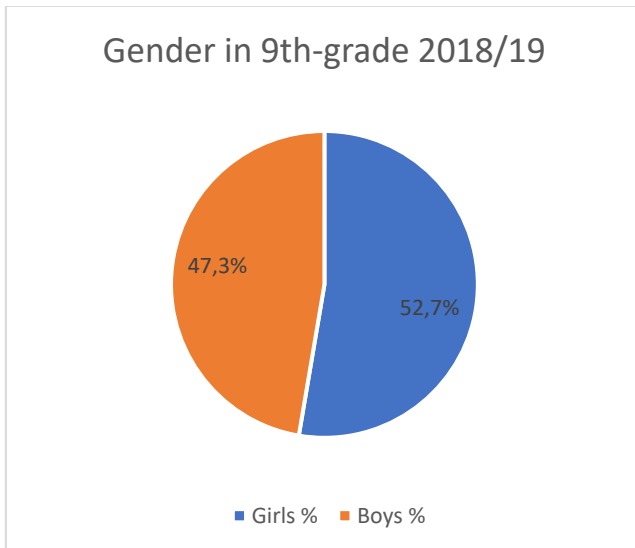
4. A macro-view of the profile and performance of all 9th-grade schools (2014/15-2018/19)

We start with a macro-view of the number of students in all 9th-grade schools in Trollhättan over time in this section. Afterward, we provide several demographic profiles of each school in Trollhättan, including the proportion of women teachers, the students per teacher ratio, the proportion of students with a foreign background, and the % of parents with post-secondary education. There will be an examination of the correlation between the student's background and parents' education level in the last part.



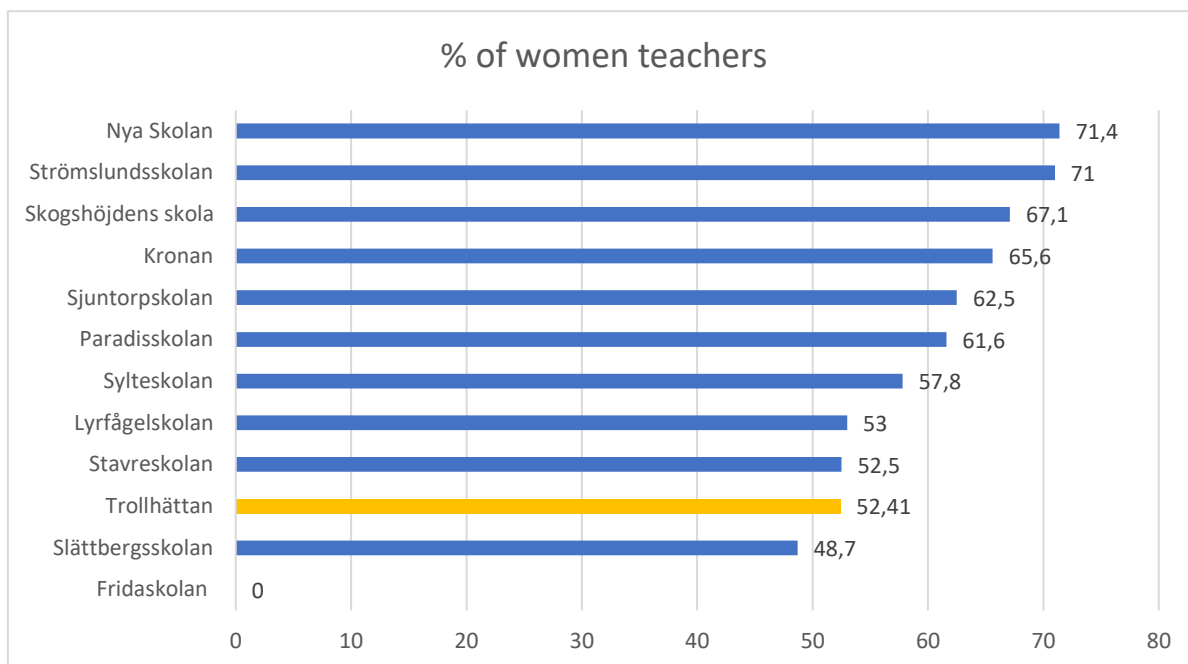
(Skolverket, 2020)

The growing number of students in 9th grade in the city over time is shown in the table above. According to Skolverket (2020), the number of 9th-grade students in all schools in Trollhättan has increased from around 600 in 2014/15 to over 700 in 2018/19. This roughly matches the population growth of Trollhättan over the same period.



(Skolverket, 2020)

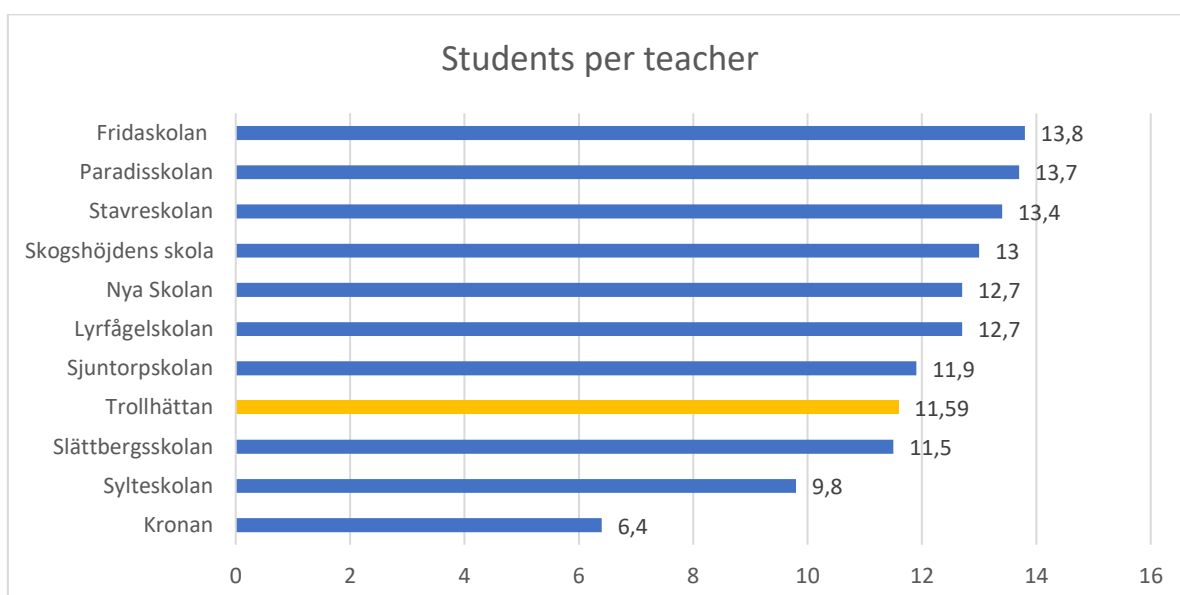
The gender difference of the students in the 9th-grade schools is minimal overall, as shown in the pie chart above. 47,3 percent of students are girls, and 52,7 percent are boys in all 9th-grade classes in the academic year 2018/19.



(Skolverket, 2020)

The ratio of women to male teachers looks different in some schools, but overall, the difference is not that great. Thus, as shown above, the average percentage of women teachers at the municipal level is 52,41% for 2019/20.

a. A similar student-to-staff ratio (Table 6 school profile sheet)

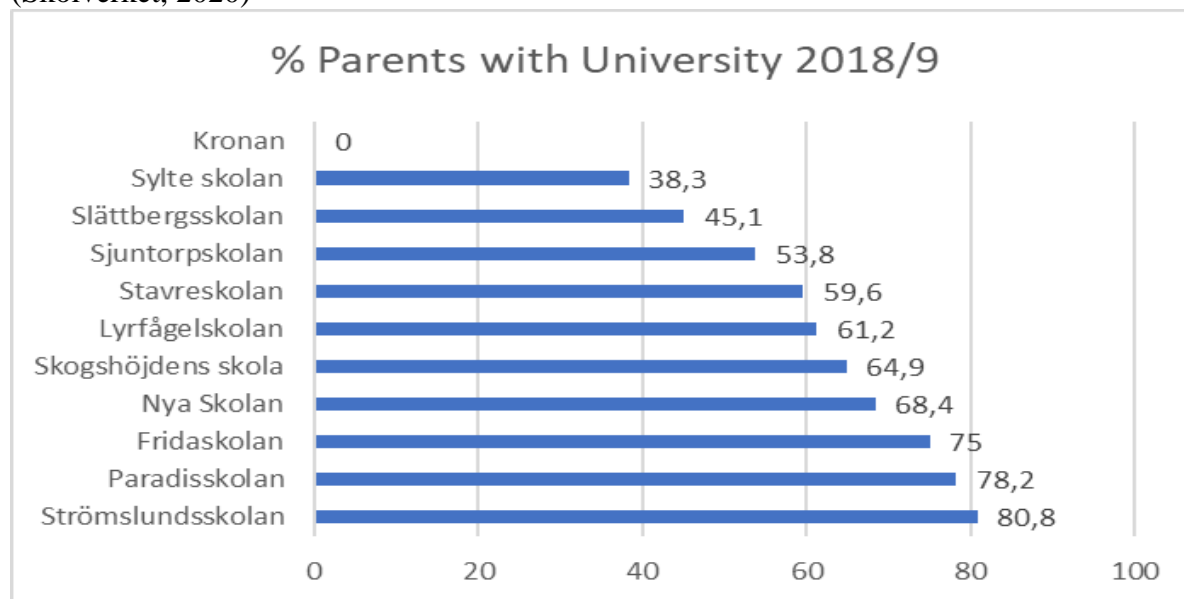


(Skolverket, 2020)

The above chart shows how the student-to-teacher ratio in 2019/20 is quite similar in most schools, with the exception of a couple of schools that receive extra state support. The

highest ratio between students per teacher is in Fridaskolan (teacher/13,8 students) while Paradisskolan, Stavreskolan, and Skogshöjdens skola also have more than 13 student-teacher ratios. In the meantime, the ratio looks lower in schools like Kronan (1/6,4) and Styleskolan (1/9,8) above. The illustration above shows an average ratio of 1/11,59 students at the municipal level, which means that most schools are found to be between 11 to 13,8 students per teacher. (Skolverket, 2020)

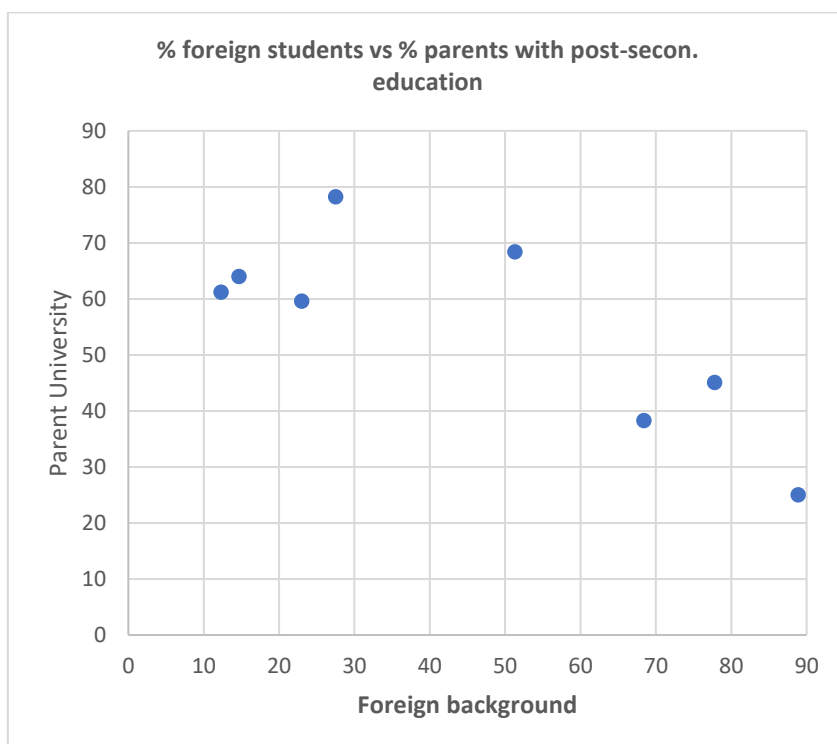
(Skolverket, 2020)



In five years, the proportion of 9th-grade students with a foreign background in Trollhättan has increased by more than five percent, from around 31% in 2015 to 36% in 2019. However, a few schools have experienced a considerable increase in this kind of student over time. The data shows that it concentrated in precisely four schools, Kronan, Slättbergsskolan, Sylte Skolan, and Nya Skolan, during this time. Nya Skolan is the only independent school among these four schools, while the rest of all three are municipally run. In contrast, in schools like Sjuntorpskolan, Strömsslunsskolan, and Skogshöjdens skola, the proportion of students with a foreign background is less than ten students from this category.

Here, the proportion of students whose parents have a post-secondary education at a municipal level has increased from around 52% in 2015 to 59% in 2019, (Skolverket, 2020). Meanwhile, if we look closer at the academic year 2018/19 above, the highest proportion of students whose parents have a post-secondary education belong to the

Strömslundsskolan. In contrast, Kronan has the lowest proportion of students whose parents have a post-secondary education.

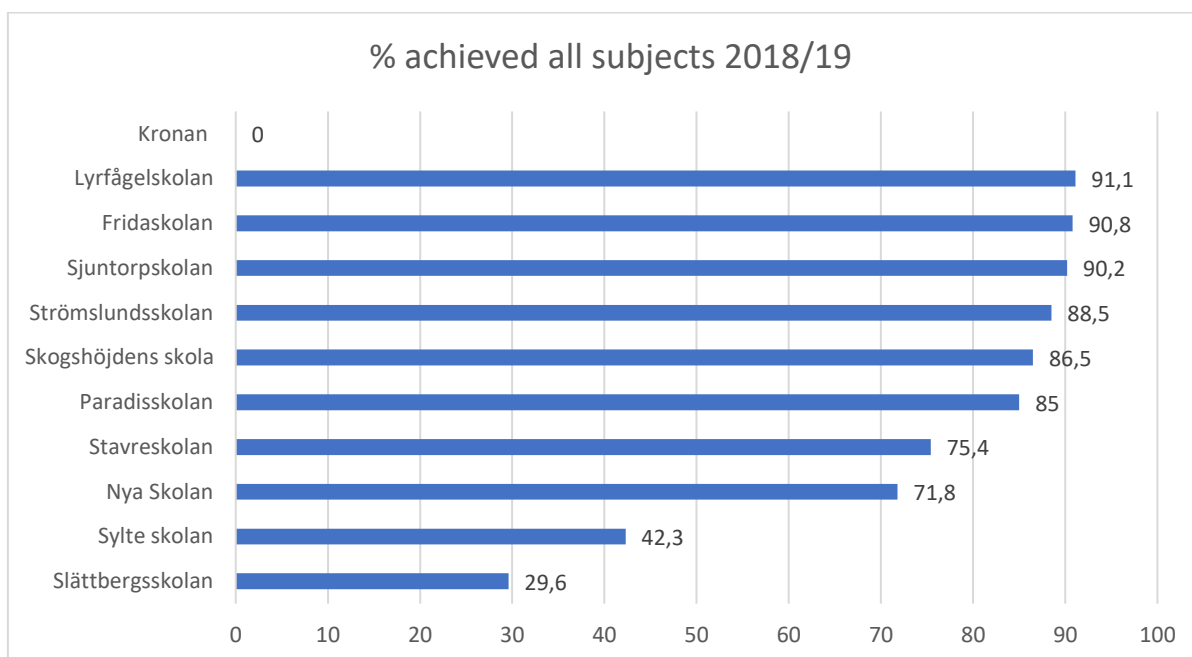


(Skolverket, 2020)

Lastly, if we compare the proportion of students with a foreign background and their parents' post-secondary education, then a pattern that suggests a negative correlation is revealed. A negative correlation means that if a school has a larger proportion of students with a foreign background, it tends to have a smaller proportion of students whose parents have a post-secondary education. Conversely put, the greater the Swedish background, the greater the percentage with a university education.

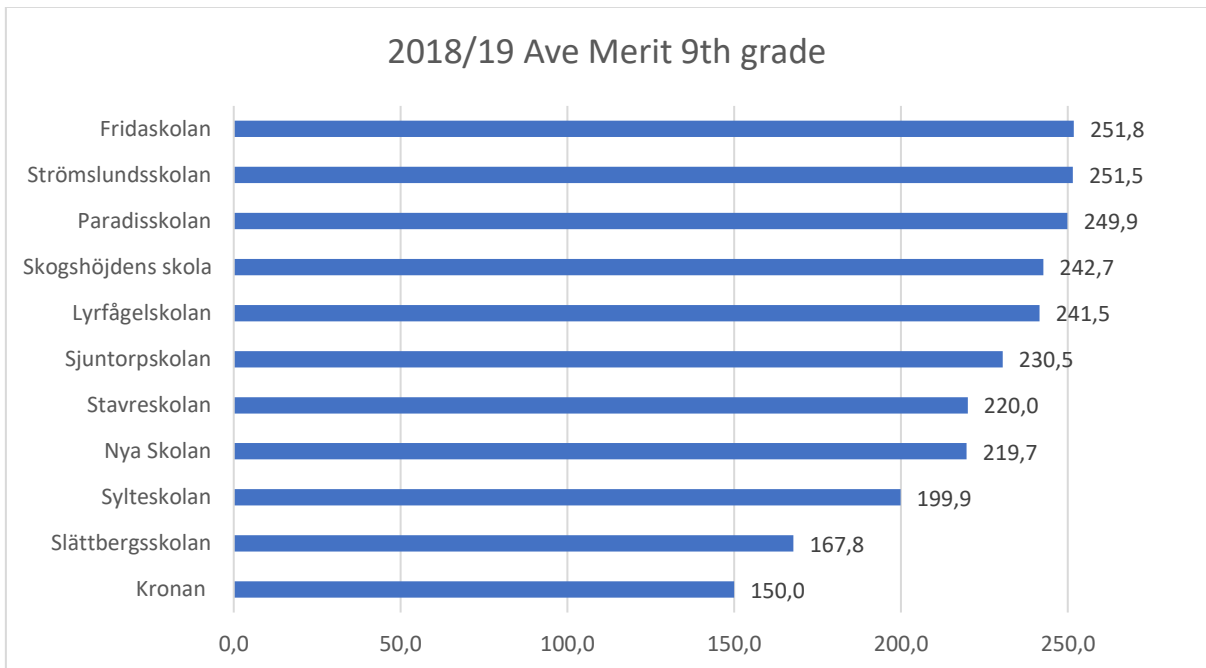
5. Academic performance

This section outlines the academic performance of 9th-grade students in their final exams. It portrays the proportion of students who achieved knowledge requirements in all subjects, the average merit score per student, and the proportion of students who passed in three important subjects, namely English, Mathematics, and Swedish as a second language. Afterward, the last of this section will show a cumulative ranking across the subjects of each school.



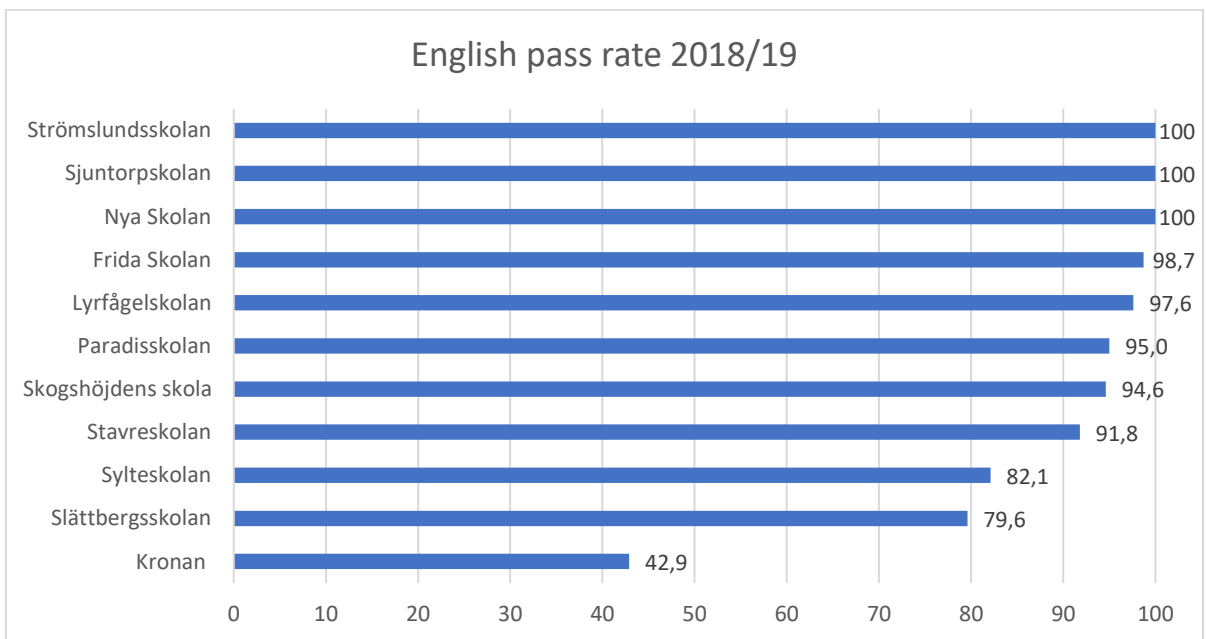
(Skolverket, 2020)

Regarding the proportion of students who achieved knowledge requirements in all seventeen subjects in the 9th-grade final exam in 2018/19 shown above, the Kronan, Slättbergsskolan, and Sylte Skolan have performed lower than the other eight upper secondary schools in the municipality. If we look further at other academic years from 2014/15 to 2017/18, the student's performance in Kronan, Slättbergsskolan, and Sylte Skolan has been lower than those other eight schools.



(Skolverket, 2020)

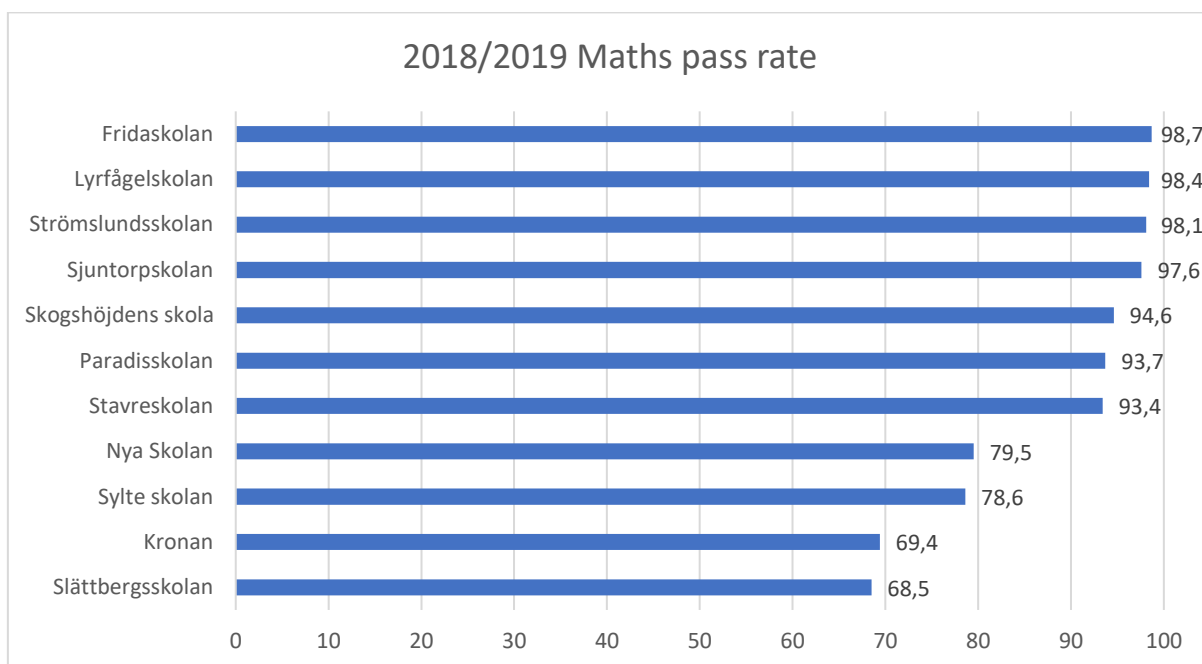
The average merit per student of 9th grade in each school in 2018/19 looks similar if we observe the top eight schools above in the graph. In comparison, students from Kronan (150,0), Slättbergsskolan (167,8), and Sylte Skolan (199,9) have a lower merit level than the other schools.



(Skolverket, 2020)

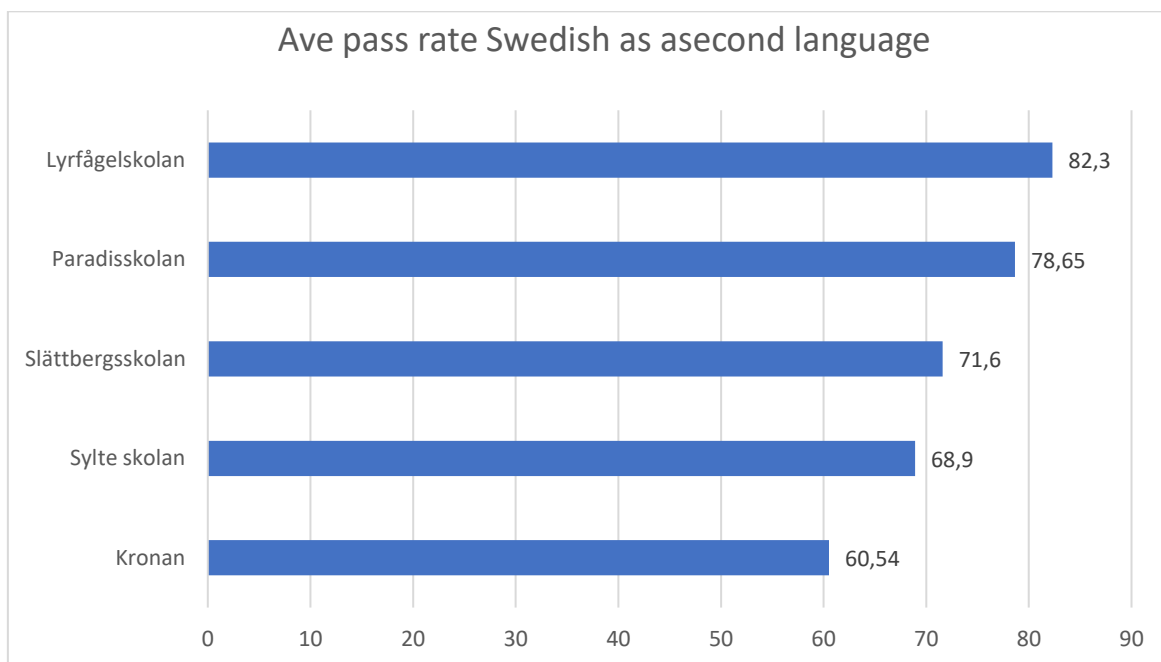
The most notable above is the proportion of students in Kronan who have performed in the English exam significantly lower than the other schools in 2018/19. Only 42,9 percent of the students in 9th grade have passed in English, while the Slättbergsskolan has this

rate of 79,6% and Sylte Skolan has 82,1%. Meanwhile, Strömslundsskolan, Sjuntorpsskolan, and Nya Skolan have a 100% pass rate in this subject in 2018/19.



(Skolverket, 2020)

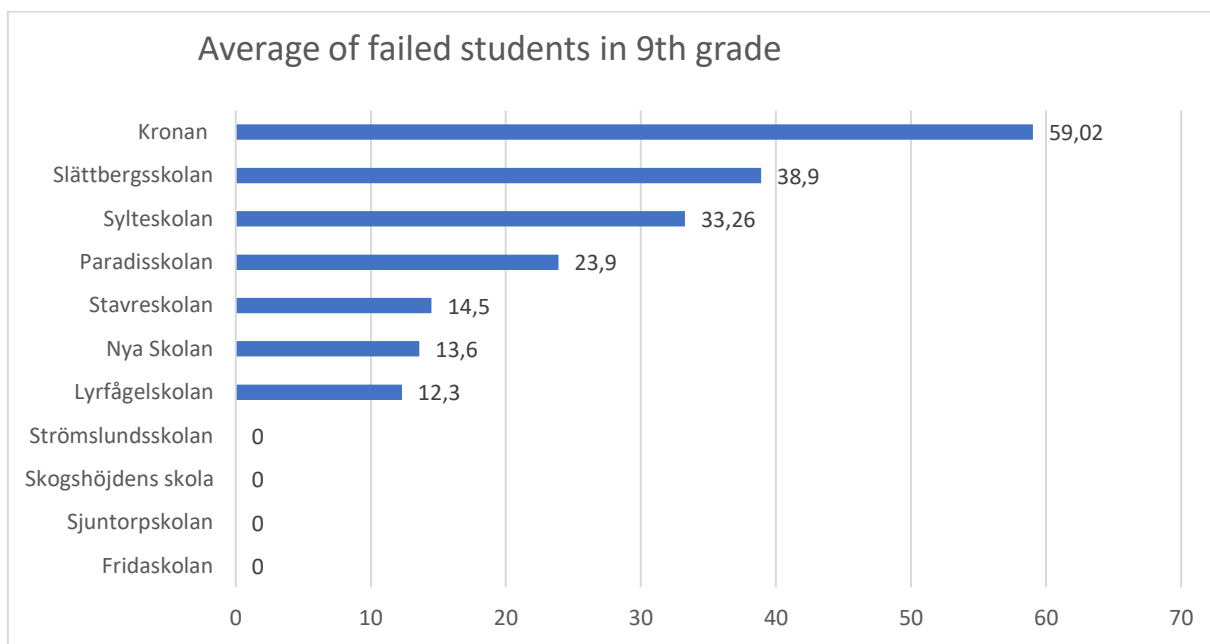
The pass rate in Mathematics is consistent with previous charts Kronan came in the second last place while the Slättbergsskolan occupied the last place in 2018/19. Moreover, the Frida Skolan, Lyrfågelskolan, and Strömslundsskolan have more than 98,0% pass rate in Mathematics, but the Sylte Skolan comes in the third last place in this ranking.



(Skolverket, 2020)

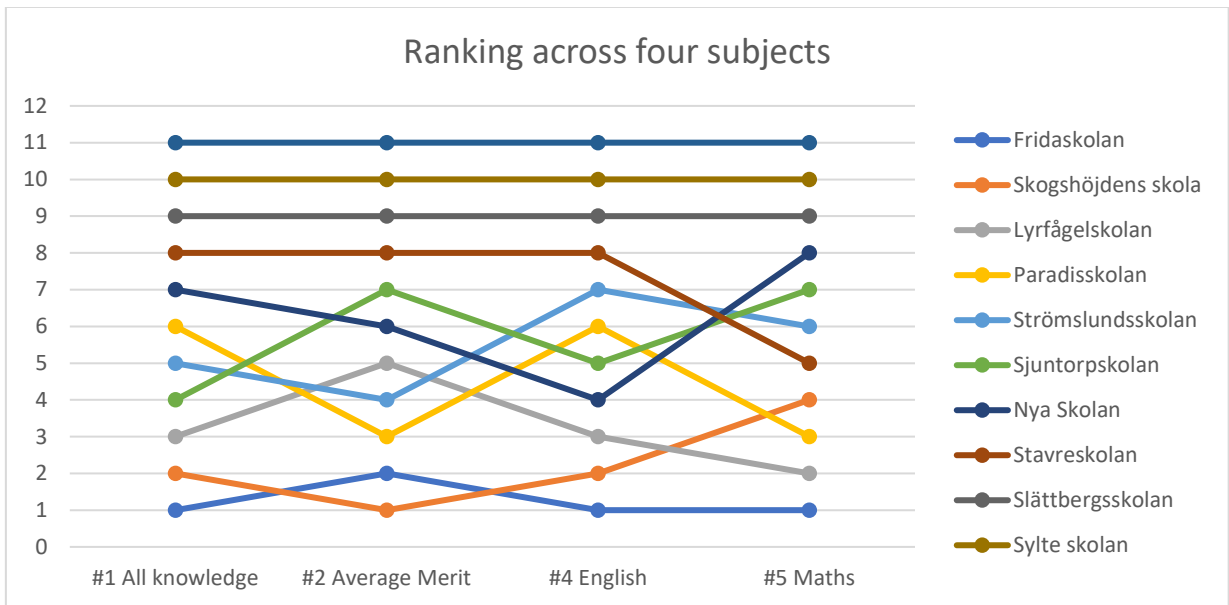
As is clearly illustrated above, the average pass rate in Swedish as a second language in 2018/19 has been significantly lower for the Kronan than the Lyrfågelskolan (82,3%) and Paradisskolan (78,65%). In the meantime, Sylte Skolan and Slättbergsskolan have more than two-third of the students who have passed this subject.

So, what has been proven up until this point is that the three schools, namely Kronan, Slättbergsskolan, and Sylte Skolan, have relatively lower performance in all three subjects mentioned above. Indeed, the pass rate in mathematics and Swedish as a second language by students in Kronan looks significantly higher than the pass rate in English. It is worth mentioning one crucial piece of information here if we see the graph above, we find statistics for only five schools. Other upper secondary schools do not provide this course, or they have less than ten students in their class. So, it has only five schools in the graph.



(Skolverket, 2020)

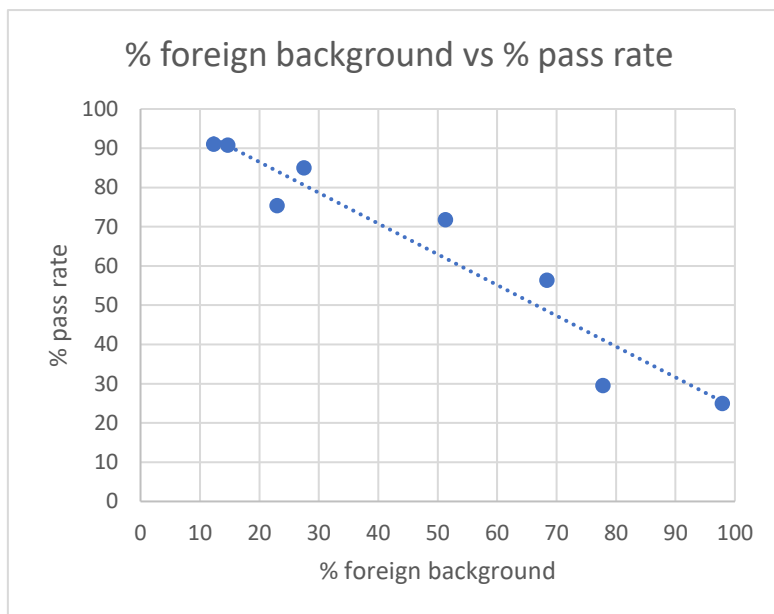
The average failure rate in 9th-grade over time (2014/15-2018/19) looks significantly higher for the Kronan (59,02) than even Sylte Skolan (38,9%). It illustrates that three out of the fifth students in Kronan had failed to pass the 9th-grade. The consequence of this result for them is that they do not have the opportunity to study in the gymnasium.



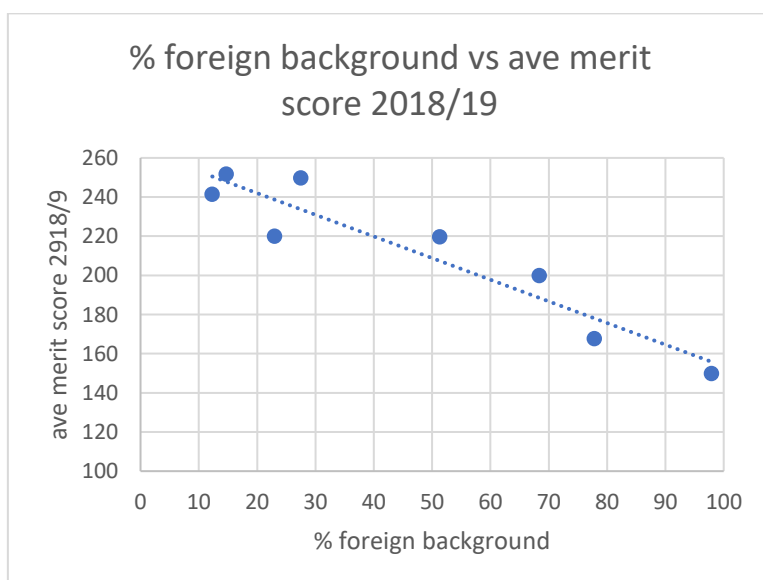
In this final chart we compare the ranking of the schools across the four main aspects of academic performance in one chart. This illustration would help us to simplify how the schools have been performing on four different scales. Most significant is the fact that three schools, Kronan, Sylteskolan, and Slättbergsskolan, are consistently ninth, tenth and last in the rankings across all four measures.

6. Profile versus performance

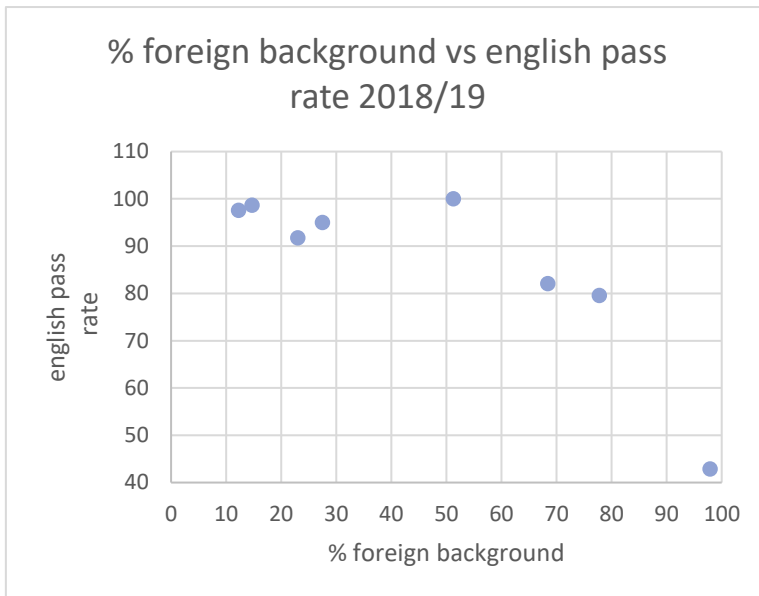
This section's main task is to compare the different variables of the schools' demographic profile, and the academic performance of those schools. In what follows a strong relationship between foreign background/parents' university education and performance is suggested.



A negative correlation between the pass rate and foreign background is clearly illustrated above in the graph. If a school has less than 30% of the students who have a foreign background, then the average pass rate tends to be above 75% in the 9th-grade exam. In contrast, if a school has more than 60 percent of students with a foreign background, their pass rate in the 9th-grade exam has less than 60%.

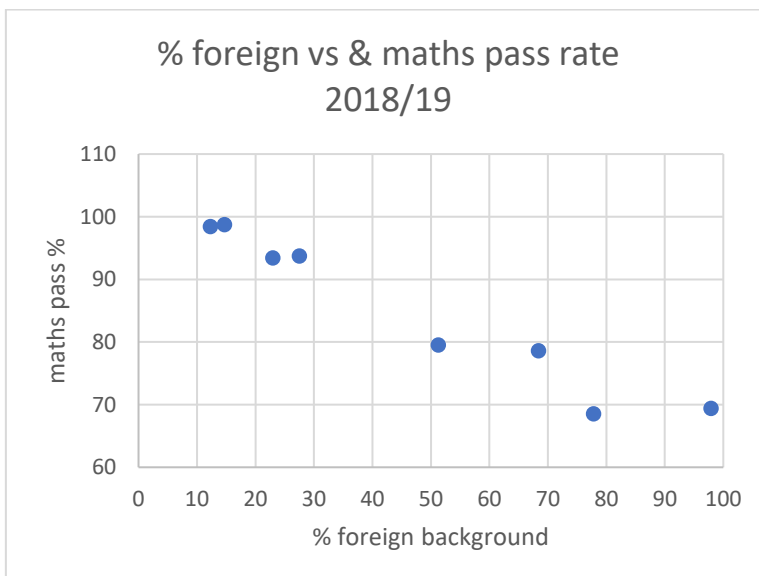


The correlation between foreign background and average merit per student has a similar correlation, as mentioned above. It means a school with a lesser proportion of students with a foreign background has about 220 merit value per student. Meanwhile, if the schools have more than 70% of the students with a foreign background, the merit value per student has only about 200.



(Skolverket, 2020)

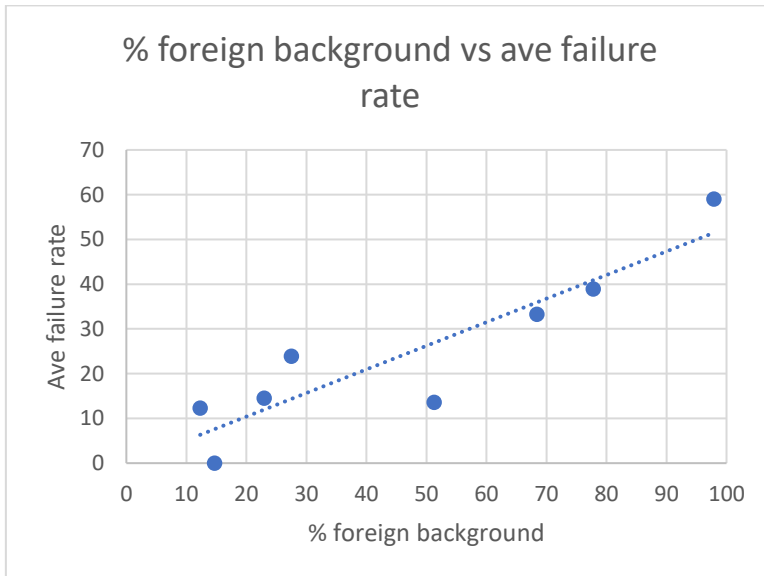
The graph indicates a looser correlation when it comes to performance in English, but still a consistent trend.



(Skolverket, 2020)

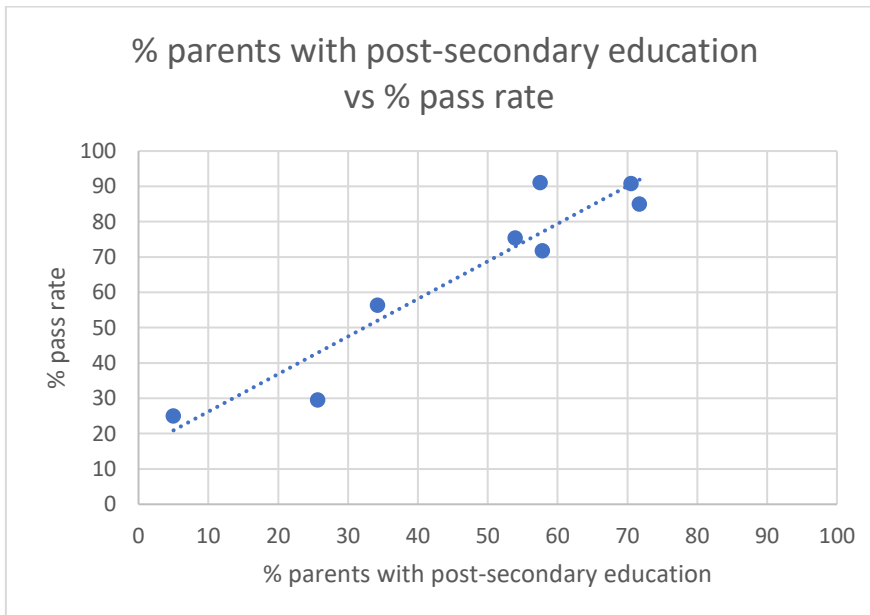
When it comes to mathematics, the graph shows a clear negative correlation between the variables. In terms of the pass rate in Mathematics in 2018/19, a school with a lower

proportion of students with a foreign background has performed better than the school with more than 50 percent of students with a foreign background.



(Skolverket, 2020)

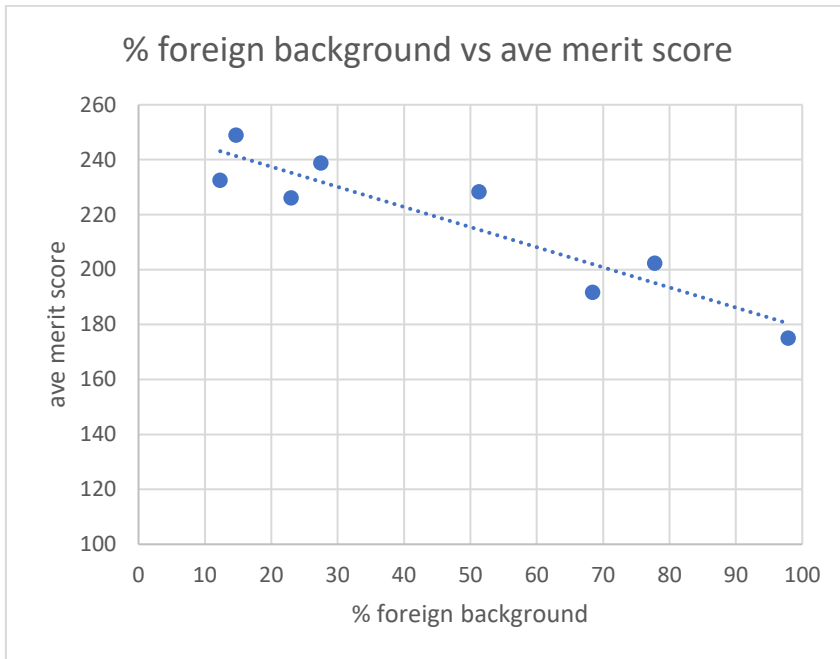
In contrast to the earlier graph, this graph illustrates the opposite correlation, namely a positive correlation to the variables. The correlation shows that schools with a larger proportion of students with a foreign background have a higher failure rate in the 9th-grade exam. We can see the school with more than 68% of immigrant students tends to have more than one third to be failed in the exam.



(Skolverket, 2020)

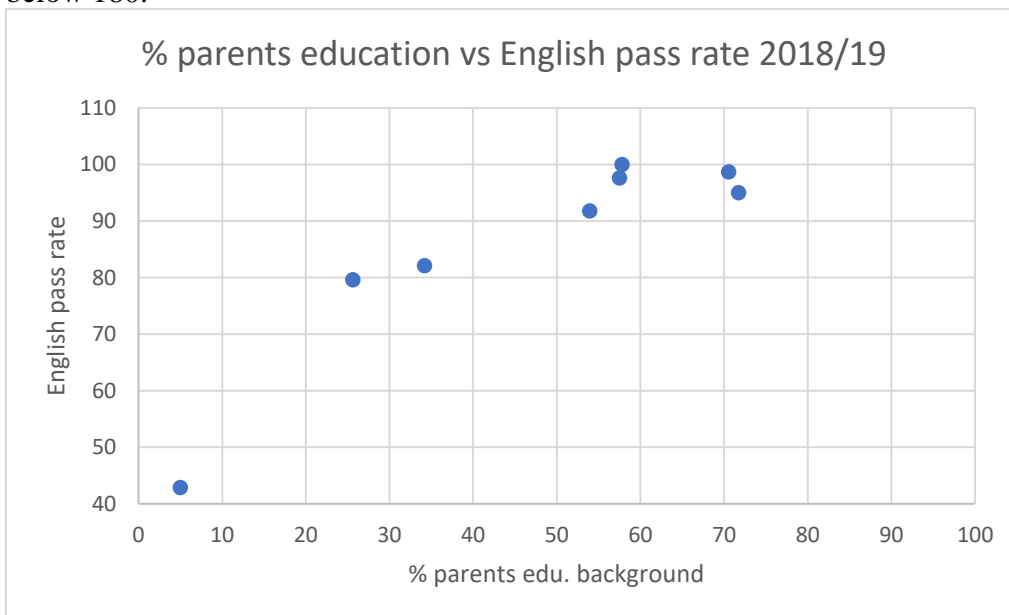
It is further noticeable that one more positive correlation to the proportion of students whose parents with post-secondary education and pass rate in the ninth grade. One can

say that a school with a higher proportion of students whose parents have a higher education tends to get a larger proportion of students to pass the 9th-grade exam. The pass rate of the students as a performance indicator of the school has significantly positively correlated to whether their parents are higher educated or not.



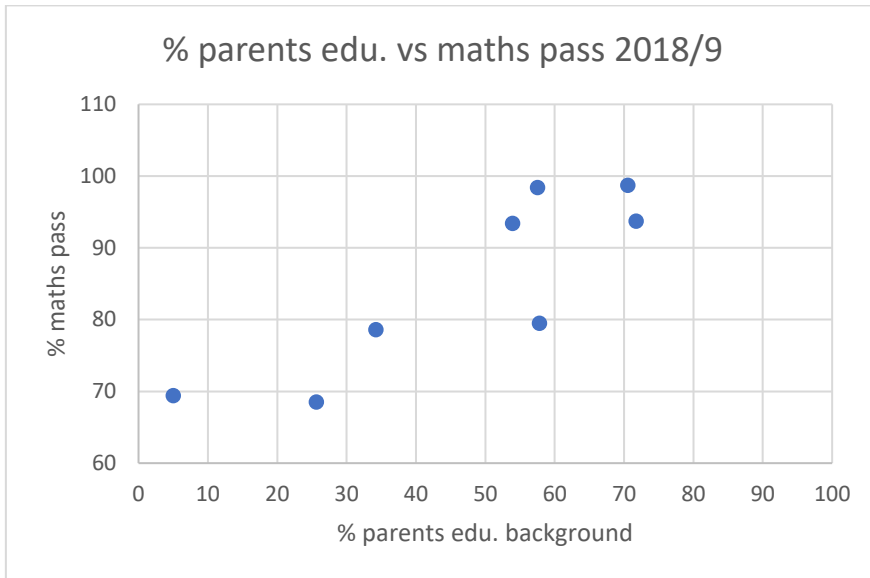
(Skolverket, 2020)

Meanwhile, the correlation between the proportion of students with a foreign background and the average merit score over time shows a negative one. As shown above, a school like Kronan has more than 95% of the students in its 9th grade who have a foreign background; simultaneously, the average merit score per score student is below 180.



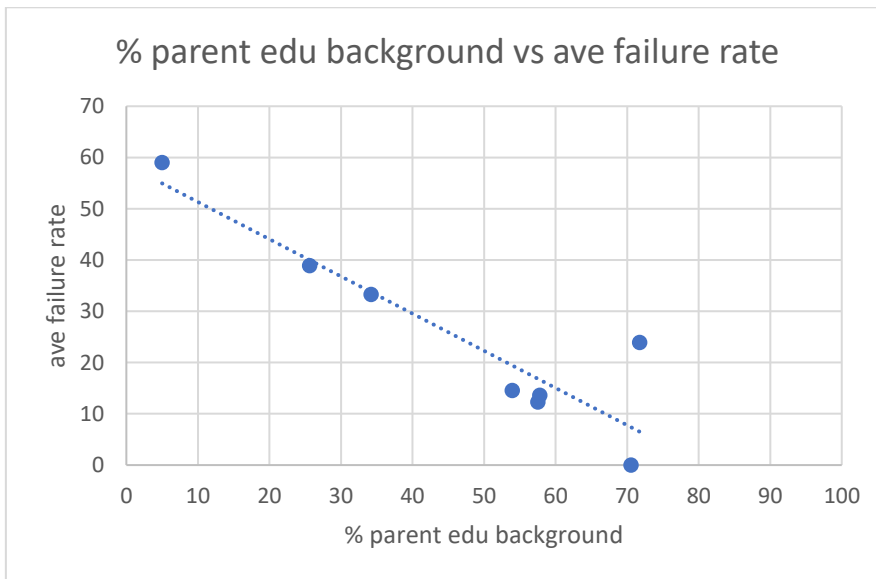
(Skolverket, 2020)

The graph above suggests a rough correlation between the proportion of students whose parents have post-secondary education and the English pass rate in 2018/19.



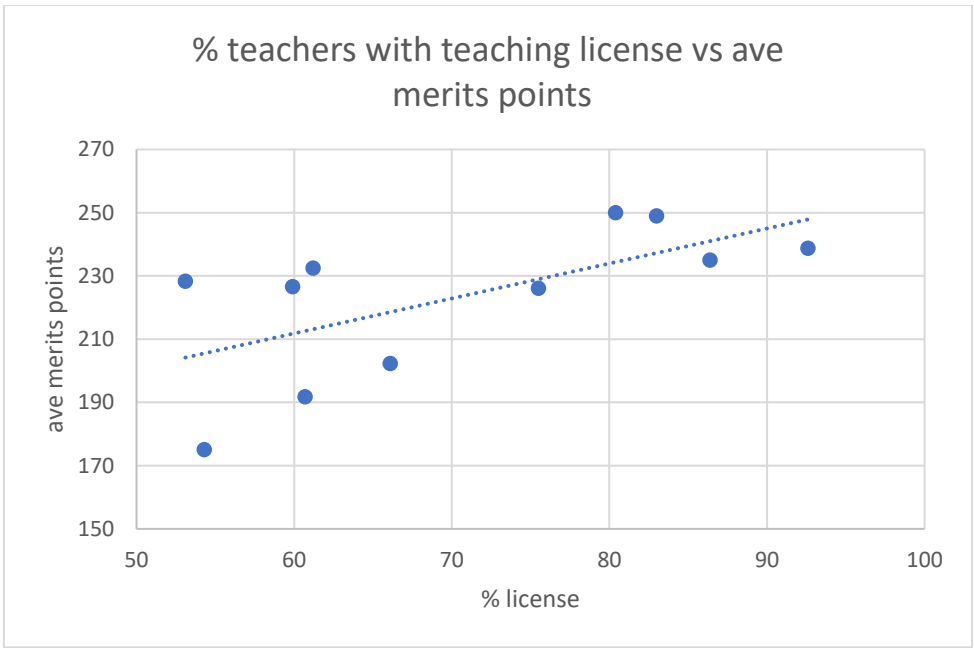
(Skolverket, 2020)

Another rough correlation is suggested above.



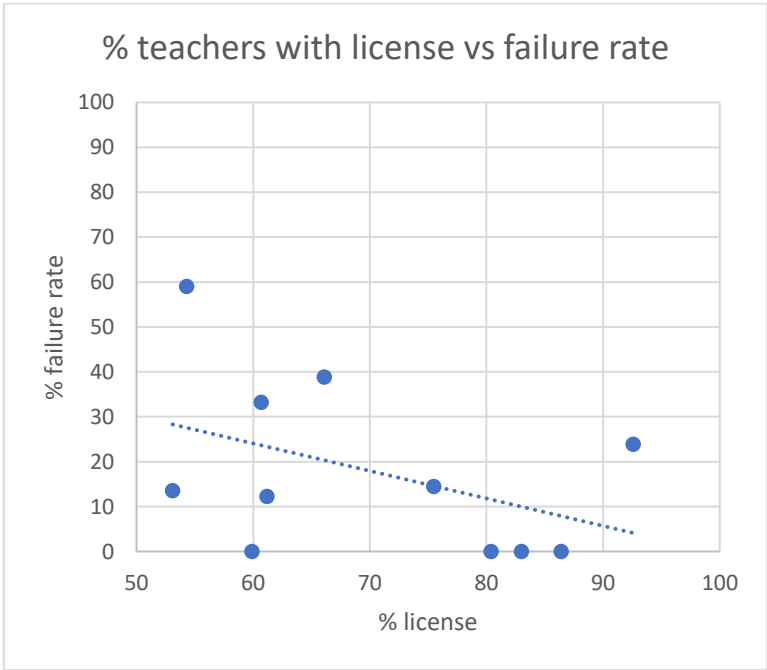
(Skolverket, 2020)

The negative correlation between parents' educational background and the failure rate in the 9th-grade exam seems clear in the graph above. A negative correlation means that students whose parents have post-secondary education are less likely to fail. Schools like Kronan and Slättbergsskolan have the highest proportion of students in this category, contributing to the higher failure rate in the exam.



(Skolverket, 2020)

The second last graph above portrays a rough positive relationship between teachers with a teaching license and the average merit point per student.



(Skolverket, 2020)

Conversely, there is a somewhat rough relationship between the proportion of teachers with licenses and the failure rate in the 9th grade.

5. Conclusions & Reflections

Based on the statistics presented above for all 9th-grade schools in the Trollhättan Municipality we can be sure that school segregation exists, such that schools with more foreign-born students and parents without university education perform consistently worse. Indeed, both of these variables (background and education background) coincide with lower socio-economic residential areas.

As shown in the demographic profile section, a higher proportion of students from Kronan, Slättbergsskolan, and Sylte Skolan not only have a foreign background, but their parents have lower levels of post-secondary education. The consequence of such segregated schools has been reflected in the academic performance of the schools. Precisely, the three most segregated schools, Kronan, Slättbergsskolan, and Sylte Skolan, have continuously been poor, and failure rates are higher in comparison to other schools.

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School of Business, Economics, and IT
Master Programme in Work Integrated Political Studies

Study 2

Residential segregation, school performance, and the closure of the Kronan (4-9)

An Exploratory Study on the municipal reasons and motivations behind the
closing decision to Kronan school in Trollhättan municipality.

2021

Authors: Sarad C. Aryal with Prof. Per Assmo, Prof. Laurence Piper & Dr.
Karl Dahlquist

Summary

This report is a collaboration project between University West and Trollhättan Municipality. The Swedish Research Council for Sustainable Development (FORMAS) funded the project. The report aims to explore the three main areas, residential segregation in the city, school performance, and demographic features of Kronan school to examine the municipal reasons and motives behind the closure decision of the Kronan school in Trollhättan municipality. The study explored a few previous school closure cases in Sweden that the city has also mentioned in its proposal, thereby the findings on school results and demographic features of Study 1 will be employed in this study to examine the research topic.

The data have mostly been accessed through the Swedish National Agency for Education (Skolverket), SCB, and the Trollhättan Municipality. Meanwhile, other sources for the study i.e., news articles, forum discussions, and audio-visual materials have been collected through national-regional and local level media houses (e.g., Sveriges Radio, Svt, Dagens Nyheter, TTELA, Gefle Dagblad, Göteborgs Posten, YouTube, Trollhattan.se, etc.).

Analysis has been conducted through a careful reading and interpretation of the official closing proposal made by the Trollhättan municipality (2020). Additionally, I have examined the citizen dialogue forums organized in the municipal premises, thus extrapolated the news and articles about the Kronan closure topic published in the local, regional, and national level media. Thus, the study includes a few important national and municipal-level research in school segregation, school results, and housing segregation. More importantly, I followed the political discourse, debate, and citizens' engagement in different forums and channels, and observed a petition and campaigns concerning the issue organized by local citizens on online forums.

The report finds three central reasons and motives behind the decision to close Kronan school (grades 4-9) in the suburb of Kronogården, 1) to deal with the poor academic performance of pupils in Kronan, 2) to alter the uneven student composition as a result of residential segregation, free school choice, and socio-economic challenges in the suburb of Kronogården, and 3) creating multicultural classrooms in the city's schools.

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1. Introduction

This report investigates the Trollhättan municipality's reasons and motives behind the proposal to close the school units *Kronan Mellanstadiet* (4-6) and *Högstadiet* (7-9). The background chapter illustrates what it says, explains the official proposal, and describes the housing segregation in Kronogården in relation to the Kronan, and a brief glimpse of Study 1, particularly on the Kronan, will be presented at the end. Additionally, the study will describe four other closure and merger cases from respective municipalities in Sweden to examine whether the motivations and reasons the Trollhättan Municipality presented would look similar or different to these previous cases. And will follow the conclusion, and then a reflection where I will discuss the municipal proposal with different explanatory factors, i.e., residential segregation, demographic realities, and school results, in the end, a short discussion about some limitations of this study will be included.

2. Background

Trollhättan municipal council *Kommunfullmäktige*, the highest local political organ, passed seven different education proposals on October 26th, 2020. Among the decisions, the Kronan primary school would be scaled down to the lower primary level *Lågstadiet*. (Trollhättans Stad, 2021).

The decision regarding scaling down the Kronan primary school from preschool class *Förskoleklass* (F) to grade 9 to preschool class to grade three (F-3) will be enforced from August 2021. The municipality will accommodate approximately 210 students from grades fourth to nine (4-9), mainly in five municipal schools in its eastern and western areas, namely *Lyrfågelskolan*, *Stavreskolan*, *Strömslundsskolan*, *Paradisskolan*, and *Skogshöjdensskolan*.

Additionally, two other decisions were made to address the consequences of school segregation, segregated schools' poor academic performance, and free school choice. The second decision was about introducing new guidelines for offering pupils who applied to the municipal schools. The offer would be based on the parent's choice and the proximity

principle; this new guideline aims to increase equality, provide students with better prerequisites to succeed in their education, and reduce school segregation in the city.

The third decision was about changing the rules for providing school bus service for the 7-9 grade students including those within 3 kilometers of school. The previous rule was that the bus service would only be for those who lived a minimum of 4 kilometers away. According to the city, this decision would facilitate the city to transfer the pupils from the segregated residential area to other city schools. (Trollhättans Stad, 2020 & 2021)

2.1 Segregation and Kronan

Assmo et al. (2021) illustrate Kronogården, a suburb of Trollhättan with its increasing problems of residential segregation and socio-economic inequality is often seen and portrayed as a *culturized entity* and prone to creating problems. For example, the problems of poor school results, safety and security, higher unemployment, poor quality of housing, and so on. The report finds that segregation is due to larger factors, namely the socio-economic structure of society and the nature of the labor market which requires highly educated employees in the city. In short, the suburbs experiences segregation on various fronts, namely in housing, the labor market, schools, etc., the authors write.

Reports highlight (Assmo et al. 2020, 2021) the cross-cutting issues of housing and school segregation in some of the suburbs in Trollhättan municipality, i.e., Kronogården, Lextorp, and Sylte. In other words, residential segregation is the decisive factor behind the growing phenomenon of school segregation in these suburbs. This means that students with a foreign background whose parents have a lower education tend to attend the same school compared to students with parents who have a higher education and a Swedish background. Already in study 1, it is established that most of the students in Kronan have a foreign background, even parents with lower education compared to other schools in the city neighborhoods, i.e., Strömslund, Skogshöjden, Stavre, etc. (Trollhättans Stad, 2017). Moreover, the proportion of residents with post-secondary education (*eftergymnasial utbildning*) is more than twice as high in the suburbs of Björndalen and Strömslund compared to Kronogården (Assmo et al. 2020, 2021).

According to a report (Assmo et al. 2020), the educational measures implemented by the municipality are individual-based or compensatory in nature to deal with the challenges of school segregation. Although it is shown in the report that the measures should also be aimed at structural problems and issues within the municipal education administration. The compensation measure to promote school integration has three main features, i.e., resource distribution, integration projects, and free school choice. Resource allocation to its schools is based on the student's educational background and place of birth, and the second measure is about gathering and engaging the students from different municipal schools in activities to promote integration. And the third is about allowing all parents and students to choose which schools the students want to attend, in short, a free school choice (ibid.).

2.2 The municipal decisions and debates

The municipality has the authority only to place these students in its municipal schools and not in independent (private) schools. The city does not have the legal authority to place the pupils from its schools in other independent schools. The municipality writes that the pupils' distribution to those five municipal schools will be based on their individual needs and conditions. Several factors will determine their individual needs and requirements, for instance, the student's age, how the student's academic performances look, etc. It will also depend on those receiving schools' abilities to receive extra pupils. (Trollhättans Stad, 2020)

In the investigation report (Trollhättans Stad, 2020), an *Equivalent school in the City of Trollhättan* prepared by the city's education board *Utbildningsförvaltningen* mentions a third of the school children in the city have a migration background. Indeed, residential segregation has led to pupils from socioeconomically disadvantaged and migration backgrounds living and attending school in neighborhoods like Kronogården, Sylte, and Lextorp. All these schools faced particularly difficult conditions, in Swedish, *Särskilt Svåra Förutsättningar* (SSF-skolor). The Kronan primary school is one of them, which lies in the neighborhood of Kronogården. a neighbourhood with 2700 inhabitants that lies

two kilometers southeast of Trollhättan's center, and it is the most segregated residential area in the city. (Trollhättans Stad, 2018)

Before the city council decided to slim down the Kronan school to a lower-primary level, the municipality organized different forums to discuss and hear the opinions of local people of Kronogården, parents, and students from the Kronan and those five receiving schools, etc. One of them has been the digital citizen dialogue *Medborgardialog* (YouTube, 2020) in its premises on September 10th, 2020, with the city's decision-makers *Utbildningsnämnden* and the education board *Utbildningsförvaltningen*. The city's political and administrative bodies for education have different roles; the former has decision-making authority, while the latter body provides the education service to the municipal residents. Each representative from respective political parties in the city's education board *Utbildningsnämnden*, namely the Social Democrats (S), Moderates (M), and the Left (V), presented in the dialogue. All the representatives from those parties in the dialogue agreed and justified closing Kronan 4-9. The main argument was the poor performance of the school for many years. For example, in 2020, more than 60 percent of students in grade 9 did not qualify for upper-secondary school. The political representatives also agreed that the school's poor performance was due to residential segregation and school segregation. (YouTube, 2020)

The proposed closure of Kronan 4-9 produced several reactions; for instance, some students had already applied to independent schools in their neighbouring areas, namely Nya Skolan and Nordic International School (Lundberg, 2020). In the meantime, some parents of the affected pupils expressed concerns regarding the closing down proposal. According to them, the school is located near their residence, so they do not need to leave and pick up their children daily while they lack a driving license. (Flodin, 2020)

The closure proposal of Kronan 4-9 has led to several public debates in the city. These include a local-led signature campaign to keep the Kronan 4-9 open and protests from some parents at the receiving schools where the Kronan's pupils would move. (Kazmierska, 2020) For example, according to them, a group of parents from the Strömslundsskolan came out publicly in the media to oppose the fact that their children

will have to compromise the basic rights of quality education by admitting the pupils from the Kronan. According to them, the Strömslundsskolan is not adequately resourced to receive pupils with a great need and lack of knowledge in the Swedish language. These parents question the proposals in terms of lacking a consequence analysis of the city. They claim the decision would lead to creating unsustainable situations for good schools, like Strömslundsskolan. The parents also hesitate that their children need to sit with pupils not usually speak Swedish as their mother tongue. They fear it will deteriorate the academic performance of their children. As a matter of fact, the pupils from Kronan have weaker performance in the Swedish language which leads the parents in receiving schools more concerned regarding the overall performance of the school. (Kazmierska, 2020)

2.3 A short glimpse of Study 1

Before we explore other school closure cases, I want to present some crucial findings that Study 1 has already presented regarding the Kronan school and its related issues. According to municipality (2020), Kronan school is located in Trollhättan municipality's southern geographic planning area and is also found among some other schools in the area with a category of Particularly Difficult Condition (SSF-schools). So, the Swedish National Agency for Education (Skolverket) had provided special grants to Kronan, which means getting extra support for its teachers, school leaders, and so on. Furthermore, Study 1 has shown that Kronan has the lowest students-per-teacher ratio among other schools in the municipality, while the proportion of students-per-teacher with a teaching license is rather opposite than the former one, which means the school has the lower number of qualified teachers in relation to other schools in the city.

Study 1 has also established that the correlation between the lower the proportion of qualified teachers to the students, the higher the failure rate of the students. In this regard, Kronan has a higher failure rate of 9th-grade students in the city, which means the average of failed students in the 9th grade of Kronan is almost 60% from 2014/15 to 2018/19, according to Study 1. Regarding the demographic profiles of pupils in the Kronan, it has the highest numbers of foreign-born students and parents without higher education (*Eftergymnasial utbildning*), and the highest levels of pupils with non-Swedish as the first language. Meanwhile, students' academic performance has consistently declined

over the years (2014/15-2018/19) in the Kronan. Briefly, Study 1 shows that Kronan continuously had poor passing grades, and failing rate looks higher compared to other schools in the city, in addition, the average merit level at Kronan during 2014/15-2018/19 is significantly lower compared to other city schools.

3. Previous school closures

Before the summary, it is worth mentioning similar kinds of school closures and mergers in the past decade, which occurred in various municipalities in Sweden. Namely, after the closing, the reopening of Rosengårdsskolan in Malmö, merging four schools into one in Nyköping, and other closure cases in Gävle and Örebro municipalities. These cases would help us see how the segregated schools in the segregated residential areas ended up either closing or merging when the pupils in these schools have relatively poor academic performance, and the schools fail in compensating for students' conditions.

3.1 Rosengårdsskolan in Rosengård, Malmö

The city of Malmö decided to close down the Rosengårdsskolan 7-9 in 2013; the parents and students in the Rosengård neighborhood demanded the city reopen the school, which it did in the Fall of 2019. The Rosengård neighborhood is the most segregated residential area in the town, like Kronogården in Trollhättan. Before the city's politicians decided to close down the school, an investigation by the school inspectorate *Skolinspektionen* found that the school had two main problems, a poor study environment for the students and a poor workplace for the staff. There were even some violations of rules concerning discrimination and bullying cases between pupils and against the teaching team in the school. (Palm, 2019)

Notably, three out of four students in the school spoke Arabic as a mother tongue, which means the classes were highly segregated. Before closing the school, 130 students in grades 7-9, and only one-fifth of 9th-grade students, achieved the knowledge required for their grades. The school and the city tried to implement different initiatives to improve the result for 25 years. The city introduced a well-known *Rosengårdmodel*, which attempted to reorganize the specific times for a lecture and break for the class to improve

the study results. For instance, the model includes new routines, working methods, support structures, and attitudes favouring the students. (UR, 2019)

The politicians decided to reopen the seventh grade in the fall of 2019 because of the pressure parents and students put on the city. Today, the classes remained segregated like in 2013, but there are fewer students in each class than before. In the meantime, there have been more than one thousand new students each year with a foreign background ready to enrol in other schools in the city. It had caused higher pressure on other schools in the city to enrol new students, forcing the city to reopen the Rosengård school. (UR, 2019)

The introduction of the Rosengårdmodel, according to the Malmö City, leads to creating a calm study environment and more secure feelings in staff and pupils in the classes. The city mentions that feelings of anxiety and disturbance were marked in the classes before introducing this model. The model was introduced based on the research and analysis of the different support structures in classrooms, routines, and treatments of the students. For instance, this model creates a clear schedule available on the notice board. The workflow in all lectures has become similar, and there will always be an adult involved in different spaces with students, like in transferring school restaurants and sports activities. The model has also introduced a genre-based pedagogy based on the circle model to achieve teaching and learning goals. (Ravhed, 2018)

3.2 Creating a giant school; Nyköping Model

In the fall of 2014, Nyköping city's four different upper secondary schools (7-9) merged into one school, *Nyköpings Högstadium*, with around 1300 students. According to the city, the aim was to reduce segregation in the city, where people with diverse backgrounds and living conditions have been increasingly segregating (Nyköping Municipality, 2020). In each class, the students were mixed based on crucial factors like socioeconomic background, parents' education level, origin, gender, and educational needs (Hedqvist 2016). The city introduced the so-called Nyköping Model to compensate for the students' different conditions with a mixture of students with different socioeconomic and

migration backgrounds by creating a multi-ethnic class to facilitate integration for the immigrant students within the municipality. (Jacobsson, 2016)

By introducing this new measure to counteract segregation, the student's academic performance improved to a certain extent. However, the new school faces other challenges. For instance, 53 out of 120 teachers left the school in the initial period of merger planning. One of those leaving teachers has claimed the main reason was that significant numbers of teachers were dissatisfied with the merger decision taken by the city. Additionally, one of the leaving teachers found themselves alone in a 117 students class. When an extra special teacher left the job and the school did not replace them with another, he could not handle the class alone. (Alexis, 2016).

The students with higher-educated and Swedish parents have been leaving for independent schools (UR, 2019). In the meantime, the merged school has become commonplace for students with a foreign background and socioeconomically disadvantaged families. Thus, school segregation could not be reduced in the city. A report presented by the Royal Academy of Sciences school committee noted that the free school choice system prevents the municipalities from addressing school segregation under its authority. The report finds that since merging the four schools into one, school segregation does not look different from before the merger. In other words, the pupils with Swedish backgrounds have been concentrating in the independent schools, while the students with a weaker socioeconomic and migration background remain in the municipal schools. (Groll & Thorén, 2018)

3.3 School closures in Gävle and Örebro

In what year? Gävle municipality decided to close down the Solängsskolan 7-9 and transfer its pupils to Nynässkolan F-9. Altogether, approximately 550 students were hosted by the receiving school. According to the city, growing gaps in academic performance between schools become the main reason behind this decision. (Eklöf, 2016) Meanwhile, the decision-makers from the Municipality claim that the aim was to improve integration in the city. Simultaneously, the composition of pupils needed to rearrange to decrease the difference in academic performance between schools. (Ränttilä, 2016)

Likewise, the Örebro municipality decided to close the Vivallaskolan 7-9 in Vivalla neighborhood in 2017 to tackle school segregation and improve the result; the measure started in 2017. The district is one of the most segregated residential areas in the city with a higher unemployment rate and criminality, while the school had 94 percent of students with a foreign background. The city decided to transfer the pupils from Vivallaskolan 7-9 to four different schools, and a positive outcome of this measure has been seen in the girls' results in receiving schools. In contrast, in the early years after closing down the school, those receiving schools did experience decreased results in high school eligibility. (Färlin, 2020) Thus, the ongoing research at Örebro University (2017) on this topic has yet to come up with results, so it is too early to draw a general conclusion.

4. Conclusions

Before we draw any conclusion from the above, it is essential to mention the primary concern regarding the previous school closure cases in other municipalities (except ongoing research in Örebro). Namely, the lack of research, follow-up study, and unavailability of academic investigations on these cases are among the main limitations of this study. Such studies would have been on the motivations and reasons behind municipalities' closure decisions. Furthermore, such studies could have explored how the allocations of pupils went and what results from such political decisions produced in pupils' academic performance, school integration, and residential segregation. Additionally, the cases are politically loaded issues, provoking much debate at that time in many municipalities, making it even harder to find balanced and objective news and materials. I instead tried to go through municipal online accessible material archives mostly, even here I have not succeeded in extracting all materials; one reason might be the municipalities' lack of archiving the old news and reports online.

Besides the limitations, if we conclude this short study, the Trollhättan municipality primarily presented the closure motivations and reasons of Kronan 4-9 look to many extents similar to the previous cases. The city portrays an urgency of addressing school segregation, and poor academic performance as a by-product of residential segregation in segregated schools' results. More significant numbers of students in segregated schools

like Kronan do not achieve the knowledge requirements. With the different state's aid and support, the municipality's education administration *Utbildningsförvaltningen* could not compensate for the disadvantageous socioeconomic conditions of pupils in segregated schools.

This study shows that these cities experience poor academic performance school before deciding the closure segregated schools. This is a significant negative impact of residential segregation, free school choice, and the ineffectiveness of compensating efforts. Consequently, the political body *Kommunfullmäktige* of the city usually intervenes by deciding whether the school closure would be possible to counteract segregation, improve results or minimize the negative effects of residential segregation in schools. Furthermore, it is believed that the classes in municipal schools need to be mixed more with students from different ethnic backgrounds, residential areas, and socioeconomic statuses in order to create a more heterogeneous class. The city has also stated in its proposal that by moving pupils from Kronan to other municipal schools, it will be possible for the moving students to have classmates with a Swedish background, which makes it them easy to learn Swedish [To bathe in the Swedish language] which would eventually help them integrate into Swedish society. (Trollhättans Stad, 2020 & 2021)

When it comes to creating a new class after the merger or closure of the schools in the new school, there have been some similarities between those schools; for instance, in Gävle and Örebro, they had moved the pupils to a specific school or unit. While in Nyköping, they merged all four municipal schools and mixed the classes with pupils' different socioeconomic and ethnic backgrounds. In the case of Trollhättan, it shows that the five schools will receive Kronan's pupils. All five schools have a limited number of students with foreign backgrounds so the classes will be more ethnically mixed, as the city claim.

5. Reflections on the closure of the Kronan school

To begin with the main concern this study aims to explore, discussing how the role of segregation, demographic factors, and academic performance has become key reasons

and motivations behind the closure decision of Kronan 4-9 by the Trollhättan municipality. In the closure proposal presented by the municipality (2020), one can locate three main arguments that are repeated and highlighted. In addition, the representatives from the main political parties in the municipality echoed the same arguments, is, on the citizen dialogue (organized by Trollhättans Stad) in the municipal hall on September 10, 2020 (live streamed via YouTube).

The municipal reasons behind the proposal to close Kronan 4-9 are the following, 1) to deal with the poor academic results of students in Kronan, 2) to deal with the uneven composition of students in Kronan 4-9 due to the product of residential segregation, free school choice and disadvantageous socioeconomic factors in the suburb of Kronogården, and 3) to create a multicultural classroom to promote integration, promote democratic values in the city's schools.

5.1 Segregation, demographic factors, and results

Assmo et al. (2020, 2021) have illustrated the residential segregation in Trollhättan municipality that contributed to the school segregation, in addition, Kronan school is in one of the city's most segregated suburbs. According to the authors, the municipality had implemented three different measures to compensate for the segregated schools in the city, although Study 1 shows that students' academic performance has not improved in the last five years (2014/15-2018/19) in the Kronan. Furthermore, the municipality argues in the report that closing Kronan would be the right way to tackle the problem of school segregation rather than just focusing on addressing other socioeconomic challenges first, such as housing segregation, unemployment, etc. It is therefore impossible to expect that school segregation will automatically be resolved after other socioeconomic challenges have been addressed by the city.

The demographic factors of the Kronan school should not be ignored in the reasons behind the municipal proposal therefore most of the students in Kronan have a foreign background with non-Swedish as a first language, and a lower level of post-secondary education in their parents make the school most segregated school in the city. At the same time, as Kronogården is one of the most segregated suburbs in the city, the students in the

Kronan come from the Kronogården which shows that residential segregation is directly reflected in the demographic features of the Kronan students.

Furthermore, most of the students with a foreign background with non-Swedish as a first language, go to the same class, then it is impossible to imagine they will perform well in the Swedish language, and that it will be easy for them to integrate into Swedish society. Even in order to pass other subjects (mathematics, science, social studies, etc.), it is therefore required that the students have good knowledge of Swedish, so if such knowledge is lacking, the students may not pass the exams or get good grades. In such a situation, the compensatory resources, the integration projects, and the free school choices might not have been enough to deal with the problem of school segregation on this scale, which is why the municipality had to take drastic measures such as closing the school, which I think is the main reason to why the municipality came out with the closure proposal.

In addition, the free school choice offered to students and their parents has not been used in the Kronan case, so the students with a foreign background go to the same school and they come from Kronogården. If the parents were aware of and used it, the composition of students in the class might not have looked like it does. Most of these parents lack post-secondary education, which would be one of the main reasons why free school choice did not occur. As Assmo et al. (2021) have stated that unfavorable socio-economic and educational conditions have meant that parents with lower education levels of Kronan students might not choose the right school for their children and do not know how the process of free school choice works. Again, the role of the Swedish language is a crucial factor to have a good knowledge of the Swedish school system that would lead to choosing the right school for their children. The demographic factors of the school in the actual neighborhood have shown a significant impact on the composition of students in the class, the exercise of free school choice, the students' Swedish language skills, and so on. All these circumstances with long-term negative consequences for the student's future, the municipality had no other option than to close down Kronan 4-9, that is the main reason that Study 2 finds by investigating the case of the closure proposal.

5.2 Limitations and discussions

Study 2 has relied on two main sources, one is Study 1, and another is the municipal documents (ex. the actual proposal, a citizen dialogue), information, and local-regional news articles and discourse on the closure proposal of Kronan 4-9. Some limitations are important to mention here, I had no direct communication or contacts with the stakeholders, i.e., the responsible municipal staffs, or concerned pupil, and their parents. Meanwhile, amid the covid-19 pandemic, I had no choice but to rely on digital sources to explore the research topic.

Therefore, study 2 is based on the official and external materials available in digital form. Then one can ask, what result it might have produced if I had used other methods to collect data, and information and if I had direct contact with the stakeholders and concerned people, the answer is impossible to locate, because what I aimed to engage with Study 2 is to explore the municipal reasons and motivations behind closure proposal of Kronan 4-9. So, the method I employed to get access to the research materials is not something different so the result would be different.

Again, it is impossible to pinpoint the exact alternative outcomes here, although what I can at least demonstrate here is based on the close reading and analysis of official documents, audio-video materials, and discourse that are accessible digitally. So, the question of whether I had different access to any research materials that could make it possible to produce other outcomes, is something I cannot speculate on here now. Otherwise, it demands rather a careful reading, analysis, and interpretation of official materials and discourses to explore the official reasons for the closure, thus the closure topic had been loaded with socio-political and ethnic issues that led to evoke and provoke different questions and skepticism in the media and digital forums. The challenges of classifying and separating these all issues raised by the stakeholders and local citizens had been not least the easy task during the exploration time. In the meantime, I strived to include the crucial perspectives of locals, pupil, and their parents to illustrate a clear and concise picture of debates, local campaigns, and opinions of political parties regarding the closure proposal the municipality laid out.

Additionally, the previous school closure examples I have presented above are based on similar cases to the Kronan, and as the Trollhättan municipality has also treated some of these cases (ex. Örebro, Gävle) in terms of successful practices in motivating behind the closing proposal of Kronan 4-9. At the same time, it is not difficult to find other examples (Svt, 2018) of school closures, but these given school closure cases have similar reasons and motives, namely, to address school segregation, the poor performance of segregated schools, promote integration, etc.

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