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6. STUDY SUCCESS IN HIGHER EDUCATION

Mind the Gender Gap

INTRODUCTION

Improving study success has become an important topic in most Western higher education systems. Societies require more and better educated people as the basic driving force for the further sustainable development of their knowledge economies. However, after the rise of participation rates throughout Europe, we are now presumably on a level that makes it difficult to raise the rates substantially further. This can be seen as a reason for higher education policymakers to shift their focus to increasing the success of those in the system. Drop-out rates have to be reduced, time to degree has to be shortened and the quality of graduates should be maintained, or even improved. This has proven to be a challenge, given the diversity of the student population and the inclusion of non-traditional students.

An emerging group of students who are at risk of being left behind are male students. Not only is the female participation rate in higher education higher, women are also outperforming male students in terms of success rate. This trend may become problematic as it implies that talents remain underdeveloped, which comes at high costs for both society and the individual students. Policymakers need to be aware of this (potential) problem and what can be done to prevent or halt the trend. There is a large body of knowledge on what may explain differences in study success in higher education. Most explanations originate from sociology and educational sciences, but more recently results from neuro-physiological studies have added an interesting and promising view on the issue.

Recently, the Dutch Ministry of Education and Science, through its directorate responsible for gender equity, commissioned a study to look for possible explanations for the differences in success rate and potential policy interventions to redress unwanted gender disparities. Based on the first results of this study, done by a consortium of researchers, these issues will be addressed in this chapter. The research questions guiding our research are the following:

1. To what extent is there a difference in study success between male and female students?
2. To what extent is the difference in study success between male and female students considered to be a problem by policymakers at various levels?

C. Sarrico et al. (Eds.), Global Challenges, National Initiatives, and Institutional Responses, 99–117.

3. What theories can explain the difference in study success between male and female students?
4. What policy instruments are used to close the gender gap in study success performance on national and institutional level and how effective are they?

METHODOLOGY

The collected empirical data originates from four sources. The first source are existing statistical databases, like Eurostat and some national statistical datasets. The second source is the HEDOCE-project. As part of this research project for the Directorate General Education and Culture of the European Commission on dropout and completion, in which CHEPS was involved, experts in 35 European countries were asked to reflect on the extent to which gender is a factor influencing study success (Vossensteyn et al., 2015). The third source is a series of case studies for which we conducted interviews or focus groups at seven Dutch higher education institutions (three research universities and four universities of applied sciences), in the period from March to June 2015. The institutions were selected on the basis of:

- small difference in study success between male and female students,
- active policies on study success differences,
- distinct educational models or activating learning environments, or
- programmes in educational domains that are regarded as typically male or female.

In the case studies we aimed to get input from different hierarchical layers within institutions: members of the executive boards, policy makers on institutional level, policy makers on faculty level, researchers, teachers and study counsellors. The institutions will remain anonymous. Therefore, we use the coding as presented in Table 1.

Lastly, academic literature on study success in (higher) education with a special focus on the gender issue was used. As a first step we reviewed overview articles. Using these articles we identified other relevant publications. Additionally, we used a search strategy, using key word such as ‘gender gap’ and ‘study success’ to find the most recent relevant publications. Insights related to the development of the brain were mainly found using the insights provided by one the partners in the earlier mentioned research project.

GENDER DISPARITIES IN PARTICIPATION AND STUDY SUCCESS

At the end of the last century there was only limited attention for the influence of gender on access to and study success in higher education. Gender was seen as an intervening variable, mediating the influence of two mainstream explanations: socioeconomic status and ethnicity. Likewise, the strong rise in the participation rates of women in higher education by the end on the 20th century, let to gender

Table 1. Coding of case study institutions

Institution type	*Function*	*Code*
Comprehensive research university	Member of the executive boards	UNI1A
	Policy makers on institutional level	UNI1B
	Policy makers and researchers on faculty level	UNI1C
Comprehensive research university	Policy maker on institutional level	UNI2A
	Policy makers and researchers on faculty level	UNI2B
Technical research university	Policy makers on institutional level	UNI3A
	Study counsellors on faculty level	UNI3B
University of applied sciences in primary teacher education	Policy maker/teacher on institutional level	UAS1
University of applied sciences	Policy maker on institutional level	UAS2A
	Policy makers, research and teachers on faculty level	UAS2B
University of applied sciences	Policy maker on faculty level	UAS3A
	Researcher on faculty level	UAS3B
University of applied sciences	Members of the executive boards	UAS4A
	Policy makers on institutional level	UAS4B
	Policy makers on faculty level	UAS4C

being gradually side-lined from (inter)national higher education agendas. However, after the turn of the century the issue reappeared, be it in another shape. Male students had lost their 'lead-position' in participation and study success and had started to lag behind female students. In the international research and policy literature this relative shift in performance was highlighted for higher education (Evers, 2006; OECD, 2008; Jorgensen et al., 2009) and for vocational education (Olsen et al., 2014; Jørgensen, 2015). In a recent article in the Economist, the issue was once more reiterated (The Economist, 2015). The abovementioned trends are confirmed by international databases, which show that there is clear gender gap in participation and that it has widened since the turn of the century (see Figure 1). However, the gender gap differs within Europe, both across countries (see Figure 2) and across disciplines (see Figure 3).

The Dutch case does not differ from the international trends; the gender gaps in study success have grown in both higher education (Langen & Driessen, 2006; Severiens & ten Dam, 2012; Claessen, 2013; Schaacke, 2014) as well as in post-secondary vocational education (Herweijer, 2008; Elffers, 2011; Kennisnet, 2013; Kenniscentrum Beroepsonderwijs Arbeidsmarkt, 2014; Onderwijsinspectie, 2014; Platform Beleidsinformatie, 2014).

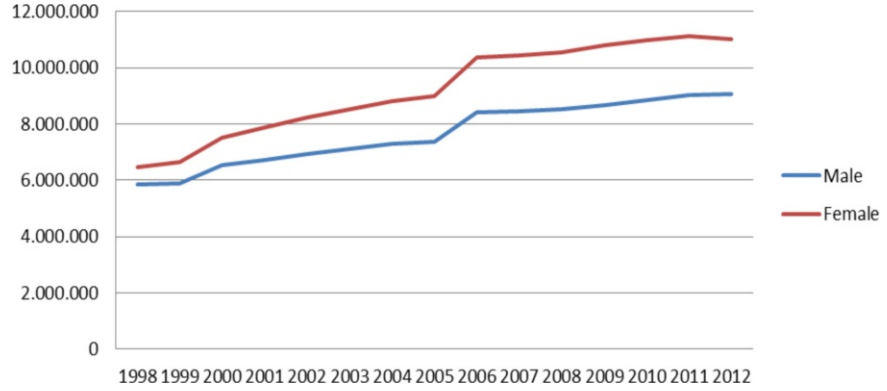

Figure 1. Tertiary students (ISCED 5–6) by sex, European Union, 27 countries. Source: Eurostat, table educ_enrl5

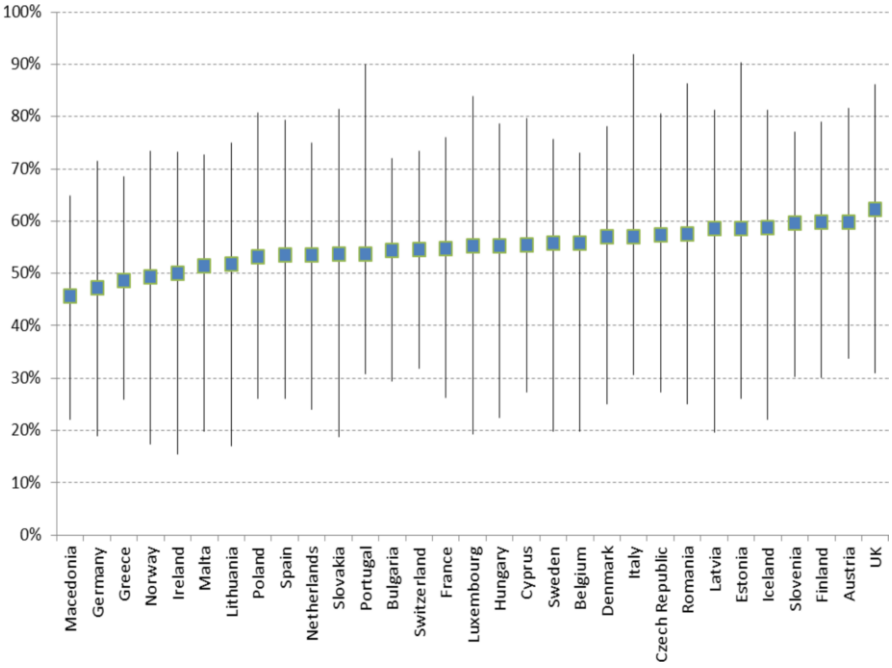

Figure 2. Proportion of female students in total enrolment in tertiary education, 2013, by country. Source: Eurostat, table educ_uoe_entr04. Note: The squares show the average of the proportion of female students, and the lines indicate the range between disciplines

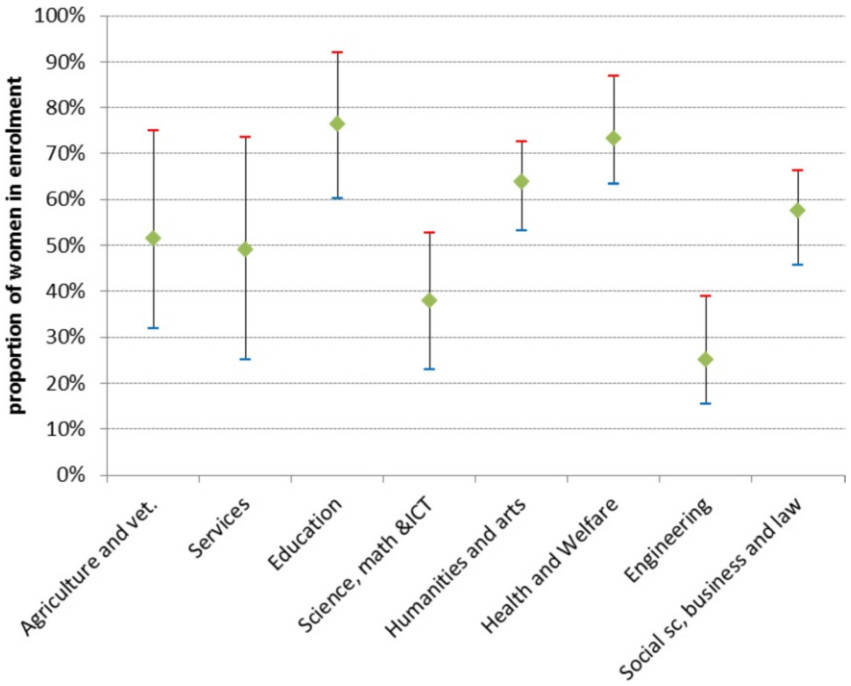

Figure 3. Proportion of female students in total enrolment in tertiary education, 2013, by broad educational field, average of 31 European countries. Source: Eurostat, table educ_uoe_entr04. Note: The markers indicate the average proportion of the 31 countries, the lines indicate the variance in scores in the individual countries

IS IT A PROBLEM?

The extent to which the gender gap in study success is perceived as a problem varies by country, but also by institution and department. Moreover, European countries differ in the degree to which study success in higher education gets priority. In general, we observe that countries that prioritise efficiency of higher education also have policies aiming to improve study success. Even if there are study success policies, they seldom address group differences in study success, related to gender or ethnicity. The Dutch case provides an interesting example of the lack of attention for group differences: in a recent policy document the government identifies study success as a policy priority for the next ten years, but although the gender gap in study success is mentioned at the beginning of the document it is not mentioned again (Ministerie van Onderwijs Cultuur en Wetenschap, 2015), thus not detailing policies to address gender differences.

We do see that some countries have policies aiming to increase the inflow of certain groups into higher education. An example is the United Kingdom were institutions are encouraged to focus their outreach on attracting male students, particularly those from less privileged backgrounds.

By asking experts in 35 European countries to reflect on the extent to which gender is a factor influencing study success, we get an impression of the differences in problem experience. Results show that most experts (13) indicate gender to have some influence on study success. Twelve experts see a limited or no influence. Seven experts see a reasonably strong influence. Three experts say not to have evidence for any influence (see Figure 4).

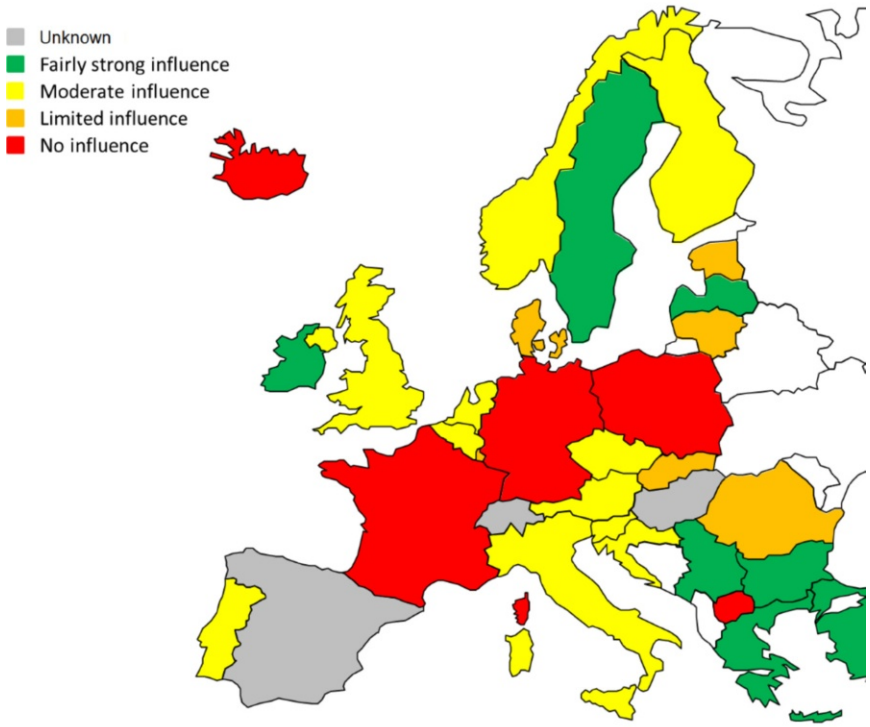

Figure 4. Expert opinion on influence gender has on study success

Generalising the observations we conclude that European experts do see differences in study success between male and female students, but in most cases they do not regard this is as an important factor that influences study success.

The European insights mainly focus on the national level. We assume, however, that on the levels below difference might be more apparent. Consequently, the institutions involved in our case studies were also asked to indicate the extent

to which they experience the gender gap in study success as a problem for their institution, faculty or study programme.

All the Dutch case study institutions pay attention to study success, for which they have introduced different policies. On institutional level, differences in study success between male and female students are known. For instance, one institution states in its institutional plan that the relatively lower study success of male students is an issue to which the institution is to pay attention to (Hogeschool van Arnhem en Nijmegen, 2012, p. 24). Likewise, a policy study on higher education institutions in the largest cities in the Netherlands states: "Men more often drop out in the first year, and even if they progress to the next years, their completion rates continue to be lower" (own translation: Zijlstra et al., 2013, p. 13). The interviewees have shed more light on the differences by indicated several aspects on which male students lag behind or differ from female students. In Table 2, these aspects a clustered in three broad groups: skills and competences, attitudes, and effects on study success.

Table 2. Aspects on which male students lag behind or differ from female students

Cluster	*Aspects on which male students lag behind or differ from female students*
Skills and competences	• Planning (UNI3B, UAS1, UAS2B) • Study skills (UNI3B) • Self-insight (UNI3B) • Discipline (UNI2B) • Academic competences (UNI3B) • 21st century skills (UNI3B)
Attitudes	• Less intrinsic motivation (UAS2B, Geerdink, 2010) • Unfounded optimism (UNI3B, UNI2B) • Late realisation of necessity to start (UNI3B) • Lag behind because of weaker effort (UNI2B) • Less willingness to ask question or for help from study councillors (UNI2B) • In the end, make more use of support services (UNI2B) • Less ambition to do more than strictly necessary (UAS3A) • Difficulties with complying to study programmes' expectation (UAS3A) • Lower interest in studying (UAS3A)
Effects on study success	• Have a higher drop-out rate (UAS3A, UAS3B, UAS4A, UAS1, UAS2B) • Study progress often remains behind (UNI2B, UAS3A) • Take longer to complete studies (UNI1A, UAS3A) • Attain less high grades (UNI3B)

Nevertheless, male students also have some positive aspects as compared to girls: they are more pragmatic effort (UNI1C, UNI3B), have more self-confidence

(UNI3B), are able to deal better with uncertainty (UNI3B), have less fear of failure (UNI1C), and are still able to attain a job sooner after graduation (UAS3B).

Insights from the interviewed institutions highlight that gender differences in study success (if experienced) mainly apply to bachelor level students. On the more advanced academic levels, study success differences appear not to be an issue. In fact, male students appear to perform slightly better on PhD-level (UNI1A).

In this section we have shown that there are indeed differences in study success. However, these differences are certainly not recognised problematic by all European experts and interviewees. Yet, the 'gap' appears to be more visible on lower levels in the organisation, e.g. by student counsellors.

THEORETICAL PERSPECTIVES ON STUDY SUCCESS AND GENDERS

Tinto's model of student integration (Tinto, 1975) is the most prominent among the different approaches to explain student success. Tinto identifies social integration as a key determinant for student success and retention at a university. The main proposition of this theoretical approach is that the more students are integrated in the social and academic community of a higher education institution, the less likely they will be to leave the university or study programme. Adequate interaction with peers and academics gives the students the chance to socialise with the institution and to internalise social as well as academic values.

Tinto distinguishes a number of different factors that may contribute to study success. The first group of factors are background variables like family background, the peer group, individual competencies and pre-schooling experiences that have a strong influence on the individual's educational aspirations and expectations. These aspirations and expectation have an impact on the initial individual's goal or institutional commitment. This commitment will show in all three aspects of engagement of the student: behavioural engagement (the student attends classes, cooperates in assignments, does not show any deviant behaviour, and participates in school related activities), emotional engagement (the student feels involved and has a general feeling of belonging), and cognitive engagement (the student invests in his/her learning and has a clear intrinsic motivation to study) (Fredricks et al., 2004). A student who is more engaged is more likely to perform academically and have a stronger feeling of belonging in the class, the programme and the institution. A higher level of academic and social integration will add to the initial commitment, which will increase the likelihood of study success (in terms of completion or grade). This process is not a linear process, but comprises of a number of feedback loops focusing on goal and institutional commitment (see Figure 5).

A slightly different perspective is presented in the expectancy value model in which key elements of the Tinto model are integrated with a psychological and an economic perspective (Eccles, 2005). In this model the 'self-concept' is the central element (see Figure 6). This self-concept has a strong influence on the perception of costs and benefits of decisions regarding study behaviour. Other elements of the

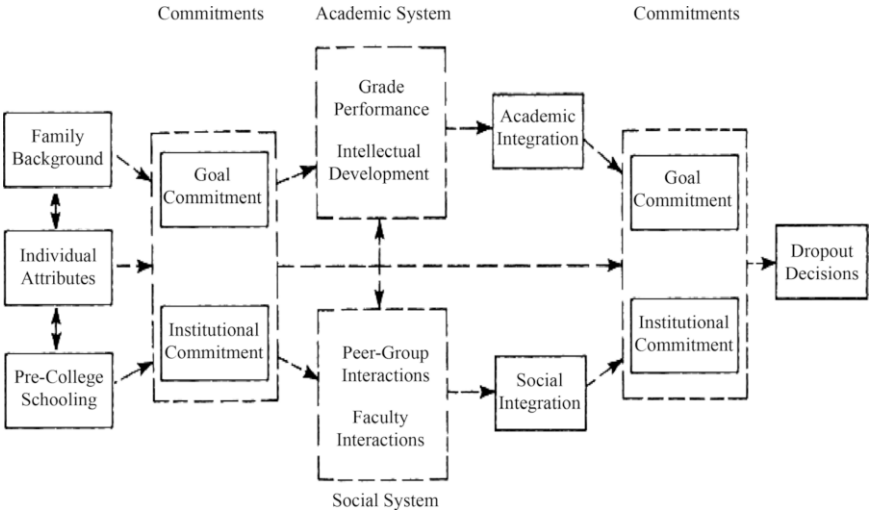

Figure 5. Tinto's interactionist model for dropout decisions.
Source: Tinto (1998)

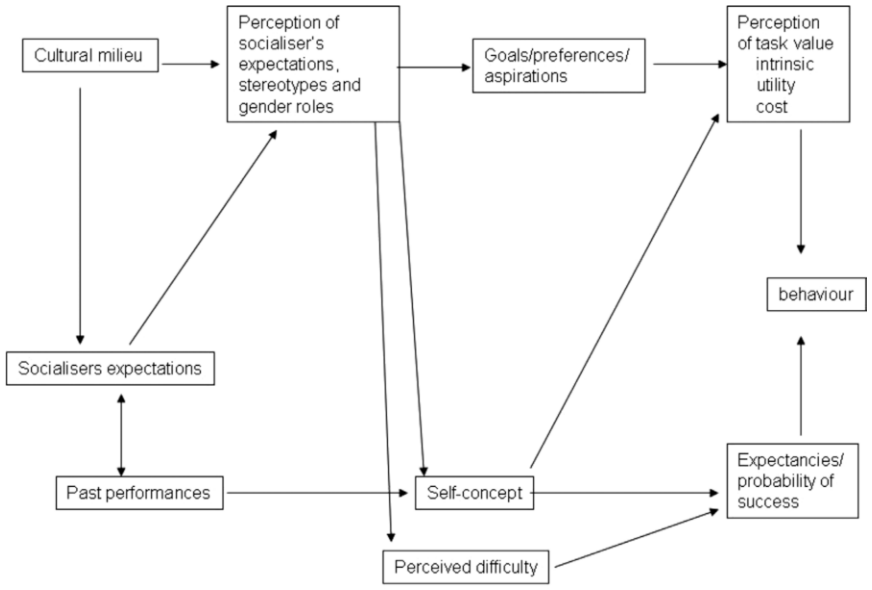

Figure 6. Expectancy value model (simplified version, based on Eccles, 2005)

Eccles model refer to characteristics of the programme (perceived difficulty) and characteristics of the peer group (as a major socialiser, next to the family).

The theoretical perspectives described above have a strong focus on individual characteristics and the influence of the social environment on those individual characteristics, both prior to access to higher education and during participation in higher education. Policy makers who want to change the behaviour of students may either want to influence the characteristics or influence the context within which the individuals take their decisions.

Psychology can add to this model. Academic performance and social integration requires not only cognitive skills, but also non-cognitive skills. These non-cognitive skills refer to self-reflection, self-regulation, motivation, curiosity, taking initiative and empathy. Non-cognitive skills are essential for using the cognitive skills. Consequently, less developed non-cognitive skills may lead to less social and academic integration and less study success (van der Velden, 2015).

Having outlined the general conceptualisations of variables associated with study success, we can address the links of the conceptualisation to the gender gap in study success. The conceptualisations offer some footing to do so. Important in this respect is the role socialisation (addressed in the expectancy value model), which may influence the expectations of students, parents, teachers, and policy makers. The role socialisation suggests that actors' behaviour and actions are guided by what they perceive to be expected from them. This may explain students' study choices, study performance, self-concept (Eccles) and their goals and institutional commitment (Tinto). Similarly, it may differentiate unconsciously teachers' expectations of male and female students, thus leading to different interactions and, consequently, social and academic integration outcomes. However, unawareness of the sex-role socialisation, may explain why institutions and teachers have different expectations, but largely use undifferentiated didactical approaches.

Not included in the conceptualisations are the physiological aspect of the maturation of the (late) adolescent brain, which may offer an additional explanation for the gender gap. More specifically, during adolescence certain 'executive functions' are still developing. These functions mature after puberty till the young adulthood, and relate to the non-cognitive skills like self-reflection, self-regulation, curiosity, empathy and the ability to assess the (long-term) consequences of choices and actions. There are indications that female students are a few years ahead of male students regarding this maturation in late adolescence. That implies that female students, on average, on entry into higher education have a head start regarding the non-cognitive skills that play an important role in study success. However, the process of brain maturation is not a completely autonomous process. It is also influenced by the social context in which the young adolescent grew up and currently lives. Culturally and socially determined gender stereotyping has a strong influence on both the development of the brain and the behaviour of individuals (Spencer et al., 1999; van der Velden, 2015).

POTENTIAL POLICY INSTRUMENTS

In the policy literature there are three types of policy instruments that are used or discussed to influence study behaviour, thus also study success at the institutional and national level:

- Information and support: Here we find policies that aim at changing the perception of (potential) students regarding the options available and the consequences of those options, in terms of costs and benefits. Students do not always have a correct idea of programmes, in terms of the content, the difficulty, its direct costs, and its future benefits in terms of the position on the labour market and the type of future jobs. Expectations based on biased information may lead to lower study success, which these type of instruments try to prevent. Policies focussing on support comprise student counselling and support structures like mentoring systems and tutoring. With these policies policymakers do not (primarily) try to change cognitive skills, but they are more concerned with improving non-cognitive skills.
- Funding and financial incentives: Policymakers can try to influence the behaviour of students with financial carrots or sticks. Higher fees for students that progress too slowly, changing grants into loans for drop outs or providing scholarships for excellent students, are some of the most frequently used financial instruments.
- Organisation of education: Policies on the organisation of the educational process refer to all interventions that may have an effect on the learning environment. The learning environment consists of social settings within which formal learning in a school or university takes place (Fraser, 1982). The main aspects of the learning environment are relations and interactions between students, interactions between students and teachers, the relations between students and content and teaching method, as well as the student perceptions of the structure of the setting. In a number of higher education systems alternative teaching models have emerged. In these alternative models, the teacher is no longer the most important source of information, students are taught using problem based or project related teaching methods, in small scale settings, with a high frequency of exams and high individual autonomy. These alternative models have, under certain conditions, an impact on study success: if the student is well integrated and if there is a close match between teaching model and individual learning style, study success tends to be higher. Furthermore, the size and composition of the class/group is also an aspect of the learning environment that policymakers may influence. Size and heterogeneity of the groups may have an effect on social integration and study success, although this is not a straightforward relation.

Having discussed the general instruments, we can focus on the question: which instruments have an effect on the study success of male and female students? We address this question with a literature overview, followed by the outcomes of our case studies.

The policy literature on instruments focussing on financial incentives is scarce, and offer no indications that financial motivations differ between male and female students. Different perceptions of benefits of studies do exist between male and female students (men have in general a better position on the labour market and women are more risk averse), but there is no evidence that this is related to differences in study success. An interesting line of argumentation focusses on the paradox that the expected benefits, in terms of position on the labour market, for women are lower than for men, yet participation of women has grown continuously (Mickelson, 1989).

Educational sciences have contributed a lot in understanding why there are differences in study success between male and female students. Most of the literature addresses the influence of the learning environment (Claessen, 2013). There are indications that girls perform better in alternative models. Study success in these alternative models rely more on non-cognitive skills, which in general are better developed among women (in the early years of the higher education career).

There is also a relation between social integration and alternative models, although there is no clear relation to gender (Severiens et al., 2014). It is also shown that the learning style of women are more adequate for the alternative model, leading to higher performance (Kolb, 1984; Philbin et al., 1995; Reints, 2013). The learning style is to some extent related to non-cognitive skills, however, also to group culture (Legewie & DiPrete, 2012). The composition effect is well researched. A strong gender imbalance has a negative effect on study success. Moreover, the sense of belonging of the underrepresented gender is relatively low, which has a negative effect on study success (Mastekaasa & Smeby, 2008; Severiens & ten Dam, 2012).

Although there is a growing body of literature on the gender gap in study success, the evidence of the effectiveness of policy instruments is scattered. Furthermore, the existing literature mainly looks at gender in terms of participation. This outcome is likely partly due to the complexity of the issue of study success, but does indicate that gender is (still) seen as a minor factor in explaining and influencing study success. Consequently, not much is known about how gender interacts with the literature's two priority factors: socioeconomic status and ethnicity.

Case Studies

To further our understanding of potential policies to stimulate study success of male students and their effectiveness we asked the interviewees to describe the used policies. The found policies described in the case studies are clustered in the following groupings: (1) policy dimensions (context, general institutional policies, and gender specific policies and (2) type of policy instrument (see previous section) in Table 3.

Table 3. Policy instruments to influence the gender gap in study success

	Information and support	*Funding and financial incentives*	*Organisation of education*
Context	• Improving the image of certain disciplines among prospective male or female students (e.g. teacher education and mathematics) (UNI1A, UNI1C, UAS1) • Early study choice decision deadline, ensuring students make a conscious choice (Geerdink, 2010)	• Performance funding, potentially making it more attractive for institutions to recruit female students (UAS2B) • Stringent study financing system, punishing a noncommittal attitude (UAS3B)	• Selection criteria, such as entrance exams on math and language, can reduce the drop-out rates of male and female students (UAS1) • Retention criteria for first year students, motivating lagging male students to perform (e.g. minimal achievement of 75% of the first year's ECTS)
General institutional policies	• General study counselling; tutors (UNI1C, UNI3B), tutor groups (UNI2B), peer tutors (UAS2B, UAS4B), personal study counsellors (UNI3A), target group specific/ specialised tutors (UAS4B) • Skills and competences trainings (UNI3B, UAS2B) • Matching activities; ensuring the right students enrol in the right study programmes, warn students for potential barriers (UNI2B), set expectations (UNI2B)		• Study culture can be positively influenced by international students (UNI1C) • Educational model: small-scale education with personalised attention (UNI1A), problem-based learning where students work in groups (UNI2B), regular progress assessments (UNI3B)

(Continued)

Table 3. (Continued)

	Information and support	*Funding and financial incentives*	*Organisation of education*
Gender specific policies on institution or programme level	• Recruitment policies with a particular gender focus (e.g. more males in teacher education studies) • Gender specific study counselling; male study counsellors for male students (UAS1), (subconscious) male specific study counselling (UNI3B, UNI2B, UAS3A, UAS2B), • Male only training sessions on planning and professional skills (UAS1)		• Adjustments in learning environments to support male students; males grouped in classes (UAS3B, UAS1), male groups for internships (UAS2B), male supervisors for internships (UAS2B). • Gender balanced teaching/ research groups (UNI1A, UNI3A, UNI2B) • Recruitment initiatives to make gender balanced student populations (UNI3B, UAS1, UNI1C, UAS4A, UAS2B). • Curriculum adjustments to make it more male friendly: assessment type (Geerdink, 2010), sport courses in first year (UAS1), less reflective assignments (UAS1, UAS2B) • Study programme differentiation by offering it in part-time or in an academic variant (UAS1)

We found both general and gender specific policies that can have an effect on the gender gap in study success. As discussed by the interviewees some achieve the intended effects, but others show to have potentially unintended effects. An example of the latter may be the inclusion of study success indicators in performance funding, which could lead to institutions aiming to recruit more female students. Also in relation to national policies, an effect of the retention criteria set in the first year (e.g. attaining 50 of the 60 ECs) is that male students set priorities. Without the fixed criteria, more male students would postpone studying actively to the second year in higher education. However, setting criteria for retention can also lead to rejecting students to pass to the second year, who do have the potential the complete the study programmes, but who were in terms of personal and brain development not yet ready for higher education. Interviewees also suggested that the policy instruments specifically focussing on male students in some cases lead female students to also aspire additional attention.

Unfortunately, little is known about the effect of the policy instruments. This is because the gender specific policy instruments are often not the only measures taken, making it difficult to quantify the specific effect of one instrument. Furthermore, the instruments are implemented as experiments and often changed or abandoned after a short period. An exception are the initiatives of one institutions' teacher education programme, where they had student groups consisting of at least six male students and made male groups for internships, which had male supervisors. These instruments led to lower drop-out rates amongst male students, and are now fully implemented. Interesting is also that the part-time programme of a teacher education programme manages to attract an equal inflow of male and female students. Explanations for this are: (1) that participants of part-time education are usually more mature, suggesting that teacher education becomes a more acceptable educational alternative for males later in life, or (2) perhaps it could also be related to the good employment prospects for male teachers. These insights suggest that role socialisation may indeed play a part in students' expectations and behaviour.

The gender specific instruments were mainly implemented in the primary teacher education programmes at universities of applied sciences. We can with reasonable certainty say this is because the gender gap problems are mostly experienced there. Looking at the other institutions' problem experiences and the found policies addressing the gender gap, we can conclude that most institutions do see differences, some also considered this a problem, but few institutions and study programmes have dedicated policies addressing the differences in study success. The lag of policies suggests that making gender specific policies could be a sensitive topic. Nevertheless, looking at the increased gap in enrolment and existing differences in study success, introducing gender specific policies might become unavoidable. An emerging question is if the problem should be solely addressed in higher education because known is that the differences also surface in secondary and post-secondary vocational education.

CONCLUSION

The gender gap in study success – or the 'boys problem in higher education' – is in general – by the European experts, by the case study institutions and in the literature – recognised, but not perceived as an urgent problem. Only in a few female dominated programmes, like primary teacher training, we have come across a clear sense of urgency. In the literature the gender gap in terms of participation is discussed more frequently, but that is a different 'problem' with different potential solutions. However, the by the interviewees indicated aspects on which male students lag behind (Table 2), as well as the distribution of male and female students over educational fields (Figure 3), do indicate that there is a gender gap.

As for possible solutions (or at least, policy instruments) to the gender gap in study success, the results of the literature review, the expert consultation and the case studies offer largely inadequate evidence to reach solid conclusions. Most initiatives focus on the composition of the group in (heavily) female dominated programmes. There are indications that restoring a more balanced gender composition has a positive effect on social integration of male students as well as their engagement. All-male groups have a similar effect, albeit the resulting all-female groups can be seen as a negative side effect.

In addition to the initiatives to change the organisation of the educational experience, there are also some gender specific initiatives in information provision and student counselling. National information campaigns to redress the gender balance in STEM programmes are well known and prove to become increasingly effective, but the information issues related to study success (improving the information on programmes and the jobs they may give access to) are only in a few cases gender specific. National policy makers, but also institutional policymakers and counsellors at secondary schools can play a role in providing such information to (prospective) students.

In the general discussions on how to increase study success in massified higher education systems, we have come across quite a number of initiatives to change the teaching models and methods. In these new, alternative models (i.e. small scale, student oriented, and activating learning environments) non-cognitive skills are much more important than in the traditional models. The brain development of those skills, especially the ones the alternative models call for, lasts till late adolescence or early adulthood. There are strong indications that male students lag behind female students in brain development of non-cognitive skills, in the early years of their higher education careers. Yet, they do catch up later on. This can be linked to the observation of some interviewees that the gender gap was most evident at the bachelor level.

In addition to the biological factor, male students tend to have different learning styles that fit less with the alternative models. A strong policy focus on alternative teaching models may therefore have a negative effect on the gender gap if these

differences in skills and learning styles are not taken into account by national, institutional and study programme specific educational regulations and policies.

The differences in the development of non-cognitive skills may have a gender specific effect on study success, also if testing and selection is strong in the early stages of higher education programmes. In the Dutch higher education policy context there is a strong push to expel underperforming students in the first year, which may have a negative effect on men as they are excluded prior to their natural capacity to further develop their non-cognitive skills. Therefore, policymakers have to be aware of the effects early selection has on male and female students in specific learning environments.

Is the gender gap in study success a problem? Yes it is, and it has the potential to affect the study success of male and female students. Yet, the visibility of the problem appears to be limited, with the exception of heavily female dominated programmes. Best known are primary teacher training programmes, but there are other programmes, like psychology and health related programmes that are becoming heavily female dominated. Consequently, the problem might surface more often in the future, particularly in study programmes where the gender participation differences continue to grow. Raising awareness among policy makers, as well as teachers and counsellors of the effects of group composition and changing learning environments on the study success of male and female students is therefore crucial.

Further empirical research on the gender gap in study success and its consequences is needed. On the one hand, insights are needed to create awareness of the effect the gender gap has on the overall effectiveness and efficiency of higher education institutions and systems. Likewise, insights are needed to create awareness that a growing number of female dominated programmes may lead to a magnification of the 'boys problem'. On the other hand, further conceptual research is needed to address the complexity of the issue of study success and the role of gender. This complexity arises from the strong interaction of gender, socioeconomic status and ethnicity in explaining study success. Needed are observation and understandings derived from a large variety of disciplinary perspectives (biology, psychology, sociology, economics, educational sciences), and from the dynamic character of the higher education process with various short and long term feedback loops. Accordingly, raising questions with practical relevance, such as: what is the effect of more female graduates on the labour market on the participation rate of next generation female students? To allow this and other questions related to the gender gap to be understood requires scholarly research, but to address the issue, increased attention is required from stakeholders on national and institutional level.

Whether we can do something about the problem remains unclear. The effectiveness of the few policy instruments we have come across proved difficult to establish. This is also because of the complexity of the issue. We underlined this complexity because the key explanations for the gender gap – learning environment and brain development – are strongly embedded in cultural and social settings. The

interdependency makes it difficult to determine what part of the differences in study success can be attributed to gender and to build a comprehensive theoretical model to understand what the main drivers of the gender gap are. Given the complexity of the problem, it also remains to be seen whether prioritizing the gender gap is justified. In particularly compared to – at least equally important – issues such as the inclusion of underprivileged students.

It is clear that addressing the gender gap will add to the already stretched mission and responsibilities of higher education institutions, study programmes, and teachers. But if the research community and policy makers start and continue to mind the gender gap, substantial societal and individual costs of leaving talents underdeveloped can be avoided.

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