



Meta-analysis of gender and science research

RTD-PP-L4-2007-1



## **D31 – Country report Norway**

Hilde G. Corneliusen

March 2009

## 1. Introduction

Norway is a small, but long stretched country with less than 4.1 million inhabitants and 4 universities in 1980, passing 4.7 million and with a handful of college universities having acquired the status of universities in 2008. In 2005, 3771 women had permanent scientific positions at universities and college universities, making up 37% of the academic workforce. Norway is a country with a strong impression of gender equality and topping World Economic Forum's gender equality ranking in 2008. The term "state feminism" has been applied to explain governmental efforts in Norway to include gender equality as a goal in laws and regulations that make it illegal to actively discriminate based on gender. The history of women in academia goes back to 1882, when women were legally granted access to the university education, followed by a law in 1884 that also gave women the right to participate in university exams, and finally by a law in 1912 that opened academic positions to women, except clerical, military, foreign affairs and ministers in the government.

Education has in general been regarded as important for reaching the goals of gender equality. The 100 years anniversary of women at universities in 1982 was however characterized not only by celebration and remembering women pioneers in science and research, but also by a surprise that gender inequalities were still notable in the academic world, with a horizontal segregation and a tendency for men and women to choose different academic disciplines, and a vertical segregation and only 3% female professors in 1980. One of the main topics within this research is the question of how the academic world still, a century after women gained access, was characterized by both horizontal and vertical gender segregation. Thus, despite a strong notion of gender equality both the educational sector and the labour market are still characterized by a strong gender divide in Norway. Since the early 1980s this has been perceived as a problem because occupations dominated by women had and still have lower wages, less power and prestige, and have little or no influence on society.

In 1991 the proportion of female students reached 50%, and it has continued to grow to about 60%. There are however differences between different academic fields, and already in the early 1980s had the proportion of women passed 50% in faculties of humanities and arts, and women are today also dominating in social sciences and medicine, while men still dominate faculties of natural sciences and technology. This horizontal segregation was followed by an even stronger vertical segregation, as only 3% of professors were women in 1980, a number that had been stable for almost 20 years. The number increased to 17% in 2005, however, still with horizontal segregation and 28% female professors in humanities compared to 6% in technology, leaving a perspective on gender equality that seems to indicate that we still have a long way to go before we reach gender equality. However, this impression of slow or even non-existent improvements in gender equality has not always characterized the picture. In the early 1980s, it was pointed out again and again that engineering, which is one of the most male dominated fields today, was one of the professions where the number of women had increased markedly since the early 1970s, from around 7% in 1975 to 27% in 1985. The petroleum sector, which is Norway's largest industry, as well as an expanding sector of computing made education of engineers as well as natural scientists vital. Researchers have emphasized the importance of increasing the number of women in sciences and technical education, both from a social political view and from an equality perspective, but despite initiatives to recruit and retain women in these fields, women are still under-represented on all levels within education and in working life in the field of natural sciences and engineering in Norway, and the situation gets worse further up in the hierarchy of academia. Thus, the main topic within this research field has been concerned with factors that might have caused and continue to cause this horizontal and vertical gender segregation, as well as outcomes of the inequality, in terms of access to positions, experiences of academic milieus and scientific results, like publications.

The second most researched topic is gender stereotypes and social construction of identity and science. This field of research is closely tied to the research on horizontal and vertical gender segregation, which is the starting point for most of the studies focusing on gender stereotypes and identity, and most of these studies aim at exploring how social and cultural factors contribute to specific patterns of gender inequality.

The next main topic in Norwegian research is related to women and gender research itself, focusing on the development of women research as a research discipline, both in terms of institutionalization and in theoretical and epistemological development. The first (recorded) meeting of Norwegian women researchers was in 1975, which were early in a Nordic context and according to the participants, created a new, active and strong women's community which was important for the further development of women research in Norway. The most important outlet for results from, as well as discussions about, women research has been the journal *Kvinneforskning* (Women Research, later *Nytt om kvinneforskning*, and today *Tidsskrift for kjønnsforskning*), established in 1977. The journal also gives an impression of the importance of both research politics and the international women research milieu in the Norwegian context. Also the Norwegian Research Council's Secretariat for women research was established in 1977, as a "child" of the new women's movement, and had its background in the interest and attention towards women's position in society, culture and science, and its main goal was to support Norwegian women research. The number of women researchers was relatively small in the early 1980s, and the Secretariat even published reports aiming at presenting all or most of the women researchers in Norway, as well as research projects focusing on women or gender.

A new discipline needs to develop theoretically and epistemologically, and so also for women and gender research, later also queer research and men's studies. This intrigued questions like what women and gender research can contribute with, or what they can offer the mainstream disciplines. Even though women research originates from social sciences, the debates about women and gender research in Norway spread early to a number of other disciplines, like history, social economy, law, medicine, and even to informatics, asking how a woman's perspective could make a difference. A women perspective in various disciplines pointed out that women's situation was not always similar to the situation of men, however, treating masculine values or men's situation as the universal made women invisible.

This also affected the question about the organization of women and gender research; is there room for women research within the traditional institutional structure, or does it need its own organization. Considering the situation of today the answer would probably be both, however, since the mid 80s, four centers for women research have been established at the four Norwegian universities: at University of Bergen (1985), University of Oslo (1986), University of Trondheim (1989), and University of Tromsø (1994). The centres, which have been seen as part of an international trend, also characterize the development within the discipline and in organization that started in the 1970s, and most of the centres have also changed name during the last decade, from "women research" to also including "gender", and even adding "cross-disciplinary". The name changes reflect how the discipline itself has moved from a more or less solitary focus on women, to including other gender categories, and finally, to emphasize the cross-disciplinarity of Norwegian women and gender research.

## 2. Analysis by topics

### 2.1. Horizontal and vertical segregation

Research on horizontal and vertical segregation is one of the most researched and most debated topics within this research. Publications on horizontal and vertical segregation are more or less overlapping, thus, below they are accounted for together.

#### **Research questions**

The Norwegian Research Council, together with the Secretariat for women research and governmental departments, like the Department of Education and Research, have been important driving forces in studies of the situation of women and gender equality in research and academic institutions. Thus, the main goal of a number of the most extensive reports on gender segregation has been to:

- deliver a status report concerning the position of women in academia,
- give an overview and evaluation of equality measures at the institutions,
- give recommendations for further actions.

*Horizontal and vertical segregation*

When the 100 years anniversary for women at universities was celebrated in 1982 with reviews of women academic pioneers, one of the pressing questions concerned why the gender differences still were so marked in academia, questioning how far women really had reached in academic institutions that still seemed to be male bastions, where men dominated the universities, in particular natural sciences and technology, as well as academic positions. While the proportion of women students had passed 50% in faculties of humanities and art by 1980, it was not until 1991 women passed men as university students in general, and still in 2008, men dominate natural sciences and technology, and do so to a larger degree in the “hard” sciences than in other disciplines. During the 1980s and 1990s it became more and more clear that the development within humanities and social sciences, where women had either passed or levelled the proportion of men, was either slower or non-existing in natural sciences.

- Much research effort was put in to get an overview of the situation, and to find out which mechanisms and factors caused the gender segregation.
- One of the first questions in relation to horizontal segregation was the numbers; what can numbers tell about the situation? How under-represented are women, in which disciplines and how is the situation on different levels?
- Much of the horizontal gender segregation seemed to emanate from boys and girls choices, and several studies were exploring boys’ and girls’ choices, traced back to high school where girls also tend to choose the “soft” natural sciences.
- Another major strand of studies had as a starting point the minority position that women had in the most male dominated education and research milieus, exploring how this position had negative effects for women.
- Studies of the vertical gender segregation asked what women wanted from academia, whether they chose not to take permanent positions or whether these positions were harder to reach for women.

*Natural sciences and technology*

Already from the early 1980s it was mainly natural sciences that received attention due to the male domination of students, but also technological educations received attention from the early 1980s. While the proportion of women has increased somewhat in most disciplines up until today, the proportion of women within technical disciplines has fluctuated during the last 20 years, and within the most technical or “hard” technological disciplines the proportion of women is again matching the numbers from the early 1980s. Thus, while the focus on women in natural sciences has decreased, the focus on women in technology has remained an important topic throughout the period, partly driven by how this field seems to be the most stable or resistant field in relation to gender equality, and partly driven by large research projects funded by the Norwegian Research Council and EU.

Questions pursued in this field have been:

- Why boys and girls choose different educational fields.
- How their early choices affect choices at university level.
- How and why girls and boys have different relationships to technology.
- Studies of how men and women experience and are treated within technological education.
- Studies of initiatives to recruit women to natural sciences and technological education.

*Medicine*

- Medicine, traditionally a strongly male dominated education and occupation, is today dominated by women, but also within this discipline men and women seem to choose different specialities, and this has been an important topic within research since the 1980s.

**Research approaches**

Most of these publications start from statistics showing the lower number of women within certain disciplines and higher positions, in both horizontal and vertical patterns of segregation,

but most of the publications building on original empirical material build on qualitative material, interviews with women students or academic employees about their choices and experiences, satisfaction with the system and future plans, as well as qualitative analysis of written material from employment processes and debates about gender equality.

A number of these publications have as the main goal to discuss the situation, suggest, and comment, rather than produce substantially new empirically based knowledge, much of these publications produced by women academics who have been motivated by and build on their own experiences as the minority gender in their discipline or institution.

## **Findings**

### *Horizontal segregation*

- The gender distribution varies with different disciplines, and while women dominate humanities and medicine, men still dominate natural sciences and technology.
- Girls and boys make very gender traditional or even stereotypical choices in their choice of educational fields.
- Many research projects have related the horizontal gender segregation to gender stereotypes and social construction of identity and science. A formal level of gender equality is not a guarantee for people behaving in gender liberating ways. Despite the strong notion of gender equality, state feminism and the position on top of World Economic Forum's gender equality ranking in 2008, Norway also seems to exemplify how the formal freedom of gender means not only freedom from suppression, but also freedom to choose education and occupation in harmony with traditional gender stereotypes.
- Much of the horizontal gender segregation is ascribed girls' and boys' educational choices, which have been traced back to high school showing that girls already on that level tend to choose the "soft" natural sciences. Thus, when reaching university level, the lack of advanced training in natural sciences from high school makes choices of natural sciences at university level less tempting or harder for girls.
- One of the assumptions about women's lack of interest in computing in the early 1980s referred to technophobia or fear of the computer. Fear was not found to be important, but rather the domination of boys and men, thus emphasising the importance of milieu. Girls were pushed aside by boys in the computer class, and female students of computing felt marginalized both socially and in their professional interests, compared to the "hard core" field of programming dominated by men.

### *Vertical segregation*

- There is strong vertical gender segregation in academia, with few women in leading positions, illustrating the leaky pipeline with less and less women higher up in the hierarchy, even in disciplines dominated by women.
- In 2005, women made up 60% of students in tertiary education, but less than 50% of research recruits, they had 37% of the permanent scientific positions, and they made up 17% of professors, still with variations within different disciplines, and 28% female professors in humanities, compared to 6% in technology.
- Equality work at Norwegian universities has improved the situation, and more women have permanent scientific positions as well as leading positions today. Thus in the 1980, only 3% of the professors were women while the number today is 17%.
- It has been suggested that flexibility in terms of the amount of years in recruitment positions and a good mentor relationship are important strategies which can facilitate career attainment for women scientists, and that improved working conditions for women can compensate for the more extensive childcare responsibilities that women have compared to their male counterparts.

### *Progress*

- Despite improvements the gender equality work is still moving forward very slowly, and a few of the measures have even been met with active resistance.
- The request for equality has in some cases been perceived as a request from the outside and not in harmony with academic criteria for evaluating scientific activity.

- The way towards both horizontal and vertical gender equality is still long, and the slow progress indicates that active equality measures and strategies are needed to reach the goal.
- Research has shown that the slowness is due to the fact that women meet more barriers in academia than men do, even meeting being systematically disfavored in employment processes.
- A recent report expresses optimism about future as a major generational shift is forthcoming within academia in Norway, and this will represent a good opportunity for reaching a better gender balance in academia.

### **Gaps**

Not many research projects have had as the explicit aim to explore the mechanisms of the vertical segregation, and most articles use it as a starting point for discussion, commenting, suggesting strategies or research questions rather than the main focus for producing new empirical material and thus new knowledge.

Discipline-internal gender differences have mostly been studied in medicine, while there is a lack of similar studies for most other disciplines.

## **2.2. Pay and funding**

There are no publications focusing exclusively on neither pay nor funding, however a few publications include discussions of access to research funding as one out of several topics. Statistical material from Norway is also used for comparison in a few research reports from other European countries, in particular the Nordic countries.

Gender equality laws in Norway secure equal pay for equal work and wages in academia is based on category of position (associate professor, professor etc.) in addition to seniority in the institution. This system and the way it should defend against gender-based differences in payment might be the reason why there are no publications produced in Norway dealing with this topic in particular. This does however not mean that men and women have equal income in Norway, and there is a general and strong horizontal gender segregation, as well as women dominated occupations in general having lower wages than male dominated occupational fields, and more women than men have part-time jobs, which together create a notable gender difference in income. The vertical segregation is however more important to gender differences in payment in academia, caused by a decreasing proportion of women higher up in the academic hierarchy, consequently leaving men as the majority in groups with the highest positions and thus highest wages in academia.

### **Research questions**

Although gender inequality in funding has not been a primary concern, some reports evaluating women's situation in research also take this into account alongside a number of other topics and as part of research studying why women advance slower than men in academia.

### **Research approaches**

Studies including a focus on gender differences in funding are based on empirical material in the form of existing registries of academics, doctoral candidates, distribution of research funding etc., and partly on surveys targeting academics in permanent positions.

### **Findings**

Women receive a little less research funding than men do, in particular external funding, resulting in women advancing slower in academia than men do. It is suggested that this is a result of women teaching more than men, they participate in more committees than men, and they participate less in national and international research networks than men. Other causes have been suggested but these have not been systematically studied.

## **Gaps**

The Norwegian equality laws are supposed to grant men and women equal pay for equal work. However at the universities today money not only come in the form of monthly wages, but also as rewards for supervision, publications and extra administrative effort. Thus despite the laws granting equality in pay, there are several sources to tweak this system, and studies of the total picture of pay and funding in academia are needed.

## **2.3. Stereotypes and identity**

Stereotypes and identity is the most researched factors in studies of women's situations in education, research and academic positions. Also research on other topics, like horizontal/vertical gender segregation, often rely on gender stereotypes in explanations of women's situation.

The two dominating topics in this research are on social construction of gender identity when facing a gendered academic culture, and on social construction of science. Cognitive abilities are generally not the main focus of studies, however, several studies point to how the assumption of men and women's different cognitive abilities affects for instance gender inclusion and recruitment strategies.

### **Research questions**

#### *Social construction of gender identity*

Already from the early 1980s it was clear that the increase in the proportion of female students did not grow as fast within natural sciences and technology as in other disciplines. Although the focus on gender stereotypes and identity increased in the 1990s, this has been a topic since the early 1980s in studies exploring reasons for the low proportion of women within natural sciences and in particular within technology studies.

- One important focus has been on how girls' and boys' choices and interests in relation to natural sciences and technology already on an early stage is affected by gender stereotypes.
- Another widespread focus has been on women's construction of gender identity in relation to a male dominated discipline, including how women experience the social environments in male dominated institutions.
- A number of studies have focused on how initiatives to recruit and retain women in technological education involves a social construction or co-construction of gender and technology.

#### *Social construction of science:*

- An important starting point for much of the early feminist research is a critique pointing out that mainstream research is not as objective and free of values as traditionally assumed, and that also research without a clear focus on gender can be affected by the researcher's gendered standpoint, perceptions of gender, or the lack thereof.
- This also relates to a series of questions relating to what women can contribute to science. Can, and will, women change science, or do we even want them to? Will women bring a "caring rationality" into the "hard" sciences?

### **Research approaches**

There are a handful of quantitative studies, although it is mostly qualitative material that has been employed in relation to this topic; interviews, analysis of public documents, whitepapers, and public debates.

Many articles also aim more at discussing the topic than providing clear answers based on empirical research. In terms of epistemological development, researchers from different disciplines contribute with insights and discussions concerning the situation of women research

as well as feminist theories, methods and possible contributions within their respective disciplines.

## **Findings**

### *Social construction of identity*

- Gendered stereotypes clearly create different expectations towards as well as different situations for girls and women compared to boys and men in various fields of education and research.
- Expectations towards the genders make both girls and boys make rather gender traditional educational choices, causing the “hard” natural sciences and technology to be dominated by men, as well as the more prestigious surgeon specialist education within medicine.

### *Social construction of identity in studies of technological education*

- Boys’ and girls’ choices and interests already as teenagers are affected by gender stereotypes, and in particular for teenage girls it is important to distance themselves from the nerd or hacker stereotypes and to emphasize their own preferences for communication and social contact.
- Studies of initiatives to recruit and retain women in technological education in the late 1990s have documented how recruitment strategies have often been based on a dualistic notion of gender that reinforces traditional gender stereotypes that associates men with technical skills and women with social skills.
- In addition to being a social minority, with the social difficulties this implies, it has also been reported that women have experienced their choices and preferences within technological education were not considered as important as male choices and preferences.
- When facing a masculine professional field, like technology, or discourse about that field, women do not have readymade role figures or subject positions to identify themselves with, thus they have to negotiate in order to make room for themselves within masculine academic fields.

### *Social construction of science*

- Feminist researchers have pointed out that a gender perspective not only makes women, women’s situation and contributions visible, but can also produce new knowledge through new theories and new focus areas. Researchers from a number of different disciplines share their thoughts on how feminist theories can offer new perspectives to their respective disciplines, in particular within humanities, social sciences and medicine, but also in subjects like law, social economy, and informatics.
- The most serious consequences of (not) employing a gender perspective is illustrated from medical research with claims that women can be diagnosed wrongly because medical science is not adequately taking differences between men and women into account.
- The conclusions to whether women contribute with anything in particular within research and science are not quite as clear. Only one study explore this more systematically, and conclude that a secondary socialization is happening within the academic environment, thus gender differences are not visible in how men and women do their research. This secondary socialization does however not affect men and women’s professional choices and preferences, which still show a gender difference.

## **Gaps**

The assumption that women can contribute with something special because they are women is often used in the popular press and it is mentioned several times within research literature, however only one study from the 1980s explores this in a systematic way, and given that this assumption is still often used it should be researched more systematically and in different disciplines.

Research on the social construction of science has documented how gendered values or perceptions have consequences for research theories, interests as well as findings. However,

only a handful of subjects have been studied, while certain subjects seem to have a stronger resistance towards this kind of questions, like mathematics and other natural sciences that still has a strong impression of objectivity and thus also gender neutrality.

## 2.4. Science as a labour activity

### **Research questions**

Three main areas have been researched in this topic; gender in relation to medical career, historical studies of women in research from their early entry into academia in the 1880s, and studies of international female scientist who have made important contributions to women research and feminist theories.

#### *Medicine*

- Most of the studies focusing particularly on the relation between career and personal life are on medicine, asking
  - what relationship is there between career and personal life for women in medicine.
  - how does children affect men and women's career paths.
  - how does family life affect men and women's specialization in medicine.

#### *Early pioneers*

- Studies on professional and personal paths of female scientists are mainly focused on the history of women in academia since the 1880s up until today, focusing on how the historical context as well as their social background affected their engagement within academia.
- The pioneers' effort to become equal participants in academia and in community life in general is seen in relation to shifting political, economical and social conditions until today.

#### *Famous women researchers*

- A number of articles about international female scientist "stars" discuss the relation between the personal and the academic career, and how their particular social situation made them focus on certain research topics.

### **Research approaches**

- Studies of men and women in medicine is partly based on existing registries on academics, partly on surveys among individuals with a dr. med. degree.
- Historical studies of women in academia since 1880s is mainly based on biographical material, focusing on their career, personal path, and social context.
- Studies of internationally important women researchers is partly based on biographical material, partly on readings of their writings and analysis of theoretical standpoint in a historical perspective.

### **Findings**

#### *Medicine*

- Research examining how Norwegian physicians balance their work and family responsibilities demonstrate gender differences in the way doctors combine work and family obligations. Research results indicate that female physicians, to a greater extent than their male colleagues have to choose between family and career.
- Among women doctors, the probability of becoming a specialist decreased with an increasing number of children.
- Postponing the birth of the first child increased the probability of completing hospital specialities.
- Although more women than men work part-time, this was the case only for a small proportion of women doctors.

- Transition from full-time to part-time work is primarily an accommodating strategy to family responsibilities, however strongly influenced by variations in the opportunity structure of different specialities.
- A larger percentage of female than of male physicians live alone, perhaps indicating that career demands a higher price for the former.
- The percentage of singles is larger among older than among younger female physicians, possibly indicating that the necessity to choose between career and family is not as strong as it used to be.

#### *Early pioneers*

- Women entering academia in the early period were pioneers to whom it was not an obvious right to study, and their history is seen in relation to their historical, social and cultural context.
- Both politics, international contacts and international solidarity have been important to the early women researchers.

#### *Famous women researchers*

- Studies of female scientists focusing on their personal and their professional life-course illustrate how these lines affect each other and how many of the questions raised within feminist research have been raised due to the women scientists' experiences as women in a world that in many contexts and situation has not treated men and women as equals.
- These women researcher's social and cultural situations made them focus on special topics, like sex roles, family, sexualized violence, women's diseases etc.

#### **Gaps**

Apart from the field of medicine there is a lack of recent studies of the relationship between personal and professional life-course, however, also from studies of women in medicine it is indicated that the situation is changed and that the relationship between childcare and career needs further studies.

## 2.5. Scientific excellence

### **Research questions**

Only a few publications focus on differences between men and women's scientific productivity and one on how male and female students work in different ways.

There are no studies focusing particular on analysis of the mechanisms by which gender bias is reproduced in the evaluation of scientific excellence, although there are studies focusing on how women meet barriers in the employment process in academia, exploring in which ways men and women are treated in different ways in the employment process.

### **Research approaches**

- Studies of male and female researchers' productivity have been based on questionnaire presented to all faculty members from the four Norwegian universities.
- Studies have also been based on interviews with researchers from specific disciplines.
- Qualitative studies of gender barriers in the employment processes have been based on the experts' written statements in the process of evaluating the applicants.

### **Findings**

- Most studies about scientific productivity have found that male researchers are more productive than female researchers, and this tendency is also present at Norwegian universities.

- While most studies treat women as a group compared to men as a group there is a clear connection between position and productivity. Professors are more productive than associate professors, who again produce more than the group below them. Women are less represented in the group of professors, thus the differences between the different positions has an impact on the average of men and women's productivity. The main image shows that women publish less than men, but they are more productive than men on the level below them.
- Studies show that child care and lack of research collaboration are the two factors that cause significant gender differences in scientific publishing. Women with young children and women who do not collaborate in research with other scientists are clearly less productive than both their male and female colleagues.
- A qualitative analysis of the experts' written statements in the process of evaluating the applicants indicates that women applicants are exposed to be passed over in the process because gender becomes the frame of interpretation in the evaluation of competency.

### **Gaps**

There are a few studies focusing on scientific productivity, a few on institutional practices of evaluation, but non on definition of excellence. Thus, all three sub-topics listed here are scarcely studied, with a clear gap in the last topic.

## 2.6 Gender in research contents

### **Research questions**

Two main topics have been important in this group; a focus on women pioneers in academia, and meta-theoretical debates about gender theory. The meta-theoretical debates can be found within most of the disciplines where questions of women and gender have been raised, and most often they combine the general gender perspective with discipline specific questions that are too diverse to repeat here, although one discipline that seems to distinguish itself in this respect is medicine, as shown below.

#### *Women pioneers*

- There has been a continuous focus on the history of women in academia, in particular in relation to celebration of the 100 years anniversary for women at universities and the 75 years anniversary for the organization for academic women, but also in articles in remembrance or celebration of national and international pioneers. This literature focus on the conditions of the pioneer women in academia and on the relation between their professional career and their personal life.

#### *Meta-theory*

- Many articles focus on theoretical and epistemological development of women and gender research.
- Many studies focus on how women research has developed in opposition to the mainstream disciplines.
- Discussions of women research also raises questions of whether women research has won legitimacy and scientific recognition.

#### *Medicine*

- Theoretical discussions in medicine explore not only the importance of gender theory as an academic effort to increase our knowledge, but also the health threatening consequences of not including knowledge about gender in medical treatment.

### **Research approaches**

#### *Women pioneers*

- Studies of the history of women in academia have mainly been based on biographical material documenting the early women pioneers' career and personal paths, exploring how they intertwined and affected each other.

#### *Meta-theory*

- Meta-theoretical discussions are based both on international as well as Norwegian theories in women and gender research that have had importance in various fields, and on the authors own research experiences, both in relation to development of gender theories and in facing mainstream theory.

#### *Medicine*

- Studies of how women are treated by medical professionals have been based on interviews with women patients.

### **Findings**

#### *Women pioneers*

- Many of the publications focusing on the history of women in academia are not so much discussing theories as making visible pioneers and important contributions to women research, documenting their research efforts as well as the challenges the pioneer female academics met as women in a man's world.
- The focus on theoretical and epistemological development of women and gender research, later also queer and men's studies, illustrates how women research started within social sciences and spread to a number of disciplines, like history, social economy, law, medicine, and even to informatics, asking how a woman's perspective could make a difference.
- It is still possible to find mainstream (or malestream) researchers who question the scientific quality of women research

#### *Meta-theory*

- A women perspective in various disciplines pointed out that women's situation was not always similar to the situation of men, however, treating masculine values or men's situation as the universal made women invisible. This discussion focused on what women and gender research ought to be, its theories, fields of interest and consequences.
- The importance of having not only women in research but also a perspective on gender was noted.
- In discussions of research politics it was claimed that many of the questions raised within feminist research would not have been raised without women.

#### *Medicine*

- The perhaps most serious consequences of (not) employing a gender perspective is illustrated from medical research with claims that women can be diagnosed wrongly because medical science is not adequately taking differences between men and women into account.
- Studies in medicine have shown that women often feel that their symptoms are not taken seriously by medical professionals, and that women often care more for their family's well-being than for their own health.

### **Gaps**

There is a notable lack of meta-theoretical debates about what a feminist perspective can provide in most of the natural sciences as well as technology, which – different from most of the social sciences and humanities – seem to have a stronger resistance towards discussions of gender in relation to the disciplinary foundation, retaining an impression of gender neutrality.

## 2.7 Policies towards gender equality in science

### **Research questions**

There has been a strong notion about the importance of education for gender equality, and as education is mostly public in Norway, this has been a field for public authorities; governmental departments and the Norwegian Research Council, including the Secretariat for women research.

Two topics are important here;

- First, the discussion of research politics, evaluation of existing research plans as well as reports aiming at giving an overview of the situation and perform as the background for further research political decisions.
- Second, evaluation of equality measures already put into action. While the first topic generally affects most, if not all, academic disciplines, the second topic is mostly focusing on the most heavily male dominated fields, in particular on technology.

### **Research approaches**

- Studies of research politics have been based on political and strategic documents, equality plans as well as statistical material from existing registries over academic institutions.
- Studies of equality measures have been based on both the strategic documents, interviews with involved participants and with students in male dominated educational fields.

### **Findings**

- One of the important findings from evaluation of equality measures is that they are not value-neutral; strategies to include or retain women also contribute to constructing particular perceptions of gender.
- Despite being well-meaning, state feminist strategies are often built on dualistic and rather stereotypical notions of gender, poorly equipped for making long lasting changes.
- Positive gender equality measures like, quotas for women, have been employed in Norway, and this as well as other measures have been debated and criticised, and have even been met with resistance.
- Positive gender equality measures are based on an exception from the principal rule of the law, which accepts this kind of positive discrimination when the main goal is a condition of gender equality.

### **Gaps**

Many initiatives during the last decades have aimed at recruiting or keeping women in the most male dominated disciplines, and many of these initiatives have been studied. Most of the initiatives gave temporary positive results, while, in particular in technology, a recent decrease of female students indicates a lack of long term effects. To learn more about how gender equality measures work we should have both cross-sectional and longitudinal studies.

## 3. Conclusions

The various topics dealt with in this report are knit together in many of the research projects referred to above. One reason for this is the important position the Norwegian Research Council has had throughout the period in motivating broad studies aiming at giving an overview of women's situation in academia. These studies have led to further studies of problematic fields as well as action plans to improve the degree of gender equality in academia, both contributing to an increased attention and interest for the topic of gender equality in academia.

Horizontal gender segregation has mostly been studied in relation to a few disciplines of natural sciences (mainly physics and mathematics) and computing, and focus on women in computing has been important from the early 1980s and even dominated this research from the late 1990s, partly due to larger research projects from the Norwegian Research Council and EU projects. Horizontal segregation is not only between disciplines but also within disciplines, which has mostly been studied in relation to medical specialist training, thus leaving discipline-internal horizontal segregation an under-researched area in most other disciplines.

Vertical segregation has mainly been studied in large projects based on quantitative material, but also qualitative material (for instance documents from the employment process) has been studied.

Horizontal and vertical segregation are often treated together in research projects, although the mechanisms making women and men choose different disciplines might not be the same as the mechanisms producing a male dominance in the top of the academic hierarchy. Most of the projects have studied disciplines or institutions where women have been a minority. From studies of women in computer related contexts it has been pointed out that although we need to understand the mechanisms of exclusion, simply changing them will not guarantee inclusion. Thus, we also need studies of disciplines and institutions where the gender gap has been more or less closed, like biology within natural sciences, or computer education within the humanities or social sciences where the proportion of women has increased steadily during the last decade, to learn more about what causes a positive gender balance.

The majority of studies of women in research belong to one of two types of research projects; either case studies, mainly qualitative, at one institution, or quantitative studies based on already existing registries of academic personnel and projects/achievements etc. Only a handful studies have produced new empirical material for quantitative, longitudinal studies of academic careers, and only a handful of studies have compared two or more disciplines in qualitative studies, which could be useful for the future. A collection and comparison of the number of different research projects might also create a more overarching view and knowledge about how gender inclusion/exclusion mechanisms work on different levels and in different contexts.

## 4. Main bibliographical references

### 2.1. Horizontal and vertical segregation

Fürst, E. 1988, *Kvinner i Akademia - inntrengere i en mannskultur?*, NAVFs sekretariat for kvinneforskning, Oslo.

Lie, S. S. & Rørslett, M. B. (eds) 1995, *Alma Maters Døtre. Et århundre med kvinner i akademisk utdanning*, Pax Forlag A/S, Oslo.

The Norwegian Research Council, Division for strategic priorities 2002, *Kvinner i forskning - fra kvotering til integrering*, The Norwegian Research Council, Division for strategic priorities, Oslo.

Melby, K. 2007, *Kjønnsbalanse i akademia - gyldne muligheter. Sluttrapport fra Komité for integreringstiltak - kvinner i forskning 2004-2006*, Komité for integreringstiltak - Kvinner i forskning, Oslo. (English version: Melby, K. 2007, *Gender balance in academia – golden opportunities*, Committee for Mainstreaming – Women in Science, Oslo.)

Gunnes, H. & Hovdhaugen, E. 2008, *Karriereløp i akademia. Statistikkgrunnlag utarbeidet for Komité for integreringstiltak - Kvinner i forskning*, NIFU STEP, Oslo.

### 2.2. Pay and funding

The Norwegian Research Council, Division for strategic priorities 2002, *Kvinner i forskning - fra kvotering til integrering*, The Norwegian Research Council, Division for strategic priorities, Oslo.

Hovdhaugen, E., Kyvik, S. & Olsen, T. B. 2004, Kvinner og menn - like muligheter? Om kvinners og menns karriereveier i akademia, NIFU STEP, Oslo.

Melby, K. 2007, Kjønnbalanse i akademia - gylne muligheter. Sluttrapport fra Komité for integreringstiltak - kvinner i forskning 2004-2006, Komité for integreringstiltak - Kvinner i forskning, Oslo. (English version: Melby, K. 2007, Gender balance in academia – golden opportunities, Committee for Mainstreaming – Women in Science, Oslo.)

Fürst, E. 1988, Kvinner i Akademia - inntrengere i en mannskultur?, NAVFs sekretariat for kvinneforskning, Oslo.

### 2.3. Stereotypes and identity

Halsaa, B. 1987, "Ånden fra Fana", eller Om kvinneforskning i samfunnsfag i Norge ', Norsk pedagogisk tidsskrift, vol. 71, no. 2, pp. 71-81.

Holst, C. 2001, Sosiologi, politikk og kvinnelighet. Norsk kvinne- og kjønns sosiologi etter 1970. Generasjoner, identiteter og diskurser, SVT Press, Bergen.

Malterud, K. 1997, 'Medisinsk kvinneforskning - pragmatisk endringsarbeid, nyskapende kunnskapsutvikling - eller begge deler?', Kvinneforskning, vol. 21, no. 3-4, pp. 81-87.

Taksdal, A. & Widerberg, K. (eds) 1992, Forståelser av kjønn i samfunnsvitenskapenes fag og kvinneforskning, Ad Notam Gyldendal AS, Oslo.

Corneliussen, H. 2003, 'Konstruksjoner av kjønn ved høyere IKT-utdanning i Norge', Kvinneforskning, vol. 27, no. 4, pp. 31-50.

### 2.4. Science as a labour activity

Blom, I. 2005, "'... uden dog at overskride sin naturlige Begrænsning" - kvinder i Akademia 1882-1932' in Minervas døtre - organisering av kvinnelige akademikere 1882-2005, ed. L.Sangolt, Sigma Forlag, Bergen, pp. 80-101.

Sangolt, L. & Asserson, A. 2005, 'Fra Cecilie Thoresen til Rosemarie Köhn: Saker og milepæler i norske kvinnelige akademikeres virksomhet 1882-2005' in Minervas døtre - organisering av kvinnelige akademikere 1882-2005, ed. L.Sangolt, Sigma Forlag, Bergen, pp. 186-224.

Berg, L. & Aamodt, P. O. 1987, 'Kvinnelige og mannlige studenters tidsbruk', Nytt om kvinneforskning, vol. 11, no. 5, pp. 13-16.

Pedersen, K. R. 1997, Rekruttering av kvinnelige forskere. Endringer og karriereveier de siste 20 år, NIFU, Oslo.

Kyvik, S. 1988, Vitenskapelig publisering blant kvinnelige og mannlige universitetsforskere, NAVFs utredningsinstitutt, Oslo.

### 2.5. Scientific excellence

Thagaard, T. 1995, 'Kvinnene og den akademiske klatrestigen' in Alma Maters Døtre. Et århundre med kvinner i akademisk utdanning, eds. S. S.Lie & M. B.Rørslett, Pax Forlag A/S, Oslo, pp. 63-66.

Fürst, E. 1988, Kvinner i Akademia - inntrengere i en mannskultur?, NAVFs sekretariat for kvinneforskning, Oslo.

Kyvik, S. & Teigen, M. 1996, 'Child Care, Research Collaboration, and Gender Differences in Scientific Productivity', Science, Technology, & Human Values, vol. 21, no. 1, pp. 54-71.

Kyvik, S. 1991, Productivity in Academia. Scientific Publishing at Norwegian Universities, Universitetsforlaget, Oslo.

Rogg, E. 2001, 'Passion and pain in academia ', NORA - Nordic Journal of Feminist and Gender Research, vol. 9, no. 3, pp. 154-161.

## 2.6 Gender in research contents

Lie, S. S. & Rørslett, M. B. (eds) 1995, *Alma Maters Døtre. Et århundre med kvinner i akademisk utdanning*, Pax Forlag A/S, Oslo.

Taksdal, A. & Widerberg, K. (eds) 1992, *Forståelser av kjønn i samfunnsvitenskapenes fag og kvinneforskning*, Ad Notam Gyldendal AS, Oslo.

Schei, B., Botten, G. & Sundby, J. (eds) 1993, *Kvinnemedisin*, Ad Notam Gyldendal, Oslo.

Holst, C. 2001, *Sosiologi, politikk og kvinnelighet. Norsk kvinne- og kjønnsosiologi etter 1970. Generasjoner, identiteter og diskurser*, SVT Press, Bergen.

Sangolt, L. (ed.) 2005, *Minervas døtre - organisering av kvinnelige akademikere 1882-2005*, Sigma Forlag, Bergen.

## 2.7 Policies towards gender equality in science

Corneliussen, H. 2003, 'Konstruksjoner av kjønn ved høyere IKT-utdanning i Norge', *Kvinneforskning*, vol. 27, no. 4, pp. 31-50.

Lagesen, V. A. 2003, 'Advertising computer science to women (or was it the other way around?)' in *He, She and IT Revisited. New Perspectives on Gender in the Information Society*, ed. M.Lie, Gyldendal Akademisk, Oslo, Norway, pp. 69-102.

Gansmo, H. J., Lagesen, V. A. & Sørensen, K. H. 2003, 'Out of the boy's room? A critical analysis of the understanding of gender and ICT in Norway', *NORA - Nordic Journal of Feminist and Gender Research*, vol. 11, no. 3-4, pp. 130-139.

Teigen, M. 2000, 'Likestilling som legitimeringsstrategi: Rekrutteringsnormer og likestillingspolitikk ved NTNU', *Sosiologisk tidsskrift*, vol. 8, no. 2, pp. 125-147.

Rogg, E. 2003, *Lyst, lidelse og legitimitet. Om kjønnsmakt og likestilling i Akademia, Makt- og demokratiutredningen 1998-2003* and Unipub forlag, Oslo.