Bachelor Thesis: “The Boys Discussion”

Study success differences in Dutch higher education

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Acknowledgements

This bachelor assignment has been done by me to finish my bachelor in public administration. The assignment could have been done internally (from the University of Twente) or externally. In my case, I have chosen for an internal assignment under CHEPS (Center for Higher Education Policy Studies). CHEPS is an interdisciplinary research institute situated at the University of Twente. Since 1984 CHEPS has been publishing a considerable amount of research related to higher education with a primary focus on system- and institutional level. CHEPS strives for more understanding about the institutional, national and international issues in higher education.

In this report, research has been done towards gender inequality in study success in Dutch higher education by means of doing a literature study. The goal of this study is to find relevant factors of learning environment that could influence the gender inequality in Dutch higher education, so that in the future, appropriate actions could be taken. This research tried to shed some light on the policy problem of gender inequality in Dutch higher education, that has been receiving increasing relevance over the past few years. It is a first step towards creating new insights into a complex and increasing relevant phenomenon.

This bachelor assignment is the first research I had to conduct myself, which made this a challenge for me. Of course I had help and guidance from my mentors, but most of the findings I had to do myself without help from other students, making me the main responsible for this paper.

My main reason for conducting this research over an external assignment is to get acquainted with doing research for the first time. I have had classes about doing research before, but I never have done a lot with this knowledge in practise. An additional goal has been actively use academic writing in English. I believe these experiences will be useful for me in the future.

I would like to thank my supervisors, Hans Vossensteyn and Renze Kolster for their efforts to help and guide me during my research. Through their experience and knowledge on the subject, they have given me structure and insights, which would be hard to attain myself.

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Abstract

The gender gap in study success in Dutch higher education has existed for many years, but has shifted around two decades ago. Boys always seemed to outperform girls, but since the '90 females started to catch up in higher education. In 2005, female students became the majority and seemed to outperform boys in terms of study success in higher education. Male students tend to drop out more often and take more time in completing their studies. The female advantage and the gender gap in higher education has still been growing till this day. Politicians and policy makers are currently orientating what can be done towards this relatively new phenomenon. This literature study tried to look at which policy instruments could be used to address this issue through affecting the learning environment of Dutch higher education institutions. Factors of learning environment have been identified and several recommendations have been made on which policy instruments could mitigate the gender gap. These gender specific interventions were based on underlying gender differences in (non-)cognitive skills, meta-cognitive skills, attitude, behavior and motivation.

While some recommendations have been made, these were often based on attributes of gender stereotypes, following these recommendations could heighten the risk of reinforcing those stereotypes. Several case studies towards “good practices” of successful Dutch secondary and higher education institutions showed that these institutions did not use gender differentiated policy and that all students, male or female, benefit from clarity, structure, diversity aimed towards all students’ interest and strong support systems with personal attention and face-to-face interactions with the staff. Till this day, barely any higher education institution in the Netherlands has developed specific policy towards the male underachievement and only a few institutions have done any research in what can be done to reduce the gender gap. They are aware and acknowledge the problem, but do not see the phenomenon as a priority. More insights are needed towards the males underachievement in study success, so research-based politics can be developed in the future. This thesis is a first step in that direction.
1. Introduction: Background and Relevance

The goal of this chapter is to give historical background about the shift and growth of the gender gap, together with the increasing attention from researchers and policy makers that came with it. We want to make clear why the growing gender gap has caught the interest of policy makers and what role the factors of learning environment can play in this.

1.1 History

Gender differences in study success have been a topic of study for several decades, but the meaning of the gender effect in education has recently started to change. In the past, girls always ran behind boys in educational achievement. Various reasons were given, like traditional values of family and a masculine school culture (Claessen, 2013b). Teachers expected less from female students and unconsciously gave less attention to them, creating a self fulfilling prophecy. This is called the Pygmalion effect (Claessen, 2013b). In the ‘60s ‘70s and ‘80s the Dutch government was actively trying to improve the educational situation of girls. Boys and girls schools were replaced by coeducation and several campaigns were started to increase the enrollment of girls in (higher) education. All these governmental actions had little to no effect, especially in higher education (Claessen, 2013b).

However, the gender issue started to shift during the ‘90. During this period the number of students in higher education grew rapidly (CBS, 2015b; Driessens & Langen, 2006). This positive growth was mostly supported by the strong increase of female students enrolling in higher education. So, while the absolute number of male students enrolled in higher education did increase over the years, their percentual advantage faded in regards to females (CBS, 2015b; Driessens & Langen, 2006). Males did not seem to have more trouble reaching higher education over the years, females just grew faster in their enrollment than males (Figure 1.1).

The increasing participation of women in higher education was an expected development, because since 1995 more Dutch girls than boys were enrolled in the higher levels of secondary education (HAVO and VWO), which were the fastest routes that lead to higher education (Coenen, Meng, & Velden, 2011). These developments in secondary education would result in women becoming the majority in Dutch higher education in 1999 (Figure 1.1). The female advantage mostly relates to HBO, where more female students have been enrolled since 1997. The complete female advantage in enrollment in higher education came around 2006, where females also became the majority of students.
in universities (Ministerie van Onderwijs, 2013). This gender difference in enrollment on both levels of Dutch higher education still exists till this day. The gender gap did not only stop at enrollment, several researches and data also showed that male students seemed to drop out more often and take more time to graduate than female students (CBS, 2014b, 2014c; Driessens & Langen, 2006).

1.2 Different Perspectives
This remarkable shift caught the attention of several researchers, leading to an increasing number of publications and literature over the years. Inequality in educational achievement is not a new topic of discussion for researchers and policy makers. A lot of research has already been done to find differences in gender, ethnicity and social economic status (SES). All these variables have shown to be at least partly responsible for some of the differences in study success. Some studies even state that these three factors could be interrelated (Dekkers, Bosker, & Driessens, 2000). Even though there has been an increasing interest towards all these factors, the factor of gender has been getting lot of attention lately because of the shift in study success between boys and girls.

One of the newer perspectives to explain the gender gap in study success is the biological perspective. This approach states that there are born differences between boys and girls in the way they learn and their brains develop over time. Some brain researchers state that the brains of boys need more time in puberty to develop certain meta-cognitive skills like planning, self-efficacy, group work and seeing consequences of their actions. But since this is a new field of study, there are still discussions about the reliability of these findings (Alst, 2010; Driessens & Langen, 2011; Voyer & Voyer, 2014). This approach, however, is being used more and has been gaining support rapidly (Claessen, 2013b). It is also often stated, that to succeed in 21st century education, students need to possess a high level of self-regulation (pay attention, follow directions, finish schoolwork, self-discipline etc.). Girls seem to perform better on these aspects according to several studies (Duckworth & Seligman, 2006).

Another perspective is the social-cultural perspective, which states that environmental factors like family, peers and school contribute to the gender gap, creating a resistant anti-school attitude with boys, and a more confirmative, obedient attitude with girls (Driessens & Langen, 2011). This statement is supported by other studies that show that boys’ study culture is significantly less study orientated (Houtte, 2004) and that non-cognitive abilities seems to be a significant determinant for the gap in college enrollment between men and women (Jacob, 2002). We also saw before that some literature stated that the gender gap might be interrelated with ethnicity and social-economic status (SES). Several documents and articles found evidence that the gender gap was significantly smaller with students from a lower SES and significantly higher with students from non-western ethnicity (CHEPS, 2014; Driessens & Langen, 2011).

1.3 Policy problem?
Together with researchers, the growth of girls in higher education and their better performance also got noticed by the Dutch media. Not only in the Netherlands, but also the rest of the world media got hold of the growing gender gap (Economist, 2015; Gnaulati, 2014). These media labeled this phenomenon as the “Boys Problem” (Claessen, 2013a). Because the growing relevance through the media attention, the problem has worked its way up to the political agenda, where governments started to see it as a policy problem. Currently governments are discussing on how serious this problem is and are orientating on how they can reduce the gender gap (Rijksoverheid, 2014).

Dutch higher education institutions are feeling increasingly pressured from their government to improve study success rates. The increasing attention from the government for student efficiency and
study success started in the ‘80s, when increased autonomy was given to higher education institutions. In 1982 the nota HOAK was introduced in the Netherlands, which gave more autonomy to higher education institutions. Institutions became responsible for the quality of their education, with output being a main determinant of the height of monetary funding from the government (Geerdink, 2010). After this the Dutch government took several other measures over the years to promote study efficiency. The main reason for these measures, was to control the costs of higher education (Geerdink, 2010). The increased attention on output, efficiency and performance also made it clear that boys took longer to graduate and drop-out more frequently. The lack of study success for boys in higher education is currently costing the higher education institutions a lot of money, which makes this phenomenon relevant to them.

Next to the control of costs, economic development and globalization also create an increasing pressure on the Netherlands as a knowledge economy, which in turn creates a need for a lot of high educated citizens. A low study efficiency does not comply with the goals of the Dutch government to compete with other countries with knowledge as most important product (Geerdink, 2010). This would explain the measures of the Dutch government to increase study efficiency in higher education institutions. But how is the need for high educated citizens related to the gender gap in educational achievement? To find the answer, a look has to be given to the report of the OECD (2012). This report states that while girls seem to outperform boys and seem less likely to drop out, these women are also less likely to make it to the top of the career ladder. This way the Dutch government is not making the most out of the available talent pool (OECD, 2012).

Since the Netherlands is focusing more and more on services and knowledge, which require a higher education degree, an economic loss is being made in human capital by female graduates who underperform at the job market. Studies show that while the views on traditional gender roles have changed, a lot of people still hold on to the traditional gender role of the male as provider, and woman as care giver. Women make less use of the investments made by the government and higher education institutions to attain their degree (Ministrie van Onderwijs, 2012). This problem has already been partially tackled by the Dutch government through different actions, like giving woman options to combine work live and private live better (for example providing sufficient daycare centers and part-time job opportunities). However, we can still see gender differences on the job market, giving hints that it takes time for certain traditional views to change. So it is important to keep the gender gap at a minimum and promote study success for both genders.

1.4 The Role of learning environment
Even though the biological factors of the brain and social-economic factors of ethnicity, SES, and home environment are important, they can barely be influenced by policy making. This study wants to look at the phenomenon of the gender gap from a policy perspective. The goal is to take a step back and find relevant factors that contribute to the gender gap in educational achievement from the higher institutions themselves. If relevant factors could be found, Dutch higher educational institutions and the Dutch government can take appropriate action with the help of fitting policy (instruments). For this reason, this study will focus on the effect of learning environments of higher education institutions on gender differences in study success, since this variable is likely to let itself be influenced by policy (instruments).

The number of studies discussing the “Boys Problem” has increased, but very little is still known about the role learning environment plays in the gender gap in study success. Some studies have referred to feminization of primary education, which means that there are too many female teachers,
leading to fewer male role models (Alst, 2010). Other literature mentions that education is becoming more linguistic and gives priority to independent learning, group work and self-efficacy (Alst, 2010). This school experience would play into most girls strengths and boys weaknesses (Duckworth & Seligman, 2006). Boys need more time to fully comply with this modern educational orientation (Alst, 2010). There are even some articles giving evidence that that classroom environment can contribute to an anti-school attitude for boys which could lead the inequality in education (Legewie & Diprete, 2012).

So there already are snippets of knowledge about learning environment factors that could (partly) explain the difference in study success between boys and girls, but none have yet given recommendation about what can possibly be done to reduce these difference in study success. The goal of this study is to take a first step into identifying relevant factors of learning environment to explain gender differences in study success in Dutch higher education. Based on these finding the study tries to find fitting policy instruments to mitigate “the Boys Problem”.

1.5 Structure of the report
In chapter 2, the research question and sub-questions we want to answer will be identified. It also discusses on this study set criteria on how we found, evaluated, selected and analyzed the literature. Chapter 3 will give a clear conceptualization of study success based on several Dutch and international articles and mentions the most important factors. Chapter 4 will discuss these found factors of study success in more detail to see if there is a gender gap and if so, where this gender gap starts to occur. It also gives statistical proof of the gender gap in study success. Chapter 5 will give a clear conceptualization of the learning environment and identifies the most relevant factors that could influence the gender gap. Chapter 6 will mention the most relevant differences between boys and girls that could explain the gender gap in study success and can be affected by the learning environment. Finally, Chapter 7 will give the most relevant interventions in the learning environment factors to reduce the gender gap, based on the previous found differences between boys and girls found in Chapter 6.
2. Methodology

In this chapter the methodology of this literature study will be discussed. This was done using the six steps and guidelines from the framework created by Cooper (2009) to ensure validity and trustworthiness of this literature review. The six steps are: 1. Formulating the research question 2. Collecting the literature 3. Evaluating the found literature 4. Analyzing and integrating the outcomes 5. Interpreting the evidence 6. Presenting the results (Cooper, Hedges, & Valentine, 2009).

2.1 Research Question

This literature study chooses for a descriptive research question, since this is a relatively new topic of study (Babbie, 2010, pp. 92-94). The research question I would like to answer is:

“Which factors of learning environments have an influence on the difference in study success between boys and girls in Dutch Higher Education and what policy (instruments) can higher education institutions use to reduce this difference?”

To help us answer our main research question, several sub-questions have been created:

1. How is the concept “Study Success” defined and what factors does it consist of?
2. How is the concept “Learning Environment” defined and what factors does it consist of?
3. What does literature say about the factors and theories behind differences in study success between boys and girls in (higher) education?
4. What are the most relevant factors of learning environments that can affect study success differences between boys and girls?
5. Which interventions could be made to reduce the gender gap in Dutch higher education?

It is clear that study success is our dependent variable. More specifically, our dependent variable is the difference in study success between boys and girls in Dutch higher education. One of the goal of this literature study is to describe “study success”, and the independent variable of “learning environment”, explain what they mean and what factors they consist of. Since there only have been a few studies who looked specifically at learning environment in explaining the gender gap in (higher) education so far, this study tries to take a first step in finding and creating links between learning environments and gender when looking at study success.

The units of analysis can be derived from the research question: “Dutch students in Higher education”. But since this study is looking for factors that can be influenced by policy, also “Dutch Higher Education Institutions” and “the Dutch Government” can be identified as units of analysis, since they are the ones who have to implement current and future policy (Babbie, 2010, pp. 98-99). The focus lies on Dutch students, institutions and government to keep a specific focus on one country. Sampling articles from multiple countries would complicate the study, because multiple different higher education contexts and systems would have to be taken into account. This could be very time consuming, time that this study unfortunately does not have.

2.2 Literature Search

In this section the procedures that will be used to find relevant research will be discussed (Cooper et al., 2009). The actual units of analysis are Dutch Higher Education students and institutions, but for a literature study the most important selection process is to decide which articles and documents are chosen and how these documents will be found (Soerensen, 2004).
The articles were sought using the domain based strategy. This searching strategy takes a starting point with a precise definitions of what is under study. It uses multiple related key words for e-database searching. This strategy is often used by literature reviewers entering a new domain, with the goal of creating overview article describing this domain (Soerensen, 2004). Since the area of learning environment and its effect on study success is relatively new, the thesis followed this strategy, using well known scientific data bases like Google Scholar and Web of Science. To prevent that we would miss relevant and important literature, all usable search terms have been used to cover every aspect of the topic under study. For international articles the following search terms were used: “Study Success” “Student Success” “School Success” “Educational Achievement” “Gender gap” “Boys problem” “Higher Education” “Learning Environment” “Classroom Environment” “Class Environment” “Gender” “Policy Instruments Higher Education” etc. But also Dutch articles needed to be included using similar search terms like: “Studiesucces” “Jongensprobleem” “Leeromgeving” etc. Relevant and recent documents need to be found on national and institutional level using websites and documents of relevant Dutch Higher Education Institutions and the Dutch Ministry of Education.

After the domain based searching strategy (Soerensen, 2004), a snowball searching method has been used to find the other related articles, which were could not be found with the relevant search terms alone. With this snowball method, the reference list of all previous found articles are looked through and relevant titles are picked up that can contribute to answering the research question. By doing this a wider collection of “hidden” articles was found related to important previous found articles, thus giving a more cohesive collection of literature.

2.3 Evaluation and selection of the found studies

After the articles are found, it is important to assess the literature on usability and keep an overview of all relevant information (Cooper et al., 2009). For this reason a literature selection framework has been made (Table 2.1). This framework has been set in an Excel file and gives an overview of the articles, while giving assessment criteria on which found articles are selected.

<table>
<thead>
<tr>
<th>Article</th>
<th>Topic</th>
<th>Unit of analysis</th>
<th>Type of study</th>
<th>Country of origin</th>
<th>Year</th>
<th>Journal</th>
<th>Validity</th>
<th>Number of citations</th>
<th>Outcomes</th>
<th>Policy implications</th>
</tr>
</thead>
</table>

*Table 2.1: The Selection and Analysis Framework*

The title and authors are mentioned together with the main topic of the article, which has to be related to our topic of study. The units of analysis and type of study (quantitative and qualitative) are also mentioned. Further, the articles can be assessed based on validity (does the literature come from a reliable source and is it peer reviewed?) and country or countries that were covered by the study. International articles were included, but it needed to be sure that enough relevant Dutch articles were found and that the found international articles had relevance outside of their country contexts. The framework also checked from which year and journals the articles were from and how often they have been cited. Even the articles that have less citations could be used, depending on the context they were written in. For example, articles in Dutch have lesser citations because they have a smaller audience. Finally the most relevant and usable outcomes of all articles were shortly written down in the outcome column, which is to summarize the conclusions resulting from the studies. After summarizing the articles, they were checked one more time to see if they contain any policy implications to narrow the gender gap in study success, thus giving hints what factors of learning environment are the most relevant.
2.4 Analysis and integration of results
After all relevant information has been collected, it was important to summarize and integrate the found information (Cooper et al., 2009). An overview of the documents was made by scanning the articles and creating an overview of the relevant data, by filling in the literature selection framework in an Excel file. All documents were separated into different groups based on which sub-question of the research they tried to answer. Some articles contributed to answering several sub-questions. For each of these sub-question, a different selection and analysis framework has been made.

When all these articles had been analyzed, detailed notes were taken on the main points and conclusions of the articles. These conclusions were put in the corresponding column of the analysis framework. These main conclusions were combined for each sub-question. Then these conclusions were compared: Articles that conceptualized study success and learning environment needed an overview what variation existed in the way they interpreted and conceptualized the variables. Articles that contained theories about the differences in gender for study success, also needed to be compared to look for differences but also to find similarities. Articles with theories needed to be checked on reliability and key statistics proving their conclusions. Finally, any methodological or theoretical gaps in the literature has been looked for (Gal, 2006).

2.5 Interpretation of the results
It is most important for this study to draw a conclusion based on the found research evidence to answer our research question (Cooper et al., 2009). To summarize our research evidence and answer our research question, it was needed to identify the relationship between the different literature. One of the final steps consists of drawing general conclusions for the groups of related documents and articles, giving an answer to each sub-question. The conclusion for the sub-questions can be identified by determining what all documents in one group have in common, but also in which aspects they differ. All the conclusions of the different sub-questions were then combined and linked to create a final conclusion where the most relevant learning environment factors have been identified. These were used to make recommendations (Gal, 2006).

2.6 Presenting the results
The found information will be complemented by several figures and tables. These can illustrate the gender gap or certain effects of the learning environment on the gender gap. Tables can also be used to give an clear conclusive overview of the most important factors of study success and learning environment.
3. Study success and the factors it consists of

Before we want to find factors of learning environment that can affect study success in higher education, we first need a clear conceptualization of study success. Several articles have been found, which investigated and conceptualized study success. These are mainly Dutch articles, as well as some international ones. This study looks at some conceptualizations of study success in secondary education, but the main focus lies on higher education to create our own conceptualization.

3.1 Dutch perspective

When looking at the literature describing study success, we found that several articles described the concept in different ways. Since this study focuses on Dutch higher education, mostly Dutch articles were used to conceptualize study success, complemented with a few international articles. Recently, a lot of Dutch studies have been published to measure or conceptualize study success in higher education. We will now mention the most relevant ones. An overview of all factors and the number of mentions by articles can be found in Table 3.1.

Van der Heijden et al. (2012) attempted to create a model to predict study success in the Dutch university bachelor education that holds policy relevance. Study success was defined into four categories: drop-out in year 1, drop out after year 1, study time longer than 4 years, attaining a degree after 4 years or attaining degree after 3 years. These categories state that completion of study and drop-out status are important factors of study success in higher education. But in agreement with other articles (Bruinsma & Jansen, 2009; LKvV, ISO, & LSVb, 2014; Torenbeek, Suhre, Jansen, & Bruinsma, 2011) it also indirectly implied that time needed for students to complete their study was a relevant factor.

Articles of Nelissen & Boon (2014) and Bruinsma & Jansen (2009) mentioned similar factors for study success in their conceptualization. Both articles tried to find factors predicting students’ first year study success in Dutch higher education in attaining their propedeuse. Nelissen & Boon (2014) conceptualized study success as student status two years after admission (propedeuse, persister or drop-out). The variables of drop-out status and attainment of propedeuse were also mentioned by Bruinsma & Jansen (2009). They differed from Nelissen & Boon by conceptualizing study success by students obtaining their first year diploma within 12 months, therefore putting more emphasis on the factor of time to attain a first year degree. Was is noticeable, is that completion of study is not mentioned in both articles, since they both only look at first year study success. However, they do see the factors of time needed to attain a degree (in their case propedeuse) as relevant.

Other Dutch articles who measured study success found similar factors: retention/drop-out status and time needed to complete study. However, these articles also found additional variables for describing study success, like average grade and collected study points (EC) (Arnold & Rowaan, 2014; Torenbeek et al., 2011). A Dutch article from LKvV, ISO & LSVb (2014) stated that study success in higher education in the Netherlands is often measured with the previous mentioned factors, like the level of drop-out after the first year and the number of months needed for a student to complete their studies. However, this document also gave us a broader perspective on study success. This perspective is more about personal development of the student rather than the attainment of a degree. This personal development could be, for example, achieved through more extracurricular activities.
3.2 International perspective
In the previous section Dutch articles conceptualized study success. But does the Dutch research correspond with international articles? To check this, we found some international articles that measure study success in higher education. An international literature review mentioned that the term study success has different meanings in several different countries, but in all these countries the concepts shares one common characteristic. This characteristic is the completion rate of the study and is concerned with the successful completion of the study program (CHEPS, 2014, pp. 14-24).

An empirical study which measured universities’ teaching efficiency, considered completion rate (number of graduates), average grade results and employment rates as the most important output factors of universities (Kuah & Wong, 2011). The study of Chalmers (2008) used similar parameters to measure universities teaching and learning quality. These parameters included completion rates and employment rates after graduation as well, but in addition mentioned retention rates (students enrolled in one year and still enrolled in the next year) and drop-out rates (enrolled in one year, but not enrolled the next year) as factors of study success. The importance of the factor completion rate has been emphasized, but the other factors of study success should be taken into account. Overall, the international perspective and the Dutch perspective appear to be similar.

3.3 Policy perspective
It has become clear that study success consists of different factors, with each article differentiating slightly. But which factors of study success are deemed important enough to include in this study? Since we want to look at the gender gap from a policy perspective, it is important to see if the Dutch government has its own definition of study success. We already know that since the ’80, the Dutch government took more measures to increase study success efficiency (Geerdink, 2010).

When taking a look into the agreement between the Dutch ministry of education (OCW) and all higher education institutions in the Netherlands (Rijksoverheid, 2012), it states that higher education institutions are partly reliable on study success for the amount of funding they will receive from the Dutch government (Geerdink, 2010; Ministerie van Onderwijs & Universiteiten, 2011). In the agreement, study success is defined by high completion rates, minimum time needed to finish the study, low drop-out rates and low rates of switching studies (Ministerie van Onderwijs & Universiteiten, 2011). This definition covers a lot of factors that were previously mentioned.

<table>
<thead>
<tr>
<th>Factors</th>
<th>#Mentions</th>
<th>Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attainment of propedeuse</td>
<td>2</td>
<td>(Bruinsma &amp; Jansen, 2009; Nelissen &amp; Boon, 2014)</td>
</tr>
<tr>
<td>Collected EC</td>
<td>2</td>
<td>(Arnold &amp; Rowaan, 2014; Torenbeek et al., 2011)</td>
</tr>
<tr>
<td>Time needed to complete study (or attain propedeuse)</td>
<td>5</td>
<td>(Bruinsma &amp; Jansen, 2009; Heijden et al., 2012; LKvV et al., 2014; Ministerie van Onderwijs &amp; Universiteiten, 2011; Nelissen &amp; Boon, 2014)</td>
</tr>
<tr>
<td>Average grade</td>
<td>3</td>
<td>(Arnold &amp; Rowaan, 2014; Kuah &amp; Wong, 2011; Torenbeek et al., 2011)</td>
</tr>
<tr>
<td>Employment Rates</td>
<td>2</td>
<td>(Chalmers, 2008; Kuah &amp; Wong, 2011)</td>
</tr>
<tr>
<td>Personal Development</td>
<td>1</td>
<td>(LKvV et al., 2014)</td>
</tr>
</tbody>
</table>

*Table 3.1: Factors of study success according to several Dutch and international articles and documents*
Based on this agreement and the previous found Dutch and international conceptualizations, the most important factors were combined in Table 3.1. This table also shows the number of articles that mentioned these particular factors. Drop-out rate, completion of study and time needed to finish study seem to be mentioned most, which makes these factors most relevant. Average grade, attainment of propedeuse and collected EC’s seem have lesser mentions but are still seen as relevant, since these factors can contribute to our previous mentioned factors of study success (completion, drop-out status and time to complete study). Since the agreement between the Dutch Ministry and the Higher education institutions, focus has been more on drop-out status and completion of study within a limited time frame. This is the concept of study success we mainly will focus on in this study.
4. Gender differences in study success

This chapter will look more deeply into the meaning of the concept of study success found in chapter 3. We want to know where in their school careers study results between boys and girls start to differ. To know if there is a difference in study success for gender in Dutch higher education, it is important to look where and when these differences start to occur. An answer can be found by looking at data from the school careers of boys and girls in the Netherlands. Also alternative explanations for differences in study success in Dutch higher education were found and ruled out. The findings are then being supported by statistical evidence that show that study success is related to gender.

4.1 Primary education

In the year 2011/2012 primary education started with almost as many girls (49.6%) as boys (50.4%) (Claessen, 2013b). In performance the girls and boys seem to barely differ from each other. The final test of primary education, called Cito test, measures the knowledge and competences of the students. The differences in the final scores of this test barely seemed to show differences worth mentioning. There are only small differences in the sub-tests, with boys scoring better on math and girls scoring better on language and study skills (Driessens & Langen, 2006). These study skills, however, could be very important determinants for the advice teacher gives to students for secondary education. Teachers focus on the Cito-score, but also other competences like study skills and attitude. Since girls score better at these points, they could get a higher advice (Claessen, 2013b). Other studies, however, show no difference in the advice given by teachers (Driessens & Langen, 2006).

4.2 Secondary education

The first differences between boys and girls in school careers usually start to appear in secondary education. Boys and girls enter secondary education on a more or less equal level, but in the first two years of HAVO and VWO a first shift already appears in the advantage of girls. These small differences only grow stronger in the third till last year of study (Claessen, 2013b). In Figure 4.1 we can see how girls have caught up with boys in completing and graduating in the highest levels of secondary education in the Netherlands, HAVO and VWO. Girls became the majority of HAVO graduates in 1978 (not depicted) and the majority VWO graduates in 1993 (Figure 4.1). Boys also seemed to get lower average grades at their diploma (Claessen, 2013b), get held back more and drop out more often than girls from higher secondary education the past years (Coenen et al., 2011).

![Figure 4.1](image-url)
The reason behind this gender shift in secondary education is not clear, although the gender gap in secondary seemed to grow more rapidly after the introduction of the “Tweede Fase” and the “Studiehuis” in 1998. Some people mention emancipation of women in education with growing motivation as the only reason, but it is also possible that girls nowadays can cope better with the requirements of the current Dutch educational system (Coenen et al., 2011).

The “Tweede Fase” or “Second Phase” was a new system of secondary education in the Netherlands in 1998, divided secondary education into a first phase (1st till 3rd grade) and a second phase (4th till 5/6th year). One of the main goals of this new system was to create measures that would give the student more opportunities for independent studying that would connect better to the way of working in higher education (Studiehuis), shifting from a more traditional learning environment to a more active learning environment. Since we already mentioned that non-cognitive skills were better developed with girls, we could see the “Tweede Fase” as a possible explanation for the growth in gender gap.

After the introduction of the “Tweede fase” in 1998, the absolute number of both boys and girls in secondary education grew substantially. However, the percentage of boys has been under 50% from 1998-2008 in VWO and HAVO has become smaller in this time period (Coenen et al., 2011).

- The percentage of boys in HAVO dropped the first years after 1998, stabilizing the years after.
- In VWO, the percentage of male students dropped in the period 1998 till 2008 for all classes.
- Noticeable is that in 5 HAVO, the participation percentage of boys is lower than in 3HAVO and 4HAVO in the period 1998 till 2008, giving indications that boys have more problems making the step to the final year, taking them more time to complete their study.
- The percentage of boys dropped more harder after 1998 in 5VWO and 6VWO than in 3VWO and 4VWO. An indication that boys have more problems in their final years after the introduction of the “Tweede Fase”.

The previous information gives hints that the introduction of the “Tweede Fase” could have had a possible influence on participation of boys in secondary education, especially in VWO, which is the main path to universities. However, more evidence for this is needed. The absolute numbers of boys graduating higher secondary education might have grown, but the number female graduates has grown faster. Girls also seem to perform better than male students in secondary education (Coenen et al., 2011).

### 4.3 Higher education

All the developments of school careers of boys and girls enters a final stage in the Dutch post-secondary education (MBO, HBO or WO). After secondary education the gender differences do not subside or become smaller in higher education. On the contrary, the differences have grown. The growth of the gender gap in higher education can be seen in Table 4.1, 4.2, 4.3 and 4.4

<table>
<thead>
<tr>
<th>Year</th>
<th>Bachelor</th>
<th></th>
<th>Master</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>Boys</td>
<td>Girls</td>
</tr>
<tr>
<td></td>
<td>Percentage</td>
<td>Months</td>
<td>Percentage</td>
<td>Months</td>
</tr>
<tr>
<td>2010/2011</td>
<td>43%</td>
<td>57</td>
<td>57%</td>
<td>52</td>
</tr>
<tr>
<td>2011/2012</td>
<td>43%</td>
<td>58</td>
<td>57%</td>
<td>53</td>
</tr>
<tr>
<td>2012/2013</td>
<td>42%</td>
<td>57</td>
<td>58%</td>
<td>53</td>
</tr>
</tbody>
</table>

*Table 4.1: Percentage of graduates and study time according to gender in HBO bachelor and master*

*Source: (CBS, 2014b)*
When looking at Table 4.1, we can see that the gender difference in graduates for HBO has reached a high point. The school years from 2010/2011 till 2012/2013 did not show any signs of change:
- Among HBO bachelor graduates, around 57-58% were female from 2010-2014
- Among HBO master graduates at least 68-69% were female from 2010-2014

Table 4.1 also shows that girls are indeed more successful and efficient completing their studies in higher education. This efficiency is confirmed when looking at the number of months needed to receive their bachelor or master degree. Girls attain their HBO bachelor degree 4 to 5 months faster than boys from 2010-2013. Only for the HBO-master, there is no difference to be found between boys and girls. This could be because HBO-masters are mostly followed by adult students.

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage</th>
<th>Months</th>
<th>Percentage</th>
<th>Months</th>
<th>Percentage</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/2011</td>
<td>45%</td>
<td>59</td>
<td>55%</td>
<td>50</td>
<td>46%</td>
<td>82</td>
</tr>
<tr>
<td>2011/2012</td>
<td>46%</td>
<td>58</td>
<td>54%</td>
<td>49</td>
<td>46%</td>
<td>81</td>
</tr>
<tr>
<td>2012/2013</td>
<td>44%</td>
<td>53</td>
<td>56%</td>
<td>47</td>
<td>47%</td>
<td>79</td>
</tr>
</tbody>
</table>

Table 4.2: Percentage of graduates and study time according to gender in WO bachelor and Master

Source: (CBS, 2014c)

If we look at Tables 4.1 and 4.2, a lot of developments in HBO correspond with the developments in WO. Girls are the majority of university graduates for WO bachelors and WO masters from 2010 till 2013. To see if girls are more efficient then boys in attaining their degree, we can again look at the number of months students need to finish their study (Table 4.2). Girls attain their WO bachelor degree 6 till 9 months faster than boys the past years, although the difference has become smaller in 2012/2013. Where there was no difference in time needed to attain an HBO-master between boys and girls, the WO-master does show a difference. It takes boys 9 till 10 months longer to get their master degree at the university, partially caused by the facts that girls already attained their bachelor faster.

Several articles also mention that girls drop-out less than their male counterparts (Claessen, 2013b; Driessens & Langen, 2006; Ministerie van Onderwijs, 2013). Numerical evidence for this can be found in Table 4.3 and 4.4, showing the drop-out percentages for male and female students per year in higher education (HBO and WO). The tables show that indeed, boys tend to drop-out more than females from 2009 till 2012 for both HBO and WO and in all years of study.

<table>
<thead>
<tr>
<th>Starting Year</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>16%</td>
<td>22%</td>
<td>25%</td>
<td>26%</td>
<td>13%</td>
<td>18%</td>
<td>19%</td>
<td>21%</td>
</tr>
<tr>
<td>2010</td>
<td>16%</td>
<td>23%</td>
<td>25%</td>
<td>-</td>
<td>14%</td>
<td>18%</td>
<td>20%</td>
<td>-</td>
</tr>
<tr>
<td>2011</td>
<td>18%</td>
<td>23%</td>
<td>-</td>
<td>-</td>
<td>15%</td>
<td>18%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2012</td>
<td>17%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>14%</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4.3: Study progress and drop-out rates at HBO level in the Netherlands

Source: (CBS, 2015a)
From these data we can conclude that the gender gap in higher education has not diminished the past few years. Girls reach higher education more often and attain their degree faster and more often than boys. Boys seem to drop-out more often in higher education in their first year, but also in later years of their study. The school careers of boys appear to be going more problematic than girls (Claessen, 2013b).

### 4.4 Alternative explanations

It is possible that alternative explanations can exist, explaining the difference in study success between boys and girls? Some of these alternative explanations need to be ruled out. A first explanation could be that more girls than boys are born, which could partly account for the difference in enrollment. Table 4.5, however, shows that this is only not true, but that even more boys than girls are born in the Netherlands over the years. We can also look at mortality rates as a possible explanation. The difference between boys and girls seem to be at an older age, but the focus of this study lies on (younger) students. Since the difference in mortality rates at student age is almost minimal, it is not possible to hold this factor accountable for the differences in enrollment in higher education.

<table>
<thead>
<tr>
<th>Year</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
<th>% Boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>122,796</td>
<td>116,332</td>
<td>239,128</td>
<td>51.4%</td>
</tr>
<tr>
<td>1970</td>
<td>122,330</td>
<td>116,582</td>
<td>238,912</td>
<td>51.2%</td>
</tr>
<tr>
<td>1980</td>
<td>92,948</td>
<td>88,346</td>
<td>181,294</td>
<td>51.7%</td>
</tr>
<tr>
<td>1990</td>
<td>101,561</td>
<td>96,404</td>
<td>197,965</td>
<td>51.3%</td>
</tr>
<tr>
<td>2000</td>
<td>105,637</td>
<td>100,982</td>
<td>206,619</td>
<td>51.1%</td>
</tr>
<tr>
<td>2010</td>
<td>94,129</td>
<td>90,268</td>
<td>184,397</td>
<td>51.0%</td>
</tr>
<tr>
<td>2013</td>
<td>87,957</td>
<td>83,384</td>
<td>171,341</td>
<td>51.3%</td>
</tr>
</tbody>
</table>

### 4.5 Statistical association

The numbers already show sizeable differences in attendance and study success between boys and girls in the Netherlands, and some alternative explanations have already been ruled out. The gap starts to occur in secondary education and grows further in higher education. But are there articles that can show statistical association between gender and study success differences in higher education?
In a recent article, Arnold & Rowaan (2014) measured a statistical association between gender effect and study success in economics and econometrics in the Netherlands. The gender effect was seen as a weak predictor for study success and deemed other factors like preparatory education or motivation stronger. The article did state, however, that the study could not rule out the existence of a gender effect. This article alone, however, does not give sufficient proof. The first article that stated more explicitly that boys achieve significantly lower than girls do was Houtte (2004), who compared boys and girls school scores in secondary schools in the Flemish speaking part of Belgium.

A very important article to give statistical proof of an association between study success and gender is the study of Voyer & Voyer (2014). This meta-analysis quantified the gender differences by examining several empirical studies that evaluated gender differences in scholastic achievement in elementary, junior/middle or high schools and at university level. This school achievement was measured by teacher assigned school marks. A small but statistical significant association was shown for the overall sample in the advantage of women with a p-value under 0.05. The significant difference in study success between gender could be influenced, however, by moderators like country of origin, source of marks and racial and gender composition. This shows that while there is an association between gender and study success, several factors have significant influence and could enlarge or diminish the gender gap.
5. Learning Environment and the factors it consists of

Over several years, multiple articles can be found that tried to conceptualize and even tried to measure learning environment. The found articles in this study reveal that the concept of learning environment is much more complex and diverse than the conceptualization of study success in the previous chapters, which had a more uniform conceptualization. A noticeable example of the diversity in interpretations of learning environment is that it is not always named as such. Learning environment is being used as an intertwined concept with classroom environment in several articles (Ames, 1992; Fraser, 1998; Meece, Anderman, & Anderman, 2006). This chapter tries to identify the most important factors of learning environment and select those ones which are related to study success. We will first try to identify general, international conceptualizations of learning environment created in secondary and a higher education context. After this Dutch (higher) conceptualizations of learning environment will be used. Finally, all these factors from different articles are combined and merged according to similarities in their descriptions.

5.1 Learning environment in an international (higher) education context

One of the first reliable and valid instruments to measure classroom environment were the learning environment inventory (LEI) and the Classroom Environment Scale (CES). The LEI was an instrument that measured the perception of students by the use of fifteen dimensions of high school classrooms (Fraser, Anderson, & Walberg, 1982). The fifteen dimensions (or factors) that were mentioned by this instrument were:

1. **Cohesiveness**: Extent to which students know, help and are friendly to each other.
2. **Diversity**: Extent to which the class provides for differences in pupil interest and activities.
3. **Formality**: Extent to which behavior within the class is guided by formal rules.
4. **Speed**: Extent to which class work is covered quickly.
5. **Material environment**: The availability of adequate books, equipment, spaces etc.
6. **Friction**: The amount of tension and quarrelling among students.
7. **Goal Direction**: The degree of goal clarity in class.
8. **Favoritism**: The degree in which the teacher favors certain students.
9. **Difficulty**: The level in which students find difficulty with the work of class.
10. **Apathy**: The level in which students find affinity with the class activities.
11. **Democracy**: The level in which students share equally in decision making in class activities.
12. **Cliqueness**: The extent to which students refuse to mix with the rest of the class.
13. **Satisfaction**: The extent of enjoyment of class work.
14. **Organization**: The extent to which classroom activities are clear and well organized.
15. **Competitiveness**: Emphasis on students competing with each other.

The LEI has been used in other research quite often, so it has been field tested. One of the more remarkable findings, is that a lot of these studies found an association between learning environment and students achievement (study success). We would also like to point out that studies showed that the factors of friction and competitiveness were higher when there was a higher proportion of boys than girls.

The Classroom Environment Scale (CES) developed by Moos & Tricket (1974) also wanted to assess the dimensions of high school social climate. They found three dimensions (relationship, personal development and system management/change) that exists in almost every institutional setting. All nine factors described in the CES can be put under one of these dimensions:
-Relationship dimension
1. **Involvement**: The extent to which students have attentive interest in class activities and participate in class discussions. The extent to which students do additional work on their own and enjoy the class is considered.
2. **Affiliation**: The level of friendship students feel for each other. The extent to which they know and help each other with homework and enjoy working together.
3. **Teacher Support**: Measures the amount of help, concern and friendship the teacher directs towards the students.

-Personal development dimension
4. **Task Orientation**: The extent to which it is important to complete the activities that have been planned. The emphasis the teacher places on staying on the subject matter is assessed.
5. **Competition**: Emphasis placed on students competing with each other for grades and recognition. An assessment of the achievement of good grades is included.

-System maintenance/change dimension
6. **Order and organization**: The level of students acting in an orderly and polite manner and the overall organization of the assignments and classroom activates.
7. **Rule clarity**: Emphasis on establishing and following a clear set of rules and if the students know what the consequences will be if they do not follow them (consistent use).
8. **Teacher control**: How strict the teacher is in enforcing the rules and severity of punishments.
9. **Innovation**: Measures how much students contribute to planning classroom activities and the amount of unusual and varying activities and assignments are planned by the teacher.

The CES has also been used in higher education by de Young (1977). This study showed that the CES was an usable tool for instructors in higher education to evaluate the classroom environment by involving their students. Students gave real and ideal levels of all factors of their classroom environment, so appropriate measures can be made to minimize any discrepancies. Minimizing these differences led to more satisfied and motivated students in higher education (Young, 1977).

Finally, the article of Ames (1992) tried to describe learning environments in relation to achievement goal theory. It states that the classroom environment consists of classroom structures who influence children’s orientation towards different achievement goals, thus influencing their motivation. Ames (1992) identified the following three classroom structures:
1. **Tasks**: Need to be designed in a way that the tasks involve variety, diversity, offers a reasonable challenge and involves the students interests (personal relevance) to promote student motivation. Motivation can also be increased by setting short term and specific goals.
2. **Evaluation and recognition**: The perception from students on their evaluation can have an influence on their motivation and orientation towards their goals. Evaluation needs to focus on individual improvement (private evaluation that focuses on students effort).
3. **Authority**: The degree in which teachers involve students in decision making to help them develop responsibility and independence. Students need a say and a level of autonomy in task completion, methods of learning and pace of learning. At the same time the teacher must also support students in planning and self management.

It was also mentioned that teachers play a big role in the effect of classroom structures, since they are the ones who structure the classroom. If all these structures head in the same direction as mentioned above, you will create a classroom environment focused on mastery motivation, promoting high quality learning. More about the effect of classroom environment on motivation will be mentioned in section 6.1 and 6.2.
While there has been research done before towards learning environment in general, specific articles about learning/classroom environment related to higher education could only be found in small numbers. Fraser & Treagust (1986) also created an a valid and internal consistent instrument to assess the classroom environment, but focused on universities. This instrument was called the College and University Classroom Environment Index (CUCEI) and measured the perceptions of students and teachers on classroom environment by the use of seven scales:

1. **Personalization**: Opportunities for individual students to interact with the teacher or other support systems and their concern for the students’ personal welfare.
2. **Involvement**: The extent to which student participate actively and attentively in class discussions and activities.
3. **Student Cohesiveness**: The extent to which students know, help and are friendly to each other.
4. **Satisfaction**: The extent of enjoyment in class.
5. **Task Orientation**: The extent to which class activities are clear and well organized.
6. **Innovation**: Extent to which the teacher plans new, unusual class activities, teaching techniques and assignments.
7. **Individualization**: Extent to which students are allowed to make decisions and are treated differently according to ability, interest and rate of working.

The CUCEI shows a lot of similarities with the LEI, a reason for this could be because of the involvement of the same researcher. The CUCEI, however, gives a more specific focus on conceptualization of the learning environment in higher education. This gives us a better indication on which factors of learning environment in higher education are most important. Just like the LEI, the CUCEI found an association between learning outcomes of the student and the nature of the classroom environment (Fraser & Treagust, 1986).

### 5.2 Learning environment in a Dutch (higher) education context

Learning environment are all measures, materials and guidance strategies aimed to facilitate the learning process of people (Simons, 1999). This is a general interpretation of learning environment, but what factors contribute to a good learning environment? Several Dutch articles made statements about which factors could be relevant.

One article stated that a powerful learning environment must leave enough space for independent exploration of the student for learning task and projects, while at the same time offer systematic accompaniment, taking the individual needs of the student into account (Corte, 1990). Lodewijks (1993) gave six factors or characteristics of a strong learning environment:

1. **Complete and rich**: Learning environment needs to provide sufficient variety.
2. **Activating**: Learning environments needs to challenge the student to make them go to work.
3. **They have to be realistic**: Make clear to students what they can and cannot do with their gained knowledge.
4. **They need to contain models and coaching**: The learning environment needs to show which learning or thinking activities could be used and coach needs to help to chose and implement these learning and thinking activities.
5. **They need to leave navigation to the student**: Where coaching is important in the first part of study, on the long term the student should been given more space for self-study and autonomy.
6. **They need to systematically raise awareness with the students of its own competence**: A student needs to see in which way he became more competent, which could motivate students.
One of the more recent articles we found came from Nijhuis, Segers & Gijselaers (2008). This study used a conceptualization in a Dutch higher education context. This study looked at the influence of learning environment perceptions on deep and surface learning strategies from second year students in a Dutch university. It identified five key elements of the perception of students on learning environment (Nijhuis, Segers, & Gijselaers, 2008):

1. **The quality of teaching**: Extent to which teachers provide students feedback, explanations, motivation and understand their problems.
2. **Clarity of goals**: Extent in which the course structure was clear and meaningful (clarity of what is expected of a student).
3. **Appropriateness of assessment**: Extent to which students are tested on memory or understanding and the extent that feedback is based on marks or not.
4. **Appropriateness of workload**: Extent to which workloads are heavy or easy and if students have enough time to finish the workload.
5. **Level of independent learning**: Extent to which students are given the choice and freedom in the work they have to do.

The study found several significant relationships between these elements of learning environment and the two types of learning strategies. Several of these elements could encourage the more beneficial learning strategies. More about learning strategies will be discussed in the next chapter.

The most recent Dutch article gives a more concrete interpretation of the concept of learning environment, looking more at the physical aspects and the material environment of higher education institutions. It mentions four different levels of learning environment, that all contribute to study success (Kok, 2012):

1. **Educational services**: ICT facilities, the allocation of college spaces, lighting, furniture etc.
2. **Comfort services**: Availability of printers and a quality front office
3. **Confined spaces for teachers to work**
4. **Social spaces**: Atmosphere of the building(s), the arrangement of the informal spaces, inner climate of the building(s) etc.

According to Kok (2012), all these aspects of learning environment have an influence on study success, positive or negative. So do educational services and comfort services have a (strong) positive influence on study success. Confined spaces, however, have a negative effect on study success, since it gives teachers the opportunity to distance themselves from their students. This means that there is less personal contact between the teacher and student, where he is able to help his students. Social spaces do not show to have a significant effect on study success. An extra factor that we could consider under learning environment is the scale of the higher education institution, which has a strong effect on study success (-0.3% for 1000 extra students). This could be because of the lack of identity, lack of social control and the increasing distance between teachers and students that comes with it.

### 5.3 Aggregation of factors

It has become clear that many different instruments have been developed over the years to measure learning environment and each includes a lot of different factors. However, several similarities between factors of different instruments could be found. This section merged all similar factors together to find the most relevant learning environment factors influencing study success. This list can be found in Table 5.1. We can cluster these factors into two groups. Course related factors, which are factors inside a classroom or lecture hall and are more related to didactic aspects. General institution related factors are the factors which could affect students outside the lecture hall.
Table 5.1: Factors of learning environment

<table>
<thead>
<tr>
<th>Factor</th>
<th># Mentions</th>
<th>Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student Cohesiveness</td>
<td>3</td>
<td>(Fraser et al., 1982; Fraser &amp; Treagust, 1986; Moos &amp; Trickett, 1974)</td>
</tr>
<tr>
<td>Variety/Diversity</td>
<td>5</td>
<td>(Ames, 1992; Fraser et al., 1982; Fraser &amp; Treagust, 1986; Lodewijks, 1993; Moos &amp; Trickett, 1974)</td>
</tr>
<tr>
<td>Rule Formality</td>
<td>3</td>
<td>(Fraser et al., 1982) (2x Moos &amp; Trickett 1974)</td>
</tr>
<tr>
<td>Workload</td>
<td>5</td>
<td>(Ames, 1992; Lodewijks, 1993; Nijhuis et al., 2008) (2x Fraser et al. 1982)</td>
</tr>
<tr>
<td>Material Environment</td>
<td>2</td>
<td>(Fraser et al., 1982; Kok, 2012)</td>
</tr>
<tr>
<td>Clarity</td>
<td>7</td>
<td>(Ames, 1992; Fraser &amp; Treagust, 1986; Nijhuis et al., 2008) (2x Fraser et al., 1982; Moos &amp; Trickett, 1974)</td>
</tr>
<tr>
<td>Autonomy</td>
<td>7</td>
<td>(Ames, 1992; Corte, 1990; Fraser et al., 1982; Fraser &amp; Treagust, 1986; Lodewijks, 1993; Moos &amp; Trickett, 1974; Nijhuis et al., 2008)</td>
</tr>
<tr>
<td>Involvement</td>
<td>6</td>
<td>(Ames, 1992; Moos &amp; Trickett, 1974) (2x Fraser et al., 1982; Fraser &amp; Treagust, 1986)</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>2</td>
<td>(Fraser &amp; Treagust, 1986; Moos &amp; Trickett, 1974)</td>
</tr>
<tr>
<td>Support</td>
<td>6</td>
<td>(Ames, 1992; Corte, 1990; Kok, 2012; Lodewijks, 1993; Moos &amp; Trickett, 1974; Nijhuis et al., 2008)</td>
</tr>
<tr>
<td>Testing and assessment</td>
<td>2</td>
<td>(Ames, 1992; Nijhuis et al., 2008)</td>
</tr>
</tbody>
</table>

Curriculum related factors
1. **Involvement**: Level of student affinity, interest in course activities and the enjoyment of tasks
2. **Variety/Diversity**: Extent to which the environment provide variety, diversity and innovation in tasks/assignments and activities.
3. **Workload**: Level of difficulty of the workload and the time limit in which it has to be finished. Is the workload reasonable challenging, but not too heavy?
4. **Clarity**: Extent to which course structure (course goals and activities) are clear, specific and organized.
5. **Testing and assessment**: Type of tests, assessment (marks or not, publicly or not etc.) and ways the students get feedback based on assignments and tests.
6. **Competitiveness**: Emphasis on students competing with each other for grades and recognition.

Institutional factors
7. **Student Cohesiveness**: The level in which students know, help and are friendly to each other.
8. **Rule Formality**: Extent to which behavior is guided by clear, formal rules. Also includes how strict and consistent these rules are enforced.
9. **Material Environment**: Availability of adequate materials like books, ICT, social spaces etc.
10. **Autonomy**: Level in which students can contribute to and have freedom in the decision making process related to class activities and space for self study and independence to develop themselves.
11. **Support**: Opportunities for students to get in touch with support systems like lecturers, faculty, student counselors etc. This help could be explanations about study, talking about personal problems, coaching in planning and the use of learning strategies etc.
We know that there is a significant difference in study success between boys and girls according to several scientific articles, but we still do not know why these differences occur. The available theories and factors trying to explain the differences in study success between boys and girls are too widespread and diverse to cover in one chapter. The goal of this chapter is to take a first step into making a connection between the differences in study success between boys and girls and the previous found factors of learning environment. To do this we looked for articles explaining the difference between boys and girls in (higher) education, but focusing only on those theories that could be influenced with the previous found factors of learning environment.

6.1 Cognitive abilities
Small gender differences in cognitive ability scores have emerged in many, although not all tests on children throughout compulsory education. These differences often show that girls have more literary skills, where boys have a slight advantage in numerical ability (Alst, 2010; Barry et al., 2011; Driessens & Langen, 2011).

This difference has been claimed as the basis for greater male participation in higher education in the past, but now suggest to be the basis for women’s greater participation and success in higher education. It has also been used to explain gender differences in study choices. It partly explains why men still have a slight advantage in attendance over woman in science related disciplines, and the existence of a stronger female advantage in more linguistic disciplines like art. The study choice could also be partly responsible for the differences in study success (Barry et al., 2011).

These findings have been contested, however. The gender gap can vary according to how gender-equal a country is and biological neuro-scientific research towards male and female brains have not found hard proof of any differences in cognitive capacities between boys and girls yet (Barry et al., 2011). Also while girls and boys slightly differ across linguistic and mathematical skills, general intelligence tests (IQ for example) do not seem to show any differences (Claessen, 2013b).

6.2 Gender specific study culture, behavior and attitude towards school
Multiple studies mentioned the difference in study culture and attitude towards learning, school and universities between boys and girls. Boys and young adults seem to be less likely than females to report liking school and university or embrace, enjoy and conform to the requirement of educational institutions (Barry et al., 2011).

Houtte (2004) discovered two remarkable findings: It showed that boys’ study culture was significantly less study orientated than girls’ study culture. Boys are less motivated to study and have a less positive attitude towards school than girls. It could give a reason for the findings that boys work less hard, are more easily distracted and show more disruptive behavior in class than girls (Barry et al., 2011; Francis, 2000; Jacob, 2002; Legewie & Diprete, 2012; Patrick, Kenny-Benson, Pomerantz, & Ryan, 2006). The second finding was that this gender specific study culture significantly influences educational achievement (study success) of boys and girls. A more study orientated culture (often found with girls) would lead to higher educational achievement (Legewie & Diprete, 2012).

The existence of gender specific study cultures and attitude is enforced by peer pressure and the process of social integration in a group in childhood and adolescence (Houtte, 2004). The ideal image
of males and females was already formed in early childhood, and was being enforced by normative peer pressure in adolescence (Driessens & Langen, 2011). The female ideal image of a conforming, diligent and obedient student fits well with the (current) school culture and leads to better working habits, where the male ideal image is tough, aggressive and rebellious. This results resulting in an anti-school attitude with male students, conflicting with the values of educational institutes. This male attitude sees educational achievement or effort for school as “not cool” or not important (Whitelaw, Milosevic, & Daniels, 2000). Even if boys do put effort into their school achievement, it is often important to them not to show their effort (Driessens & Langen, 2011; Morris & Edward, 2008). It has been shown that males in higher education also put less effort in their study than female students (Barry et al., 2011). What is another important finding, however, is that a higher level of competitiveness seems to be part of the male study culture and behavior (Legewie & Diprete, 2012).

There has been little evidence that peer pressure with males continues in higher education, but there is evidence that their anti-school attitude continues to exists. The male attitude towards universities was less positive than those of females, where male students have shown to be less engaged with the learning process and put less effort in their study. This lesser effort can also come from boys’ unrealistically confident and optimistic attitude. A lower degree of male students enjoys or attends lectures, find their lecturers enthusiastic or conformed to the requirements of their educational institutions than their female counterparts. Male students also seemed to find feedback less useful and interact less with peers and the teaching staff. Finally male students are less likely seek help from student services, counselors or other support systems (Barry et al., 2011).

Legewie & Diprete (2012) argue that class environment can shape the conceptualization of masculinity in peer culture, affecting boys’ attitude towards school, learning orientation and academic effort, thus affecting their educational achievement. It stated that school recourses that contribute to an learning orientated environment would suppress masculinity and boys’ negative attitude towards school (Legewie & Diprete, 2012). The study proved this with the following findings:

- There were significant larger female advantages in achievement in schools with a less learning orientated class environment (lower social economic composition)
- A class environment with a higher SES peer composition (an important factor/resource of an learning oriented environment) had a stronger positive effect on the attitude towards school, academic effort and learning orientation for boys than girls. Girls did not vary as strongly in achievement and attitude over different class environments.

Studies have shown that boys’ study culture is significantly less study oriented than girls’, being characterized with lesser effort, weaker motivation and an anti-school orientation. The gender specific study culture leads to different behavior and attitude towards schools and university. This gendered behavior shows to have a significant influence on differences in motivation, attainment (Barry et al., 2011), and educational achievement of boys and girls (Houtte, 2004), partly accounting for the gender gap in education. Other studies claim that the boys’ masculine study culture and negative attitude towards school could be suppressed by creating a learning oriented class environment (Legewie & Diprete, 2012).

6.3 Achievement goal orientation and motivation

Several studies already showed us that boys appeared to be less motivated than girls (Francis, 2000; Houtte, 2004). This difference in motivation is strongly related to the differences in the learning goals both sexes pursue. Two types of achievement goal orientation have been identified in the literature,
although named differently by different authors (Bouffard, Boisvert, Vezeau, & Larouche, 1995). We will use the conceptualization used by Ames (1992):

1. **Mastery/learning goal orientation**: focused on self-improvement and the intrinsic value of learning. People with this type of motivation believe that effort will lead to a certain form of mastery, skill or knowledge and understanding of their work. This would result in failure tolerant students, who are motivated to engage in the learning process and recognize the value of learning.

2. **Performance goal orientation**: focused on one’s own ability and self worth. These persons are driven by the “recognition from” and “outperforming of” others. They prefer achieving success with little effort, making them feel more competent and consider errors as a signal of lack of competence. This often leads to an extrinsic motivated, failure avoiding students.

These two types of goal orientation are intertwined with the two types of motivation: intrinsic and extrinsic motivation. Mastery goal orientation can be linked to intrinsic motivation, which is the motivation to do something because you enjoy it or find interesting. Performance goal orientation can be lined more to extrinsic motivation, which is motivation based on external rewards or to avoid negative consequences. Goal orientation has an influence in the way students are motivated (Ames, 1992). It has been shown that the pursuit of performance goals relative to the pursuit of mastery goals had an undermining effect on intrinsic motivation (Rawsthorne & Elliot, 1999).

But do boys and girls in higher education actually differ in their goal orientation and motivation? Previous articles already mentioned that boys take pride in achieving high academic performance with little effort (Driessens & Langen, 2011; Legewie & Diprete, 2012). This is a very typical aspect of performance goal orientation. Other articles provided further evidence for the difference in goal orientation between gender. Patrick et al. (2006) found that girls endorse mastery over performance goals to a greater extent than did boys (only for secondary education). Geerdink (2010), however, showed some contradicting findings that girls in Dutch higher education are more dependent on the approval of significant others, like teachers, while men trust more on their own opinion. This search towards approval is an aspect of performance goal orientation. Bouffard et al. (1995), however, reported that women in higher education are more mastery orientated than men, but also more performance orientated than men to a lesser extent. This could explain the findings of Geerdink (2010) that girls deem importance to the approval of others more than boys.

Geerdink (2010) also stated that boys in Dutch higher education were more extrinsically motivated, where girls showed to be more intrinsically motivated. These findings have been confirmed in many other articles. Van Alst (2010) mentioned that women in Dutch higher education are more intrinsically motivated, more disciplined and put more hours into their study, while Dutch male students are extrinsically motivated, have an unfocused learning style and are challenged most by competition with other students and teachers. The findings of Van Alst and Geerdink are also supported by Arnold & Rowaan (2014) who gave statistical proof that women in higher education are more often intrinsically motivated than males. The broad motivation to learn in higher education also lies higher with girls (Arnold & Rowaan, 2014; Bouffard et al., 1995).

But are these different goal orientations and motivation patterns between boys and girls related to their enrollment in higher education and their differences in study success? Velayutham et al. (2012) stated that performance goal orientation has the potential to undermine motivation and achievement. Patrick et al. (2006) found that the tendency of girls to be more mastery and less performance orientated than do boys, enhanced girls grades because it fosters beneficial self-regulated learning strategies. Boys on
the other hand show to be more performance and less mastery orientated, leading to lesser grades. The data from these studies, however, is applied to secondary education instead of higher education, but it does give important implications about college enrollment. Patrick et al. (2006) state that the effects described in their study accumulate over time, leading to women pursuing higher education at a greater rate than do men.

Results of Bouffard et al. (1995) and Dompnier et al. (2015) also showed results between goal orientation, motivation and academic achievement, but this time in higher education. According to Bouffard et al. (1995) a systematic relation exists between their learning goal orientation, self-regulation and achievement in higher education for both males and females. Both goal orientation and self-regulation were clear predictors of academic achievement. Female students had a stronger orientation towards learning (mastery) and a lesser orientation towards performance than did males. This accounted for that women used significantly more self regulatory strategies and were more intrinsically motivated, making them outperform males in achievement. An important and remarkable finding in this research, however, is that it showed that performance goal orientation could also have a positive effect on academic achievement, but this effect was only found with male students. Finally, Arnold & Rowaan (2014) state that differences in intrinsic motivation account for most of the variation in study success between Dutch students in higher education.

According to Ames (1992), the classroom learning environment can make different type of goals orientation salient and as a consequence can create different patterns of motivation. Ames (1992) mentions that a classroom that promotes mastery goal orientation is more favorable, because this type of motivation contributes to long term learning strategies, self-regulated learning, and high quality involvement leading to achievement behavior. Performance goal orientation, however, contributes to short term learning strategies and little self-regulation. However, we need to keep in mind that Bouffard et al. (1995) showed that learning environments promoting performance goal orientation could have positive effects on the achievement of boys in higher education.

6.4 Learning strategies and self-regulation (non-cognitive skills)

There is enough proof that boys and girls differ significantly in their approach to learning. In section 6.3 it was already stated that differences in learning strategies could be influenced by gender differences in goal orientation, motivation and attitude. These same studies showed that there is a relation between goal orientation, motivation, the use of self regulated learning strategies and academic achievement (Bouffard et al., 1995; Diseth, 2011; Dompnier et al., 2015; Geerdink, 2010; Patrick et al., 2006; Velayutham, Aldridge, & Fraser, 2012). According to these articles, motivation and goal orientation are strong predictors for a students’ level of self-regulation and which learning strategies they use. These beneficial self regulating learning strategies will eventually lead to higher academic achievement. Some of these articles also mention a gender difference in self-efficacy (belief in own capabilities), where boys’ is significantly higher.

We know that girls are more intrinsically motivated and mastery goal orientated, where boys seem to be more extrinsically motivated and performance goal orientated. We also know that boys have a more negative attitude towards school or college and show more signs of disruptive behavior. The gender differences in attitude, goal orientation and motivation lead to a higher level of self-regulation and more effective learning strategies used by girls (Barry et al., 2011; Bouffard et al., 1995; Patrick et al., 2006). This higher level of self-regulated learning, contributes to their academic achievement in (higher) education (Bouffard et al., 1995; Duckworth & Seligman, 2006). You can see an overview of the relation between these variables in figure 6.1.
Self-regulation is the ability of an individual to control his or her conduct to achieve a set goal. It has several different terms to describe these underlying conceptions. Discipline and self-control have often been used as the same concept. Research showed that self-regulated learning is about a students’ use of cognitive and meta-cognitive strategies, but also effort regulation (maintain focus) and motivation have to be taken into account (Bouffard et al., 1995; Velayutham et al., 2012). Students who are engaged in self regulated learning will set goals, plan, seek information, organize, select strategies and monitor and control to evaluate the effectiveness of these strategies. They are not afraid to ask for help, are self-conscious and rehearse and practice a lot (Bouffard et al., 1995; Velayutham et al., 2012). Boys appear to be less strong in these aspects (Jacob, 2002), using unrealistic confident, risky and less effective learning strategies to do “only enough to get by”. These strategies do not conform with the current higher education landscape, making them more vulnerable to failure. Current elements of higher education seemed to suit girls’ learning dispositions and interests better (Barry et al., 2011).

Motivational enhancing interventions in the learning environment could be made to enhance self-regulated learning (Velayutham et al., 2012). This gives an indication that the learning environment can be changed to influence student motivation and goal orientation (Ames, 1992; Meece et al., 2006), which in turn could cause a difference in the level of self-regulated learning. These changes to learning environment to positively change goal orientation and motivation of boys could positively affect their academic achievement and retention rates (study success).
7. Synthesis of factors and interventions

This chapter tries to find the most important factors of learning environment, based on the previous found differences in gender. We now know that learning environment factors can influence different type of goal orientations, motivation, attitude, behaviour and learning strategies which in turn, contribute to the gender gap study in success in higher education (Bouffard et al., 1995). This chapter tries to find which interventions in the learning environment can make to influence goal orientation, motivation and learning strategies of male and female students, thus affecting their study success and academic achievement. These interventions should be aimed at diminishing the gender gap, but need to promote higher study success for both genders. We looked at Dutch and international policy recommendations about which strategies could be useful for higher education institutions.

7.1 Mastery orientated learning environment?

Several studies have already been done to find effects of the classroom environment on motivation and therefore study success. Classroom environment factors have the ability to make different motivational patterns and goal orientations stand out (Ames, 1992). Almost all articles which investigate the effect of learning environment on academic achievement, state that a learning environments which fosters mastery goals will be more favourable than learning environments fostering performance goals (Ames, 1992; Meece et al., 2006). Learning environments which emphasize on mastery, promote higher intrinsic motivation, long-term, high quality involvement and self-regulated learning strategies used by students (Ames, 1992; Bouffard et al., 1995). These qualities could lead to higher academic results and would be more favourable for almost all students. Learning environments which emphasize on performance, however, often lead to failure avoiding students, having negative effects on intrinsic motivation and are correlated with more disruptive behaviour and lower academic achievement.

But which factors of learning environment promote mastery goal orientation and higher levels of motivation? In which way can these factors contribute to a mastery orientated learning environment? Both Ames (1992) and Meece et al. (2006) mention several of our previous found classroom environment factors that promote mastery goal orientation. The way these factors need to be addressed show a lot of similarities with the recommendations from Lodewijks (1993) and Corte (1990) for a strong learning environment.

- **Variety and involvement**: Tasks should be varied, diverse in their design and content should appeal to the diverse student interests.
- **Workload**: Tasks should offer a reasonable challenge to students, while giving enough opportunities to finish tasks at the appropriate time.
- **Clarity**: Tasks and courses should have clear, short term and specific goals and explanations, so students know what is expected of them.
- **Autonomy**: Students need to be involved in the decision making process about their learning strategies and task completion. Students should be given opportunities to develop independence and responsibility for their own learning.
- **Support**: Students have to be given room to develop independence, but also need support on their development of planning, monitoring, self-regulatory skills, the use of effective learning strategies and how to implement them.
- **Competitiveness and evaluation**: Learning environments supporting mastery orientation should not encourage competition. This can be done by making evaluation and assessment private. If incentives would be used for competition, it should focus on effort and improvement, instead of performance.
The learning environment factors that Ames (1992) and Meece et al. (2006) described should support a mastery goal, leading to higher motivation, better learning strategies, which in their turn predict better academic achievement. But is a mastery goal orientated learning environment preferred for male students and does it address the gender gap? Bouffard et al. (1995) stated that performance goal orientation is also related to academic achievement, although only in the case of boys. Also Meece et al. (2006) mentioned that there is some evidence that performance goals (demonstrating ability and outperforming others) are positively associated with persistence and achievement outcomes, especially for college students. These could mean that interventions should not only aim for mastery and intrinsic motivation, but also performance and extrinsic motivation. In section 7.2 and 7.3 several international and Dutch (policy) documents will be discussed, aimed at recommendations about which interventions higher education institutions can use to react to the lack of male access, retention and success in higher education, based on gender differences.

7.2 International recommendations and strategies

One of the first who tried to develop evidence informed approaches and strategies to improve retention rates and study success of all students across universities in the United Kingdom were Barry et al. (2011). The focus was on which institutional strategies could address the barriers thought to account for the underachievement of male higher education students. These barriers were the previous found gender differences in (non-)cognitive skills, motivation, attitude and learning strategies.

Based on these barriers, Barry et al. (2011) offered insights into strategies to improve male retention aimed within the learning and course context, since a lot of reasons for male students to drop-out seem to be course related. Male and female students report to be motivated by similar factors like an intrinsic interest in the subject and an enjoyable learning experience. The gendered behaviour of male students to work less hard and use more risky learning strategies, would suggest that they may benefit from being alerted to potential risks of this learning approach early in the year. Formative assessment could also be very beneficial, which gives students ongoing feedback about their strengths and weaknesses, so students can improve their learning and instructors can improve their teaching. Even though males appear to find feedback less useful, it is important to also teach them the benefits and techniques of learning from feedback. Males also appear to lack in attendance, this could be improved by giving incentives like the attachment of course credits to attendance or giving assessment feedback in person (Barry et al., 2011).

Institutional barriers for male achievement that needs to be addressed is that male students are less likely to approach services that the universities offer to help them (Barry et al., 2011). Staff ought to ensure that male students attend tutorials rather than assuming that males possess the self-awareness to seek out help and create their own support system. It is therefore very important, especially in the first year, that the academic staff is also more explicit about explaining the availability of (pastoral) support that universities offer to students like student services, personal tutors, student counsellors or course administrative staff. Boys may benefit from a clearly-defined point of contact for academic, behavioural, emotional or motivational support. So more structured opportunities for male students to create their own support mechanisms are likely to be beneficial. This suggest that more resources may be required to support the maintenance of small-group or even face-to-face staff-student interaction and that higher education institutions reward good practises in this regard.

Another article that mentioned the “right” way to educate boys were Martino & Berrill (2003). This “right” way, is a method to mobilize general understandings and assumptions about boys based on their differences in behaviour and learning orientation. This results from gender differences in
biological factors. These assumptions about gender differences were then translated into simple tips for teachers' approaches to address boys' educational needs and influence their orientation to learning. These tips include more hands-on activities, more clear and structured programmes for boys, consistent application of the rules by teachers and a more varied and relevant curriculum which takes boys' interest into consideration (Martino & Berrill, 2003).

Also other international research highlighted elements of what they believed contribute to an effective (literacy) pedagogy for boys, through affecting social behaviour, motivation, attitude and orientation towards learning. These elements involve the need to encourage students' sense of competence and challenge, the importance of teachers to respond personally and with genuine interest to students, designing tasks with a clear and immediate purpose, the allowing of students to have some control over the knowledge they acquire, the accommodation of students' interests and making learning relevant to real world contexts (Smith & Wilhelm, 2002).

### 7.3 Dutch policy recommendations

The recent relevance of the gender gap has also increased the number of Dutch literature which tried to find strategies to address this gap in higher education. So did several articles mention that early drop-out rates were caused by the wrong choice of study, caused by students’ lack of informing themselves, which seemed to be more often the case for male students (Alst, 2010; Geerdink, 2010). Also do male and female students often continue to choose for gender typical studies (Alst, 2010). The factor of study choice has also been mentioned by Barry et al. (2011) as possible contributor to the gender gap, but cannot really be influenced by the learning environment in higher education. Better education and informing of students about the possibilities in high school would be helpful here. Whilst wrong study choices are partly responsible, the learning environment and curriculum also have a role to play in affecting study efficiency and study success differences between male and female students.

An interaction between student and curriculum factors can partly explain the gender difference in study success (Geerdink, 2010). These again match with our previous findings. Cognitive skills and learning styles are mentioned as student factors, but claimed to only show minimal differences. Attitude, motivation, orientation towards the world and approaches to study were considered the most relevant student factors to affect gender differences in study success in higher education. Boys seem more extrinsically motivated, orientated towards objects and themselves and have a closed approach to education. This leads that boys are less likely to ask for help or accept feedback, are more competitive and experience their education less positive. A model of student and curriculum (learning environment) factors is found in figure 7.1.

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<th><strong>Student factors:</strong></th>
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<td>- Orientation on the world</td>
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<td>- Orientation on others</td>
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<th><strong>Curriculum factors:</strong></th>
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<td>- Course goals and content</td>
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<td>- Didactic teaching methods</td>
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<td>- Organization</td>
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<td>- Assessment and testing</td>
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![Figure 7.1 Explanatory model for gender differences in study results and efficiency in Dutch higher education](source: Geerdink, 2010)
Curriculum factors that affect the different performance of male and female students are course content, course goals, testing and assessment procedures to measure the set goals, the organization of courses and the study and didactic teaching methods. Based on differences in student factors, several recommendations for interventions were made by Geerdink (2010) to make the curriculum fit better to the needs of male students. Preferred didactic teaching methods include a clear outline of the study and it’s courses and assignments. The content of study needs to connect to students’ end goals and expectations. It is important to inform students about what is expected from them. Assignments also need to be clear about what is expected of students and what the added value is of doing the assignment. This is important since boys usually tend to start working before delving into an assignment and want to see the practical use of what they are doing. Also testing and assessment are relevant, since girls prefer group and writing assignments and boys are less open to feedback. Lecturers need to consider if the feedback is direct and clear enough in what needs to be changed when considering boys. They also need to consider if essays and writing assignments are necessary or if skills could also be measured through regular and more traditional tests, which boys seem to prefer.

Next to didactic measures aimed at course related factors, also some recommendation for institutional change have been made by Geerdink (2010). In contrast to what other articles have said (Ames, 1992; Barry et al., 2011; Meece et al., 2006), the extrinsic motivation of boys needs to be encouraged with extrinsic incentives, which would increase the level of competition. Like Barry et al. (2010) stated, boys seem to have less non-cognitive skills and self regulation than girls and also seem less likely to try to get contact with tutors or other support systems that the university has to offer to its students. Boys need to be informed about the possibilities of these (pastoral) support systems. Staff needs to keep the lower level of self-regulation and planning with boys in mind, and try to help them develop those skills if needed. One must also look in the way the support is being provided. Boys seem to prefer a rational, well informed approach and like to hear they are doing well. Girls prefer a more personal approach based on trust and a positive relation with the person responsible (tutor). These differences and preferences for types of feedback, support and teaching methods have to be acknowledged when an institute wants to provide fitting, gender specific, academic support.

One of the first who was orientating on possible practical interventions towards the gender gap in higher education in the Netherlands was Van Alst (2010). She identified similar biological differences in study success between boys and girls (boys are extrinsically motivated, competitive, put less hours in study and have low self-regulation) and looked at what studies in universities could do on a small scale to reduce the gender difference in study success by sketching three scenario’s to make higher education fit better with the preferences of boys. The first one was the expansion and improvement of tutoring and support systems in universities. We know boys are less likely to seek help or tutoring. Students need to be given opportunities to reflect on their academic attitude and study progress under guidance of a tutor or student counsellor. To encourage boys to get into contact with support systems, the need of male students to see the benefits of activities and assignments has to be addressed. Tutoring needs to be clearly related to their study to let them see the added value. This is why tutoring and development of academic skills have to be embedded into core courses of the curriculum. The tutoring and study support should also take the difference in academic development of male and female students into account. For academic development female qualities of planning, discipline, dialogue are important, but male qualities like taking risk, competition, goal focus has also a contributing value to academic development. All these qualities have to addressed and developed accordingly for all students.
The second scenario would respond to boys’ extrinsic motivation and the need of boys to see the value in what they are doing. This could be addressed by creating more ‘real life’ and “field work” orientated assignments like excursions, internships, projects or research for actual professional clients with presentations for these clients as final assessment. The expectation is that these measures will heighten the motivation to perform with male students. The last scenario to stimulate male students is by giving more challenge and explorative space. Some modules need to give space for explorative and inquiry learning, which should be accompanied with strict assessment and high expectations. Boys seem to prefer alternative assessment methods like a wiki or a video.

7.4 Learning from good practises

A final article that sought to find interventions to address the gender gap in higher education was Claessen (2013b). He mentioned several interventions like more male teacher in primary education, more exercise at in primary and secondary school and experimentation with the return of gender segregated schools. It has been proven that these interventions would be very unlikely to create a significant positive effect. It could be very useful, however, to learn from good practises in secondary education, since policy addressing the gender gap in higher education has barely been developed (Claessen, 2013b). The parliament in the Netherlands has already looked into results of several Dutch studies which found successful interventions in Dutch secondary education by looking at good practises in middle schools where boys were doing relatively well in terms of study success (Dijken, Loo, Sanders, & Vliegenthart, 2012; Heemskerk, Eck, Kuiper, & Volman, 2012).

A lot of these interventions for secondary education to reduce the gender gap show similarities with the recommendations made for higher education. The literature study of Heemskerk et al. (2012) found that boys like to have challenging, hand-on assignments that are related to the world outside school (real life). These could be internships, guest lecturers or extra-curricular activities where boys are seen as equals in their contribution. Boys need assignments that give room for exploration and where boys are involved in the decision making of their own learning process. Challenging real life assignments with high expectation should respond to boys’ extrinsic motivation and competitiveness. These authentic assignments also encourage the need for variation in work forms, which boys seem to need more to stay concentrated and motivated. These work forms also need to be clearly structured by short step-by-step explanation of what the assignment entails, since boys prefer to start working before reading into assignments. Variety in content and outlet should also connect to the interests of boys.

Heemskerk et al. (2012) also stated that boys are less likely to ask for help or to talk about their problems. This is why counseling and student support should be customized for each individual student based on learning style, learning tempo etc. To achieve this, teaching, counseling and other support has to be given on a small scale with direct students-teacher and student-counselor interactions. Also attention in counseling has to be given to the development of the skills boys are less strong in like meta-cognitive skills (planning, structuring, reflection, discipline etc.). Boys who are at risk of dropping out could also benefit from discipline, transparent rules and regular monitoring of their study progress with immediate reaction and feedback when problems start to arise. Boys need structured, personal and direct feedback, since they are less likely to hear critical feedback.

Currently, CHEPS (2015) is also conducting a case study about what we can learn from good practices in higher education (and MBO) in regard to the gender gap. Here, they found policies used by “good cases”, similar to those previously mentioned. These are teaching and counseling on small scale aimed at individual interaction, regular testing and monitoring or student progress, making student counseling obligatory and teaching students how to use non-cognitive skills (planning, discipline, etc.)
7.5 Complexity of the gender gap

Even though some learning environment factors have been identified and some recommendations related to these factors have been made, the same articles giving those interventions also keep pointing out that the gender issue of study success is very complex with many inter-related factors inside and outside the university context that could affect the gender difference in achievement. The learning environment can only explain gender differences in higher education to a certain extent. Other factors like family situation or even previous educations can have an effect on gender differentiated study success (for example gender specific study choices). This means that it will be very difficult to create a clear and direct solution. (Alst, 2010; Barry et al., 2011; Geerdink, 2010; Martino & Berrill, 2003)

The literature study of Heemskerk et al. (2012) stated that most literature builds on the ideological opposition of the nature nurture debate, creating contradictory findings. Most interventions we found were based on the nature approach to educate boys (Alst, 2010; Geerdink, 2010; Martino & Berrill, 2003). This approach considers boys as an homogenous group with fixed biological and behavioural differences in cognitive skills, attitude towards school, motivation and learning styles, where appropriate measures could be taken. The nurture vision does not see gender as a homogenous group and aims at an differentiated approach beneficial for all students. The case studies of Heemskerk et al. (2012) and CHEPS (2015) gave proof that institutions often do not make policy aimed at one gender. It showed that successful secondary and higher education institutions in the Netherlands where males and females were doing relatively well (good cases) did not use a gender differentiated policy.

While the interventions we found based on fixed gender differences certainly have value to address the gender gap, we must always keep in mind that boys and girls cannot be seen as homogenous groups. We must be wary of becoming over reliant on using underlying fixed differences between boys and girls explained by biological factors. We need to keep the broader context of social factors in mind (Barry et al., 2011; Heemskerk et al., 2012; Martino & Berrill, 2003). Attributing differences in attitude, motivation, (non-)cognitive skills and learning styles only to biologic factors of being a men and women, will create the risk that we reaffirm gender stereotypes, since males and females are still sensitive to peer pressure and gender images (Alst, 2010; Barry et al., 2011; Heemskerk et al., 2012). We must acknowledge gender differences, but need to react appropriately on an individual level.

Most articles also mentioned that while the differences in study success have been acknowledged as a policy problem, the level of systematic research towards gender differences in higher education is limited. Also in the Netherlands, research towards male underachievement in higher education is still in its oriental phase of development. Most literature based their assumptions on theories related towards small scaled studies, but hard evidence based on grand empirical studies has yet to be found. Most Dutch and international research so far focused mostly on primary and secondary education (Alst, 2010; Geerdink, 2010). More attention and knowledge about gender differences would help to create fitting policy and diminish the gender gap (Barry et al., 2011; Geerdink, 2010).

An important barrier to address attainment differences between man and women is the lack of institution-specific information. Higher education institutions have the data by gender, but have barely given attention to it or have put effort into developing fitting strategies to address the gender gap (Barry et al., 2011). The key changes that would really support improved male and female experience and performance are effective, research and evidence based strategy and policy development. The differences in learning outcomes, attendance, satisfaction rate, preferred learning and assessment styles should be routinely monitored at institutional and course level (Barry et al., 2011).
8. Conclusion & Recommendations

The goal of this research was to take a first step into finding relevant factors of learning environment to create relevant policy recommendations to address the underachievement of males in Dutch higher education in terms of study success. Where girls have been the focus of educational research and policy for years, lately the boys problem has been getting more acknowledgement of politicians and policy makers (Claessen, 2013b). Male students are currently the minority in Dutch higher education, seem more likely to drop-out and take more time to complete their studies than their female counterparts (CBS, 2014c). The increase in attention is related to the increasing demand from the Dutch government for high educated civilians. This lead to several measures aimed to increase study success efficiency in higher education. So for higher education institutions it has also become more relevant to increase male study efficiency, since their funding is partly based on their study success rates (Geerdink, 2010). We will now try to answer our main research question, by answering all of our sub-questions in a systematic matter.

1. How is the concept “Study Success” defined and what factors does it consist of?
We have identified several Dutch and international articles who conceptualized study success. These articles were combined and compared to create our own conceptualization of study success, which could be applied in Dutch higher education and holds policy relevance. This interpretation consisted of three main factors: retention/drop-out rates, completion of study and time needed to achieve this. We also identified other factors that are less relevant but contribute to our main factors. These are collected EC’s, completion of the propedeuse and average grades. Study success conceptualized as a student not dropping out and completing their study within a limited time frame seems to be the most relevant for higher education institutions, since these factors are mainly used by the Dutch government to measure study success efficiency. This efficiency partly determines the amount of funding higher education institutions will receive (Ministerie van Onderwijs & Universiteiten, 2011).

2. How is the concept “Learning Environment” defined and what factors does it consist of?
Where study success seemed have a more uniform conceptualization, learning environment showed to be much more diverse and complex. Several Dutch and international articles mentioned several instruments, each consisting of different factors to describe learning environment which could influence study success. However, several similarities between these factors have been found and these factors were merged together into eleven relevant factors. These factors were then clustered into two groups:
- Curriculum related factors: Involvement, Variety/Diversity, Workload, Clarity, Testing & Assessment and Competitiveness
- Institutional factors: Student Cohesiveness, Rule Formality, Material Environment, Autonomy, and Support

3. What does literature say about the factors and theories behind differences in study success between boys and girls in (higher) education?
This literature study found several differences in non-, meta- and cognitive abilities, attitude, behavior, motivation and learning strategies between boys and girls that affect study success. These differences between boys are caused by differences in biological and social development of boys and girls an can be addressed through changes in the learning environment. An overview of the found differences from chapter 6 can be found in Table 8.1.
Cluster Characteristics of boys seen as problematic/differ from girls

Cognitive skills
- Worse literacy skills, better numerical abilities
- No significant difference in intelligence

Attitude
- Lower enjoyment and interest in school and the learning process
- Difficulty conforming to the values and requirements of the school
- Only put limited effort in their study (just enough to get by)
- Attend fewer lectures and interact less with lecturers and peers
- More competitive
- Want to see the relevance and use of doing assignments
- Less open to feedback and less likely to see feedback as useful
- Unfounded confidence and optimism
- Less likely to seek help from support systems

Motivation and goal orientation
- Less motivated to study
- Performance goal orientated over mastery goal orientated:
  - Focus on competition, “recognition from” and “outperforming of” others
- Extrinsically motivated over intrinsically motivated
- Motivation based on external rewards or avoiding negative consequences

Non-cognitive and Meta-cognitive skills
- Low level of self-regulation
- Risky and not effective learning strategies
- Less disciplined
- Fewer organizing and planning skills
- Start working before reading into the assignment
- Harder to maintain focus (easier distracted)
- Lower level of self understanding and self monitoring

Table 8.1: Differences between male and female students contributing to the gender gap in study success

Sources: (Alst, 2010; Barry et al., 2011; Claessen, 2013b; Driessens & Langen, 2011; Francis, 2000; Geerdink, 2010; Heemskerk et al., 2012; Houtte, 2004; Legewie & Diprete, 2012; Patrick et al., 2006)

Differences in cognitive abilities can lead to different study choices, where males more often choose scientific studies and females tend to choose more for linguistic disciplines. This could partly explain the differences in study success between male and female students (Alst, 2010; Barry et al., 2011; Driessens & Langen, 2011). However, this cannot be directly affected by the learning environment. Multiple general intelligence tests between boys and girls have show barely any significant difference in intelligence or cognitive abilities between boys and girls (Claessen, 2013b; Geerdink, 2010).

Boys seem to have a more negative attitude towards learning and educational institutions and are less likely to conform to the current requirements of these institutions. The differences in attitude (Table 8.1) are partly caused by a gendered study culture. This gender specific study culture also influences differences in motivation and learning styles that also explain gender differences in study success. (Barry et al., 2011; Driessens & Langen, 2011; Houtte, 2004; Legewie & Diprete, 2012).

We stated before that boys are more performance orientated than mastery orientated. These types of students want to achieve academic success with little effort and prefer outperforming others over improving themselves. These differences in goal orientation are also strongly related to gender differences in motivation (Ames, 1992; Rawsthorne & Elliot, 1999). This explains why several articles stated that boys were more extrinsically motivated and more competitive than girls. (Alst, 2010; Barry et al., 2011; Driessens & Langen, 2011; Francis, 2000; Geerdink, 2010; Patrick et al., 2006)

These differences in attitude, motivation and goal orientation are strong predictors of boys’ different approach to learning and their level of self-regulation (Bouffard et al., 1995; Dompnier et al., 2015; Geerdink, 2010; Patrick et al., 2006; Velayutham et al., 2012). Boys’ extrinsic motivation, performance orientation and negative attitude towards learning leads to their lower level of self-
regulation and less effective learning strategies. Boys also show to have lower non-cognitive and meta-cognitive skills to plan, organize, monitor, seek help or reflect on themselves and their learning strategies (Alst, 2010; Barry et al., 2011; Driessens & Langen, 2011; Geerdink, 2010; Heemskerk et al., 2012; Martino & Berrill, 2003).

4. What are the most relevant factors of learning environments that can affect study success differences between boys and girls?
Based on the recommendations we found, almost all factors of the factors of learning environment could be addressed to reduce the gender gap in study success. Only two factors were left out, since there was little to no evidence found about their effect on the gender gap in study success in higher education. These were material environment and student cohesiveness. This leaves us with nine learning environment factors.

5. Which interventions could be made to reduce the gender gap in Dutch higher education?
Based on the biological and social differences in (meta-)cognitive skills, goal orientation, motivation and attitude between male and female students, several policy recommendations have been made for interventions in the learning environment to reduce the gender gap in Dutch higher education. An overview of the recommendations for each learning environment factors can be found in Table 8.2

<table>
<thead>
<tr>
<th>Learning environment factors</th>
<th>Policy Instruments/Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Involvement</td>
<td>• Accommodate courses, tasks and assignments more to the diverse student interest.</td>
</tr>
<tr>
<td>Variety/Diversity</td>
<td>• Creating more diversity and involvement by reacting to boys’ extrinsic motivation and competitive nature</td>
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<tr>
<td></td>
<td>• More “real life” and “field work” assignments in curriculum</td>
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<tr>
<td>Workload</td>
<td>• Tasks should be reasonable challenging with high work pace.</td>
</tr>
<tr>
<td></td>
<td>• Give students enough opportunity to finish tasks</td>
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<tr>
<td>Clarity</td>
<td>• Inform students early what is expected from them and inform boys the risks of their learning strategies</td>
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<tr>
<td></td>
<td>• Short term and clear goals for courses and assignments</td>
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<td></td>
<td>• Immediately clarify what the practical use is of an assignment</td>
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<tr>
<td>Testing and Assessment</td>
<td>• Traditional testing methods (for example MC tests)</td>
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<tr>
<td></td>
<td>• More presentations as testing methods</td>
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<tr>
<td></td>
<td>• Formative feedback</td>
</tr>
<tr>
<td></td>
<td>• Immediate and strict feedback on assignments and progress</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>• Offer extrinsic incentives for attendance and assignments</td>
</tr>
<tr>
<td>Rule Formality</td>
<td>• Transparent rules</td>
</tr>
<tr>
<td></td>
<td>• Consistent enforcement of those rules by institutions</td>
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<tr>
<td>Autonomy</td>
<td>• Opportunities to develop independence for own learning</td>
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<tr>
<td></td>
<td>• Modules giving freedom for exploration and inquiry learning</td>
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<tr>
<td>Support</td>
<td>• Embedding counseling into core courses of the curriculum (make counseling obligatory)</td>
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<td></td>
<td>• Make availability of support systems clear immediately at the beginning of the year</td>
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<td></td>
<td>• Regular monitoring of student progress</td>
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<td></td>
<td>• Invest more to create and maintain small scale support systems with student-staff interaction</td>
</tr>
<tr>
<td></td>
<td>• Give training to develop boys’ weaknesses in non-cognitive and meta-cognitive skills</td>
</tr>
<tr>
<td></td>
<td>• Support systems should be rational, well-informed and clear</td>
</tr>
</tbody>
</table>

Table 8.2: Recommendations to reduce the gender gap in study success aimed at learning environment factors Sources:(Alst, 2010; Ames, 1992; Barry et al., 2011; CHEPS, 2015; Geerdink, 2010; Heemskerk et al., 2012; Martino & Berrill, 2003; Smith & Wilhelm, 2002)
Recommendations: Curriculum related factors
Since males tend to be less involved in the learning process and tend to lose interest/motivation sooner than females (Table 8.1), it is important to keep students involved by letting courses, tasks and assignments accommodate to the diverse intrinsic interests of both male and female students (Ames, 1992; Barry et al., 2011; Heemskerk et al., 2012; Martino & Berrill, 2003; Meece et al., 2006; Smith & Wilhelm, 2002). A way to better respond better to this diverse student interest are more varied and diverse work forms that can also respond to males’ competitive nature.

One of these work forms that could create more diversity in the curriculum could be authentic “field work” orientated assignments (Alst, 2010; Heemskerk et al., 2012). These type of assignments bring “real world” to the classroom, linking practice to theory and letting boys see the relevance of doing the courses and the assignments. Examples of “field work” assignments could be guest lecturers, excursions and research or projects for real clients, where students are treated as equals. These field assignments could be concluded with a final presentation for these clients as assessment. Assignments should also be reasonable challenging with high teacher expectations and strict assessment (Alst, 2010; Ames, 1992; Heemskerk et al., 2012; Smith & Wilhelm, 2002). These interventions could improve male students’ study success, by responding appropriately to males’ high competitiveness, extrinsic motivation, performance goal orientation and their need to see the value in what they are doing (Table 8.1). This can lead them to be more involved in the learning process, which in turn could contribute to higher motivation and more effort to study with male students. Effort and involvement can also be improved by providing other extrinsic incentives like attaching EC’s to attendance.

We already stated that it is important to clearly show male students what the added value of the curriculum is. Most interventions found in this literature study also stated that male students benefit from a clear and structured curriculum with a clear purpose and clear expectation of what is expected of its students (Geerdink, 2010; Heemskerk et al., 2012; Martino & Berrill, 2003; Smith & Wilhelm, 2002) . Males’ learning strategies are characterized with working on assignments before looking into what is expected of them and putting in only enough effort to get by. They need to be alerted to the potential risks of these learning strategies at the beginning of the year and need to know expected of them during their study. Also courses and assignments need to be clear and structured. This can be achieved by setting short-term and clear goals with a step-by-step explanation about what the courses and assignments entail (Ames, 1992; Heemskerk et al., 2012).

Male and female students also seem to differ in preferences for testing methods. Linked to girls’ stronger linguistic skills, they prefer to write essays or other forms of writing assignments. Males on the other hand prefer more traditional testing methods that take less time and give immediate clarity if they passed or not. We also mentioned before that boys prefer presentations as testing method (Alst, 2010). Lecturers need to consider for each situation if it is necessary to use essay as a testing method or if they could use more traditional methods like multiple choice tests (Geerdink, 2010). We know male students are less open to assessment and feedback and see it as less useful (Barry et al., 2011). Still it is very important for male students to receive direct, clear and strict feedback on their assignments and general progress when they are underachieving (Geerdink, 2010) and what the desired changes need to be. This is important since male students tend to be unrealistically confident and optimistic about their abilities and are less likely to hear a negative note (Alst, 2010; Barry et al., 2011). For this formative assessment can be used, which gives ongoing feedback about a students’ strengths, weaknesses and progress so students can improve their learning en teachers can improve their teaching. Since boys are less open to feedback, it is also important to explain the added value of feedback to male students (Barry et al., 2011).
Recommendations: Institution related factors

We will now discuss what faculties and institutions can do outside of the lecture halls. Discipline is very important for boys who are at risk of dropping out. Discipline increases by maintaining clear and transparent rules with a consistent use of those rules by their institutions (Claessen, 2013b; Heemskerk et al., 2012; Martino & Berrill, 2003). So next to a clear structure of the curriculum and its goals, rules also need to be clear for boys.

Students need freedom and should be given opportunities to develop independence and responsibility for their own learning (Ames, 1992). Boys need to be involved in the decision making process about their own learning process and given space for exploration and inquiry learning in certain modules (Alst, 2010; Heemskerk et al., 2012). This could be achieved by giving students freedom to design their own education and methods of testing. Another way has already been mentioned by offering a variety of options to attend courses fitting to the diverse interests of students.

While males need independence for to develop their own learning, they still need to be supported in this. It has been stated before that biological differences cause a slower development of non-cognitive and meta-cognitive skills with boys. Male students are not as strong in planning, organizing, discipline, self-regulation and reflection on themselves. At the same time boys are less likely to seek help from the university for the development of these skills. The most mentioned and important recommendation for addressing these differences to reduce the gender gap is the improvement and expansion of student support systems (tutoring and study counseling). It is important to respond immediately to (male) underachievement, therefore it is important to regular monitor students’ progress (Barry et al., 2011). It is also important that counseling is aimed towards boys’ preferences, which seem to be a rational, well-informed approach (CHEPS, 2015; Geerdink, 2010)

There are several ways for higher education institution to improve their support systems and make them more fitting for boys. This can be done by embedding counseling into core courses of the curriculum (Alst, 2010) and making counseling sessions obligatory (CHEPS, 2015). Counseling needs to be clearly related to their study to let males see the added value of it. Higher education staff should not assume males possess the self-awareness to seek out help and should, especially in the first year, be more explicit in explaining the availability of support systems the university has to offer (student services, personal tutors or student counselors). Boys may benefit from a clearly defined point of contact and more structured opportunities to create their own support mechanisms (Barry et al., 2011; Geerdink, 2010). The student support should be customized for each individual student based on their weaknesses. To achieve differentiated support aimed at individual needs, higher education institutions need to invest more resources to support the maintenance of small-scale of even face-to-face student-staff interaction (Barry et al., 2011; CHEPS, 2015; Heemskerk et al., 2012). Since the support systems should focus on individual improvement, they should give attention and training for the development of boys’ weaknesses: non-cognitive and meta-cognitive skills (self-regulation, planning, discipline and the development of more effective learning strategies). It is important to challenge male students where their strengths lie, and support them in their weaker aspects (Heemskerk et al., 2012).

Discussion

This literature study has made a first step into finding effective policy interventions and recommendations to address the growing gender gap in Dutch higher education. However, while doing this study, the complexity of the gender issue in higher education became more apparent. Learning environment is only partly responsible for the differences in study success between male and female students, while other social factors outside the higher education context are also very relevant. All
these factors seem to be interrelated, making it very difficult to create a clear cut solution. It is still important, however, to see how the learning environment can contribute in diminishing the gender gap.

The interventions we found also appeared to have some limitations, since a lot of them are build on fixed biological and social differences between boys and girls. A lot of these interventions assume that boys have less meta- and non-cognitive skill, have a worse attitude and are less motivated, just because of them being male. These approaches tend to see boys as a homogenous group. Overreliance on these fixed differences creates the risk that we reaffirm gender stereotypes.

Case studies of Heemskerk et al. (2012) and CHEPS (2015) in secondary and higher education institutions in the Netherlands where boys were doing relatively well, gave insights that a gender differentiated approach is not always the best method. Most institutions in the study of Heemskerk et al. (2012) did not even know they were using “good practices” and CHEPS (2015) found that the gender gap is not experienced as a problem at higher institution level, but is seen as problem on faculty and educational level. It is remarkable that while most institutions acknowledge the gender gap, only a few developed specific gender policies to reduce this gap in study success study success (Pabo). The findings, however, did similarities of practices of these institutions to the policy recommendations found in this literature study. That all students, male or female, in secondary or higher education, benefit from clarity, structure, diversity aimed towards all students interest and good support systems with personal attention and face-to-face interactions with the teachers, lecturers or staff.

While first steps have been made and the gender gap is increasingly being recognized as a policy problem, more insight and research is needed towards the complexity of reasons behind male underachievement, especially in higher education. Grand empirical studies have barely been done and most evidence is based on small scaled studies. Higher education institutions can also play a role in the increase of research by giving more attention to the gender gap. What would really support improved male and female study success would be effective research-based policy. More research is needed in the future to see how effective these interventions are and what other research based policy can be found to reduce the gender gap in higher education.
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