Female Empowerment in Science and Technology Academia

FESTA DELIVERABLE WP6.3

Gender Sensitive PhD Supervision: Supervisor's Toolkit

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Encourage female candidates to apply

What
Encourage female candidates to apply for PhD positions

Why? – Gender perspective
Women might not consider themselves as possible candidates for PhD positions in science and technology academia. Greater diversity, especially gender diversity can lead to the development of innovative ideas.

Recommendations for good practice
Contact possible female candidates personally and pay attention that the language appeals to female researchers. Show that diversity is appreciated:

- If you identify a qualified female student in your lectures and seminars or among your student assistants, ask her personally. Less self-assured students may need to be asked more than once, so do not be discouraged if your first enquiry is denied. Be aware that there are different styles of self-presentation and some qualified students may need time to think
- Every team has a specific team culture which is influenced by the gender dynamic of the team, by the structure of the work group and by the style of interaction. Potential candidates compare themselves to the perceived culture and when the possibility of a good fit seems too low it is less likely that the candidate will apply. So check if your team is perceived as a heterogeneous group who is open to new and diverse members. This perception is created both on an interactional level as well as by the representation of your team in promotional materials. Show the diversity of your team and/or former team members on your website
- Give attention to the wording of job advertisements – language can be stereotyped – be aware of gender sensitive wording to attract the widest pool of applicants:
    - Use verbs rather than traits
    - Check if words are stereotypical for "male" behaviour and use "female" associated or neutral words
    - Stress that all genders are welcome. Write about your institution's support for family care (if there is some kind of support)

From literature and other sources
It is important to encourage female candidates to apply for PhD positions. Due to the low proportion of women in STEM fields, in particular at high levels, women often lack role models. There is evidence that potential applicants are discouraged from applying if they feel they might not fit in with the employer's culture (Roberson et al 2005). One reason female candidates might not feel they will fit into the employer's culture is the male-dominated nature of STEM fields. However, this can be overcome; in particular, it has been shown that being asked by another woman raises a woman's probability of applying (Hentschel 2014).

On average, women are less self-confident and underestimate their abilities in application processes (Sieverding 2003). Additionally, they have engaged in less clear career planning than male researchers (Dever et al. 2008).

While science and technology academia is still a male-dominated environment (Schmidt and Umans 2014), the integration of several different people, with different profiles can be a first step to a transformation of the dominant culture and can lead to the development of innovative ideas.

Dever, Boreham, Haynes, Kubler, Laffan, Behrens, Western (2008): Gender Differences in Early Post-PhD Employment in Australian Universities. The influence of PhD Experience on Women's Academic Careers. Final report.

Hentschel, T. and Braun, S. (2014): Erfolgsfaktor Personalauswahl: Talente für die Wissenschaft gewinnen [Personnel selection as a success factor: attracting talents for science]. In: N. Hille & B. Langer (Hrsg.), *Geschlechtergerechte Personalentwicklung an Hochschulen. Maßnahmen und Herausforderungen,* 173-195.

Roberson, Q. M., Collins, C. J. and Oreg, S. (2005): The Effects of Recruitment Message Specifity on Applicant Attraction to Organizations. *Journal of Business and Psychology 19*, 319-339.

Schmidt, M. and Umans, T. (2014): Experiences of well-being among female doctoral students in Sweden. *International Journal of Qualitative Studies on Health and Well-being*, 9, 23059.

Sieverding, M. (2003): Frauen unterschätzen sich: Selbstbeurteilungs-Biases in einer simulierten Bewerbungssituation. *Zeitschrift für Sozialpsychologie*, 34, 147–160.

Other useful resources

Handbook with Guidelines on recruitment and appointment processes appointment processes
http://www.festa-europa.eu/public/deliverable-512-handbook-gender-issues-recruitment-appointment-and-promotion-processes

Marieke van den Brink (2011) on recruitment and selection for professorship positions in the Netherlands:
http://media.medfarm.uu.se/play/video/2528

Ensure transparency in recruitment and application processes

What
Ensure transparency in relation to recruitment and application processes.

Why? – Gender perspective
Female applicants can face stereotypes when applying for PhD positions in male-dominated areas and disciplines. Transparency is one way to reduce the effect of stereotypes on recruitment decisions.

From contexts and experiences in the FESTA-project
A female professor stated that although she had significantly more publications and received more third party funds, a male researcher with less merits got the position. Although publications and funding are easily measured criteria, there was a clear preference towards the male candidate. Applicants to PhD positions are not assessed on such criteria, which facilitates more individual interpretation within the assessment.

Recommendations for good practice

- Establish a systematic recruitment and application process – perhaps there are guidelines or rules regarding recruitment and selection at your institution. Apply the same process to every candidate.
- Design a job profile before advertising. Check if the job profile encourages applications from both female and male researchers?
- Design a list of criteria which have to be applied to all candidates. Check if there are gender biases. For example the criterion of being available 24/7 is more problematic for female researchers in societies where they are responsible for family care.
- Are the criteria explicit, transparent and weighted in a standard way? Are they fixed for the entire process?
- Advertise the job in public, post it in scientific networks. Look also for existing female networks and advertise there. Do not only rely on applications which are initiated by students themselves (this is the common way in Germany).
- Is more than one person involved in the jury?
- Unconscious biases may disadvantage female scientists in the evaluation process. Are there gender awareness initiatives or briefings in place for jury members? Is every person involved in the process aware of gender equality issues?

- Persons with strong positional and/or symbolic power can easily influence the decision making process. Is there a strategy to ensure a meeting culture that allows open discussions and involvement of every participant?
- Some decisions may be made within groups. Are these groups gender-balanced?

It is important that only the criteria agreed upon have an impact on the decision and are applied equally to every candidate. Is there a routine process to ensure this?

From literature and other sources

Transparency is said to enhance women's chances of promotion and decreases the chance of gender-related bias (Ledwith and Manfredi 2000; Rees 2004; Academy of Finland 1998; Allen 1988; Husu 2000; Ziegler 2001; Martin 1994) cited in van den Brink, Benschop and Jansen (2010).

One reason for this effect is that biases which interfere objective decision making are "more likely to occur if assessments are based on obscure criteria and the evaluation process is kept confidential (ibid.)."

The assessment of applicants can be influenced by stereotypes. Current research shows that stereotypes are particularly relevant when criteria are not properly defined and the assessors use their own individual and personal images of an ideal candidate
(Heilman et al. 2004).

As technical subjects still are male-dominated and associated with masculine characteristics, female applicants in many STEM subjects might face unconscious biases that disadvantage them in assessment processes.

Academy of Finland (1998): Women in academia: Report of the working group appointed by the Academy of Finland. Helsinki: Academy of Finland.

Heilman, Wallen, Fuchs, Tamkins (2004): Penalties for Success: Reactions to Women Who Succeed at Male Gender-Typed Tasks. *Journal of Applied Psychology*, 89, 3: 416- 427.

Husu, L. (2000): Gender discrimination in the Promised Land of gender equality. *Higher Education in Europe 25*,2, 221–228.

Ledwith, S. and Manfredi, S. (2000): Balancing gender in higher education. *The European Journal of Women's Studies 7,* 1: 7-33.

Martin, J. (1994): The organization of exclusion: Institutionalization of sex inequality, gendered faculty jobs and gendered knowledge in organizational theory and research. *Organization* 1/2: 401–431.

Rees, T. (2004): Measuring excellence in scientific research: The UK Research Assessment Exercise' in *Gender and Excellence in the Making*. EUR 21222. Brussels: DG-research, European Commission.

Van den Brink, M., Benschop, Y. and Jansen, W. (2010): Transparency in Academic Recruitment: A Problematic Tool for Gender Equality? *Organization Studies 31,* 12, 1–25.

Ziegler, B. (2001): Some remarks on gender equality in higher education in Switzerland. *International Journal of Sociology and Social Policy 21*, 1–2, 44–49.

Other useful resources

Handbook "Gender-sensitive Design of Criteria and Recruitment, Appointment and Promotion Processes in Academia". http://www.festa-europa.eu/sites/festa-europa.eu/files/5.1.2.%20Gender%20Issues%20in%20Recruitment,%20Appointment%20and.pdf

Support a good start

What
A PhD is very different from Bachelor and Master Programs. Many PhD students work in isolation for much of the time. Departments are responsible for ensuring candidates make a good start, by providing good working conditions in an attractive and inclusive environment, both academically and socially. Supervision should be seen as the total oversight by the institution of a PhD student's progress and broad academic development.

Why? – Gender perspective
The supervisor offers advice, and guides the student to successful and timely completion of the thesis. This is likely to be more prescriptive and directive in the early part of the PhD career.

A good working relationship should exist between supervisor and student, with the supervisor providing encouragement, personal support and guidance at all stages and for all different PhD students (male, female, foreign PhD students and other forms of diversity).

Recommendations for good practice
Examples from different national practices
To support new PhD students at their arrival, one FESTA partner organizes "welcome days" during which a third-year PHD student explains to the newcomers the activities that must be performed during the program. A lot of support is offered by the welcome office which helps new PhD students with bureaucratic procedures (visa, permit), and to find an accommodation for the first year.

Providing useful information (as link to B4: Clear information about rights and routines)
Interviews with PHD students conducted by one FESTA partner showed that an important aspect is to provide useful information to PhD students when they start the doctorate. This is important because PhD students are frequently coming to an organization which is different from the University where they got their master's degree and many details which they previously took for granted are no longer relevant.

This information may be provided by various actors involved in the doctorate, who can be grouped at two levels: The Supervisory Level and the Institutional Level.

Supervisory level: the supervisor is the person with whom the PhD student interacts most frequently during the doctorate period. The information may be concerned with:

- Expectations of the supervisor about the PhD student's achievements;
- The way the supervisor would like the PhD student to carry out the assigned activities;
- The goals that the PhD student should aim to achieve, by specifying the period of time (e.g.: writing their first article within six months from the start of doctorate).

Several supervisors suggest that it would be helpful to collect this information in an official document that both the supervisors and the PhD students would sign before the doctorate starts. This document will protect both the student and the supervisor, if the agreed rules will be not respected.

Institutional level: by the administration, because they can provide information on administrative and organizational aspects of the organization hosting the student/offering the grant. The information may include:

- Introduction about the PHD programme structure and list the main milestones
- Information about department / lab/ research unit the PHD student will work at
- Rights and duties, responsibilities
- PhD school management roles (e.g. director, committee of professors)

A request that emerged from some interviews with PhD students in one FESTA partner is the set-up of a support office where students can go to ask different kinds of information about the doctorate (a sort of mentoring service). The people offering this "service" should have contacts and know the PhD students and the supervisors as well. In this way they can give accurate information, according to past experiences, about what the supervisors expect from the students, how it would be better to deal with them, and to have timely and accurate information about the PhD program. One example might be support structures to facilitate a PhD student when motherhood and PhD studies need to be reconciled.

Allowing a transitional period

For most PhD students, the employment for PhD is their first "regular" employment, so they need support in becoming a professional researcher. Supervisors should keep in mind that PhD students have to learn what working as a professional researcher means. Stating clearly that this is one of the learning targets for the first phase, makes expectations clear for both the supervisor and the student. Examples are:

- Management of literature
- Working in laboratory, including preparation and follow-up work
- Scientific writing
- Team work and independent working
- Other aspects you will find within this online-tool

Sometimes potential PhD students work as undergraduate student assistants on topics that might serve as a basis for a PhD. For a smooth transition it is necessary to clarify explicitly what PhD supervisors expect from a student assistant who wants to do a PhD to avoid frustrations on both sides.

The transition from being a student assistant to PhD student changes roles for both sides. This should be explicitly talked about in the beginning and the roles of PhD student and PhD supervisor should be clarified.

Addressing students' specific needs

Each PhD student has individual needs. They derive from individual circumstances such as culture, age, lifestyle, and family status, physical or psychological limitations. Some may affect the organization of work. Supervisors should explicitly ask about students' needs and take them into account. Examples are:

- Do PhD students have parental duties or responsibility to take care of the elderly?
- Is there a need for flexibility in time or location? How can this be arranged?
- Is there a need for assistance, e.g. in the case of disabilities?

Unwritten rules on behavior or scientific ethics can differ between countries or even universities within one country. New PhD students may not be familiar with these rules and ethics and may need some explanation.

PhD students who differ in some respect/have a minority status within the department/team may benefit from contact with other researchers who can serve as role models. Inform the PhD student about existing supportive networks like mentorship programmes.

Examples from different national practices
One institute cluster at another FESTA partner has designed a PhD process with a one year starting phase. In the first year, PhD students "familiarize themselves with the research at the institute and are integrated into teaching, ongoing project work and acquisition of external funding. At the end of this phase they settle for a topic area close to research projects, which they are working on, and know the relevant scientific "state of the art". The final confirmation of academic supervision is coupled with a contract extension for two more years and is given after [a 2.5 days] dissertation tour." (https://www.ima-zlw-ifu.rwth-aachen.de/en/careers/doctorate_process.html).

From literature and other sources
From the beginning of a project, a supervisor can help a student to understand the significance of what she or he is doing - and frequently reaffirm that significance as the work progresses (Baldwin, 1999).

James, R. & Baldwin, G. 1999, Eleven practices of effective postgraduate supervisors, University of Melbourne, Victoria.

Other useful resources
Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. Educational Researcher, 18, Cryer, P. (1996). The research student's guide to success. Buckingham: Open University Press.

Yeatman, A. (1995). Making supervision relationships accountable. In: A. Lee. A & B. Grenn (Eds.) Postgraduate studies postgraduate pedagogy. The University of Sydney, Centre for Language and literacy.

Moses, Ingrid (1989): Barriers to Women's Participation as Postgraduate Students. (AGPS, Canberra).

https://www.youtube.com/watch?v=E-1IJJ6qJOg

https://www.youtube.com/watch?v=G3SPukI41bQ

Establish PhD student – supervisor relationship

What
Ensuring that a clear psychological contract is established between PhD-student and Supervisor. The psychological contract is the unwritten expectations between an organization and an employee that are not expressly outlined in the contract of employment.

Why? – Gender perspective
Converging expectations and setting up a psychological contract to clarify the working relationship makes it easier for a PhD-student to understand and negotiate the new situation s/he has entered. This can ease the transition from graduate to post graduate life and work in Academia. Establishing a clear psychological contract, by making implicit rules and knowledge explicit, can level the playing field for everyone – also newcomers or people not already familiar with Academia.

From contexts and experiences in the FESTA-project
As part of the FESTA project on gender sensitive PhD-supervision, a number of study circles were held at one of the participating universities. One such PhD supervisor study-circle session was well underway when one of the younger participants suddenly exclaimed that he had so many reflections on the best way to get the programme started and to establish the relationship with both male and female PhD-students – he had been experimenting with a number of different styles and methods but had yet to find his preferred modus. This brought about an engaged and fruitful discussion concerning first meetings, establishing the 'right' working tone and sounding out the nature and preferences of the PhD-student.

Recommendations for good practice
Converging expectations - Supervisor's checklist for first working meeting with PhD-student after student has started

The following checklist may be used as a general guideline for the first working meeting after the PhD-student has started. It can be supplemented or modified according to Supervisor's personal preference, style or practice. This checklist has the strength of being personal and establishing an interactional practice based on openness.

- Reflection concerning the PhD programme:
    - Why have you chosen to enrol as PhD-student and what are your expected outcome(s) of the programme?
    - Do you have ideas about what you want to do afterwards? (If not, it is completely ok, but if you do, it gives us a chance to emphasize those elements that will strengthen you in relevant ways.)
    - Do you wish to continue on to an academic career /a career in Academia after you obtain your degree?

- Expectations student-supervisor:
  - What do you expect of me as supervisor on your PhD project?
  - What do you expect concerning my accessibility?
  - Do you expect me to respond to e-mails in weekends or vacations?
  - I expect from you that you
    - Are engaged in your PhD-studies both in relation to your research and your teaching
    - Really want to do your PhD – that it is not a second choice
    - Keep your dates, obligations and agreements – both with me and with others in the group
    - Work full time – and if you are not physically present (e.g. if you work from home), then it is possible to make contact with you by phone or mail
    - Help others in the group and communicate your knowledge to the other students including BSc- and MSc-students.
    - Interact with me in an honest and open manner and tell me clearly if you come across situations that are problematic
    - Tell me directly if I need to show particular consideration - for shorter or longer periods
    - Keep me regularly updated about the progress of your project and involve me if you encounter problems. Think first, see what you can solve yourself, and then ask. Use me to bounce off ideas and qualify possible solutions
    - Do not expect me to be able to mind read – tell me what you are thinking and then we can take action
  - I do not expect you to read or respond to emails in the weekends or on vacation. If I happen to write to you during weekends/vacations, then you are not obliged to respond straight away
- Supervision:
  - How do you prefer day-to-day supervision?
  - Would you prefer a regular meeting once a week? Or a more ad- hoc meeting schedule?
  - Please be aware that I may not always have the opportunity/time to supervise you right when it would be best for you. Give me a little flexibility. If the suggested time does not suit me, I will let you know and we can arrange a different time to discuss your question
  - This of course also goes the other way: I do not expect you to be able to talk to me right when it suits me best. Instead I expect that we can find a different time to talk

Establish communication and working routines

This is a suggestion for how to establish a psychological contract, communication and working routines between supervisor and PhD-student by giving or sending an e- mail including the following text.

Please consider the following questions prior to our next working meeting:

- How do you prefer the day-to-day supervision?
- Please describe your preferred working routine?

- What are your preferences concerning meetings with me – how often, tone and style, ad-hoc or regular, other?
- What are your preferences concerning communication with me – oral, written, tone and style, ad hoc or formal, other?
- Do you have any particular concerns or wishes for how we may establish the best possible working routine and communication in our work together?

At the meeting, we will use this as input to finding out how we are going to work together – with regard to responsibilities, organization of work, working routines, meetings, communication - that suits both of us.

Clarify roles

This recommendation is meant as a guide for supervisors for what to keep in mind when establishing the psychological contract and working relationship. These actions are best practiced as early as possible but can be revisited throughout the course of the PhD-project.

- Clarify roles of both student and supervisor early.
- Discuss expectations on both sides to avoid future misunderstandings and to allow for the possibility to make necessary adjustments.
- Set boundaries and limits to what you are prepared to do.
- Schedule regular appointments which both parties are responsible for keeping.
- Record decisions made during meetings.
- Provide more assistance early and gradually assist the student to develop more independent learning approaches.
- Try to assess where your student is academically; assess their knowledge of the discipline.

    - Be aware of the risk of "gendered expectations" for women supervisors and clarify expectations / roles when needed

- The PhD student and the supervisor present their respective expectations regarding the "ideal" project and agree on an outline implementation plan.

From literature and other sources

PhD students, who have more interaction with their supervisor, stand a better chance of finishing the doctoral program in the specified time (Lovitts, 2001).

"... in order for a student to have an overall positive experience of their PhD, it is imperative that he or she has a positive experience of supervision. Supervisors should have access to training to allow them to develop people management skills which incorporate equality and diversity considerations, as befits their role. A local pastoral care structure should be implemented by institutions, so that PhD students have someone to turn to, and to take the pressure off supervisors and post-doctoral fellows" (Lober- Newsome, 2008).

There is evidence that there is a difference between men's and women's PhD-experience: "Women are less likely to have a positive doctoral study experience than men" (ibid, p.9.)

PhD students describe the early years of the doctorate as very hard and different from the academic environment they had imagined (De Welde and Laursen, 2008).

Everyone has to prove he/she is doing well not only to their colleagues, but also to the rest of the faculty and teachers, emphasizing how the work they do is of high quality. For women, the need to prove they are doing well is described as even greater, since they are immersed in a sexist environment and women have to struggle daily to be treated as [equal to] their male colleagues (Seymour, (2002).

De Welde, K., & Laursen, S. L. (2008). "The 'Ideal Type' advisor: how advisors help STEM graduate students find their 'Scientific Feet'". The Open Education Journal, 1(49-61).)

Lovitts, B. E. (2001). *Leaving the ivory tower: The causes and consequences of departure from doctoral study*. Rowman & Littlefield.

Lober-Newsome, J. (2008). *The chemistry PhD: the impact on women´s retention*. The Royal Society of Chemistry and the UK Resource Centre for Women in SET. p.9.

Seymour, E. (2002). "Tracking the processes of change in US undergraduate education in science, mathematics, engineering, and technology". Science Education, 86(1), 79-105).

Other useful resources

For more tips on converging expectations by "Student-Advisor Expectation Scales", see material on https://earth.stanford.edu/programs/eiper/sites/default/files/adv_expectations-VPGE.pdf

Also check out "*Support a good start".*

Prepare for the defense

What
There are various aspects which a PhD student should consider while preparing for the defense of the theses.

Recommendations for good practice
Obtaining useful information:
The format of the defense is different from country to country. How the dissertation defence works varies enormously between fields, universities, and departments. In some countries and at certain universities, graduate students are advisory members of the committee during the PhD defence. In other countries, a PhD defence takes place in public and everyone might ask questions at the end.
Interviews with PHD students conducted by one FESTA partner showed that an important aspect is to provide useful information. This information may be obtained in several ways and can be grouped at some levels:

Supervisory level:

- Ask your supervisor. He/She should obviously know what the requirements of the defence are, exactly

PhD student level:

- Attend other defences. Typically, PhD defences are public, and it is highly recommended that any PhD candidate should visit a few before her/his own, to get to know the procedure and get a feel for what the defence talk is supposed to look like

Administrative level:

- Look it up in the programme description and talk with your administrative supervisor, generally your Head of Department/Programme. Usually, the programme description will contain exam regulations for the defense, and this should describe the exam procedure and who is supposed to ask what kind of questions.

From literature and other sources
The selection of examiners is one of a number of decisions in the final stages, albeit one which the supervisor must make alone. Other choices are for students and supervisors to discuss together. One such decision is simply whether the research is ready for submission. It is appropriate to consider the likely outcome if the research is presented in its current state and to what extent the project could be improved with more persistence.

For most people, completing a research degree is one of their biggest accomplishments in life, and their emotional investment causes stresses and strains. Moments of doubt can start to appear in the final stages. Even though the vast bulk of the work has been done and (in the supervisor`s opinion) little additional work

may be necessary, some students nevertheless stall. The supervisor must be a calming and reassuring influence, while at the same time playing the devil`s advocate and putting the work through a comprehensive quality – assurance audit. (Baldwin, 1999)

James, R. & Baldwin, G. 1999, Eleven practices of effective postgraduate supervisors, University of Melbourne, Victoria.

Other useful resources

http://phdtalk.blogspot.bg/2013/08/how-to-prepare-for-phd-defense.html

http://jameshaytonphd.com/preparing-for-your-thesis-defence/

Dinham, S. (2007a) Leadership for Exceptional Educational Outcomes. Teneriffe, Qld: Post Pressed.

Elmore, R.F. (1996) 'Getting to Scale with Successful Educational Practices', in Fuhrman, S.H.; O'Day, J.A. (Eds), Rewards and Reforms: Creating Educational Incentives that Work. San Francisco: Jossey-Bass.

Prepare and facilitate transition into career

What
Prepare and facilitate the transition into future career through discussing future strategies, encouragement to seek career advice, and continuous support.

Why? – Gender perspective
PhD students often are not clear about their future career and what is needed to successfully pursue a career. This is even more true for young female researchers.

From contexts and experiences in the FESTA-project
One professor conducts yearly meetings about career planning, which are separated from yearly meetings on the progress as a PhD student. He sees a necessity to prepare transition because you need to have some merits if you want to apply for a new job. He says that this is important for both academic and non-academic positions. During the PhD it is possible to work on individual strengths and weaknesses.

Recommendations for good practice
Encourage student to seek career counselling:
Although it is very important for PhD students to know what to do after PhD, this issue is easily forgotten amidst everyday work. In some institutes of RWTH Aachen University, yearly meetings are in place, which also include the topic of career planning. It is important that PhD supervisors instruct their students about career planning, so that they will start to think about their future plans.

In many universities there are training courses on career planning, where professionals guide the students to find their path. In some universities mentoring programmes exist, in particular for female researchers. It is good if the supervisor knows about these services and distributes information about it openly, stresses the importance and supports the students to attend these trainings.

Looking for career counselling is especially important if PhD students head to a non-academic position and the supervisor has less personal experience of working in industry.

Administration/unions: Informing PhD students via e-mails or other up-to-date communication about new courses helps to spread information on the training available. At RWTH Aachen University, PhD students have the right to attend courses on personnel development. This entitlement acknowledges the importance of trainings.

Discuss strategies for the future with your student:
As supervisor and senior staff, you are not only an expert in the field, but have also profound knowledge about how to navigate the academic system after the PhD. Moreover, you probably know your PhD student well and might be able to give specific advice due to the students´ research interests and specific context.

As a supervisor, you might

- Reflect together with your student upon what kind of choices and decisions might be important for a future career
- Show an active interest in your students´ plans for the future and encourage a future academic career
- Together with your student, problematize pros and cons of an academic career
- Give concrete support by letters of recommendations etc.

Strategies for a future career might also be supported on an institutional level. Thus, at Uppsala University, the faculty of Science and Technology offers the postgraduate course "Exit from PhD studies", which includes topics such as thesis publishing, different career options at the university, in the private sector and in governmental authorities, the importance of pedagogical and teaching documentation, how to write a research grant application and where to apply for money, what is important when applying for a post-doc position and planning a post-doc period.
(http://www.teknat.uu.se/utbildning/forskarniva/kurser/fakultetsgemensamma/)

Provide continuous support:
Many supervisors stay in touch with their former PhD students and continue to support them in their academic career. As a supervisor, you might for example

- Support your former student, particularly during the first period after the PhD, by writing letters of recommendation; provide feedback on applications for grants and / or academic positions etc.
- Recommend your former student for different academic tasks such as being a reviewer, a key note speaker, a journal editor etc.
- Facilitate access to scientific networks and / or arrange contacts to key persons

Gradually, the former student – supervisor relationship will probably become more and more equal; both parts might continue to support each other in their continuous, separate, academic careers.

From literature and other sources
Many junior researchers are in a phase where changes in job orientation are quite common. Over half of researchers have no clear focus of their aims or what is needed to reach the target (Briedis et al. 2013). Female researchers do less career planning than male researcher (Dever et al. 2008).

During this phase of orientation advisors´ support is needed, in particular for those with no clear career planning. Research shows that "advice about careers and postdoctoral positions [is] clearly important, as [are] letters of recommendation and help with networking." (De Welde and Laursen 2008: 54).

There is some evidence that female PhD students are "less likely to be engaged with their professional community. In particular, female graduates were significantly less likely than male graduates to interact with professionals outside academia and with visiting scholars during the course of their PhD studies." (Dever et al. (2008), p. i) At the same time PostDocs say that "those characteristics that they had acquired during their PhD" were "important in developing their career at work." (ibid, p. ii).

Kolja Briedis/Steffen Jaksztat/Julia Schneider/Anke Schwarzer/Mathias Winde (2013): Personalentwicklung für den wissenschaftlichen Nachwuchs. Bedarf, Angebote und Perspektiven – eine empirische Bestandsaufnahme (Personnel development for young researchers. Demand, supply, and perspectives – an empirical survey), HIS:Projektbericht Juni 2013, online: http://www.dzhw.eu/pdf/22/projektbericht_personalentwicklung.pdf

Dever et al. (2008): Gender Differences in Early Post-PhD Employment in Australian Universities. The influence of PhD Experience on Women's Academic Careers. Final report, online: https://www.wgea.gov.au/sites/default/files/Gender-differences-in-early-post-PhD-employment.pdf

Kristine De Welde/Sandra L Laursen (2008): The 'Ideal Type' advisor: How Advisors Help STEM Graduate Students Find Their 'Scientific Feet', in*: The Open Education Journal*, 2008, 1, 49-61.

Other useful resources

FESTA's guide to Career counselling guides academics and researchers at all career stages to make strategic decisions to advance their careers. It is particularly useful for early-career academics, at PhD stage. http://proisis.lero.ie/festa/App/Consult

Facilitate enculturalization into academia

What
Supervisors have a significant role to play in facilitating the PhD student's induction into the academic environment and becoming an independent researcher.

Why? – Gender perspective
A welcome and induction into the academic environment is essential if the student is to successfully progress through the PhD journey.

There is factual data the student needs to know about regulations and procedures, however, becoming familiar with the culture (i.e. the way we do things around here) is equally important. Given that scientific environments tend to be male dominated, such enculturalization is especially important for female students who may not have informal networks.

Evidence / background - Gender perspective
The first few days and weeks of a PhD programme can have a lasting effect on students' perceptions of their overall PhD experience. It is essential therefore that student undergo a very positive induction process. Aside from the factual data concerning regulations and supports, students need to understand the culture. The PhD supervisor is critical in facilitating such understanding, by explaining what constitutes a reasonable workload, standard attendance, basic work conditions and regulations and ways of communicating and behaving in the team and department. For the first few weeks the Supervisor should operate an 'open door' policy so that the student has the opportunity to ask questions regarding cultural and value information. Given that scientific environments tend to be male dominated, such enculturalization is especially important for female students.

From contexts and experiences in the FESTA-project
A (female) PhD Student noted: 'knowing that you can contact/meet your supervisor on ad-hoc basis/ outside scheduled meetings if necessary.

While the male dominated culture was also noted by a (male) PhD student: 'SET (Science, Engineering and Technology) is male dominated. And it's difficult for somebody who is not identified with that to broach it and pursue a career'.

Recommendations for good practice
Formal introduction:

- Arrange a local induction for the PhD student
- Explain standards of behaviour and means of communicating

Availability and support:

- Operate an 'open door' policy for the first few weeks
- Be alert to difficulties faced by female PhD students

- Assign a second or third year student to mentor the new PhD student
- Support PhD students in establishing networks among other PhD students and within the team to avoid social isolation. Group coffee breaks or lunches can help. Remember to include the female PhD students
- Support collaboration between PhD students and senior researchers where their contribution is acknowledged. This provides the sense of belonging to the scientific community
- Facilitate one-to-one meetings where you can also ask about how comfortable PhD students feel It is important to give emotional support through listening and encouraging when needed

Sense of belonging (incl. team meetings):

- Facilitate meetings on a regular basis, where current information on the department/institute and new colleagues can be shared. This ensures that PhD students are more embedded into communication processes.
- Explicitly ask for contributions of new and shy PhD students during the meetings and acknowledge their contributions
- Team events can enhance team spirit. Choose activities that do not excluding anyone

Scientific ethics:

- It is important that the supervisor clarifies his/her wishes and expectations concerning scientific ethics in respect to academic writing and writing formalities
- Further, since many PhD students also perceive problems with certain aspects of research such as data collection and analysis as well as publishing, the supervisor should approach the student about these topics so that there are no misunderstandings or obstacles to the student's progress
- Supervisors should check the students' work regularly, to identify ethically problematic behavior

From literature and other sources

Starting an academic career can be highly complex and demanding (Trowler and Knight, 2000). New starters do not fully understand what their new department or university expects of them and because it takes time to become familiar with departmental cultures, they do not know what is acceptable or permissible in their actions and work. Such cultures are 'created by the discourses and practices of the community in which one works' (Knight and Trowler, 1999: 23) and are therefore discipline and university specific, and probably unintelligible to an outsider.

The PhD supervisor has a critical role to play in facilitating the students' socialization into the department and university.

Creating a sense of belonging (to the research team, department, and university) is achieved through activities which foster inclusion and through communication with existing colleagues. PhD students should be given opportunities to present their work at departmental seminars, academic conferences, summer

schools. They should be included in team meetings, be introduced widely and encouraged to actively participate in the research team, department.

A mentor, in the form of a second or third year PhD student, should be established for the new PhD Student.

Knight, P.T. and Trowler, P.R. (1999) 'Organizational Socialization and Induction in Universities: Reconceptualizing Theory and Practice', *Higher Education* 37(2): 177–95.

Trowler, P.R. and Knight, P.T. (2000) 'Departmental-level Cultures and the Improvement of Teaching and Learning', *Studies in Higher Education* 25(1): 69–83.

Other useful resources

http://www.reading.ac.uk/web/FILES/graduateschool/pgrmonitoring.pdf
PhD Supervision: Good Practice Guide.

Ensure good communication

What
Providing supportive feedback, establishing and maintaining trust and understanding as well as applying intercultural communication skills are crucial for effective supervision.

Why? – Gender perspective
Good communication as a precondition for a supportive relationship has a high impact on women´s overall PhD experience and wellbeing.

From contexts and experiences in the FESTA-project
Focus interviews with PhD students at FBK show that women:

- Might have less time with their supervisor compared with their male colleagues
- Might receive less encouragement than their male colleagues, when it would be important that they were given more encouragement (especially when working in areas considered "malestream")
- Are more likely than men to require perfection from themselves and, therefore, tend more easily to delay or fail to complete the required work

Recommendations for good practice

Establish and maintain trust/support/understanding
Good communication as a fundamental basis for a professional, helpful and respectful supervisory relationship might be supported – particularly in the first phase of the PhD education – by:

- The ambition to establish a honest and trustful atmosphere of mutual respect
- Clarifying and negotiating expectations and responsibilities
- Establishing procedures and processes of joint working
- Regular informal interactions
- Identifying the student's interests and skills

Personal chemistry and emotions, support and trust between a PhD-student and a supervisor, play crucial role in PhD education. Different personalities seem to have different behaviour. Hence, the relationship between a supervisor and a PhD-student are full of idiosyncrasies and peculiarities. Beneficial relations between supervisors and students usually emanate from the authority position of the supervisor. They sometimes could be exacerbated in cases of "non-traditional" PhD-students such as elder persons, female students or those who use English as a second language. The supervision process needs to be implemented with high sensitivity and to be built on relationships of trust and respect.
There are many and varied informal and formal ways of obtaining support, understanding and help.

Some examples of formal sources for a PhD student might be:

- the supervisor

- an academic mentor
- the Head of Department
- the administrative staff supporting the PhD-students
- the faculty PhD-student representative
- foreign students may get specialized support from the International Officers

Their duties and responsibilities include:

- Arranging induction sessions for PhD-students
- Taking care of pastoral and administrative responsibilities
- Mediating in cases of dispute between a PhD-student and a supervisor

Some examples of informal sources might be:

- the supervisor
- an academic mentor
- colleagues and friends

Internationalisation and globalisation of academia mean that the PhD-students and their supervisors often come with different educational, religious, cultural, and linguistic background. This can be the main reason for the lack of trust between them. In order to build a helpful, professional and respectful relationship between a PhD-student and his/her supervisor there are some key factors such as:

- open and productive communication
- mutual respect
- clarified expectations
- PhD-students and supervisors together should establish procedures and processes of collaborative working which might require:
    - more regular informal interactions
    - clearly identified the student's needs

Skilled supervisors offer some valuable recommendations:

- establish reasonable and agreed expectations
- inspire and motivate your students
- ensure that the partnership is appropriate for that specific project
- initiate and keep regular contact as well as provide essential feedback
- help if academic and/or personal problems occur

Constructive feedback

The character of feedback has to change over time depending on how the student´s work is progressing. Particularly in the first phase of the PhD-education, frequent scheduled meetings enhance an atmosphere of trust and support and provide opportunities for feedback. Feedback can range from very specific comments on particular issues to occasional friendly reassurance and support. It can be both oral and written. However, the feedback should always be given to help, not to hurt or create resistance and

restrains. The purpose of giving feedback in the supervision process is to improve the student's performance, but not to discourage it. When the feedback is predominately negative, studies have shown that it can discourage students' effort and achievements.

General advice: Supportive feedback should:

- Be given timely and frequently since a delay in responding can create insecurity and hinder progress
- Be as specific as possible (instead of general)
- Be expressed in an encouraging and supporting matter
- Emphasize even good things, not only things that have to be improved
- Use the concept of a "feedback sandwich" to guide your feedback: Compliment, Correct, Compliment
- Formulate critical comments in a constructive way through giving concrete examples and being as specific as possible
- Feed forward: provide an opportunity to reflect on how to proceed and develop further on
- In many disciplinary fields within STEM, supervisors and students meet on a daily basis. Even if feedback might be given ad-hoc, scheduled meetings are important for more holistic feedback
- Providing written feedback some days before the meeting might be a tool to help the student to think about your feedback in advance
- At the end of a meeting, you might ask your student to summarize your feedback and what actions need to be taken in his / her own words, in order to make sure that the student has understood you correctly
- Since feedback needs to be adapted over time, it might be useful to reflect on the nature of the feedback you want to provide: Amongst other things, it might summarize and mirror a progression and point out what still has to be done, provide a general judgement or clarify strengths that the student can build upon. It might encourage and motivate, correct concrete failures, identify things that still have to be improved, give explanations leading to a deeper understanding, challenge the student´s understanding and stimulate critical thinking and creativity or enhance self - reflection on the process itself.

Intercultural communication

Carroll and Ryan (2005) provide helpful advice concerning intercultural supervisory relationships and intercultural communication skills.

Try to allocate supervisors with overseas experience, cultural sensitivity or intercultural communication skills, empathy, or who have background knowledge of the student´s home country or culture.

- Clarify roles of both student and supervisor early
- Discuss expectations on both sides to avoid future misunderstandings
- Set boundaries and limits to what you are prepared to do
- Schedule regular appointments which both parties are responsible for keeping
- Record decisions made during meetings

- Provide more assistance early and gradually assist the student to develop more independent learning approaches
- Try to assess where your student is academically; assess their knowledge of the discipline.

Ryan, J. (2005). Postgraduate supervision. *Teaching international students: improving learning for all*, 101-107.

Balancing, planning, prioritizing

What
PhD studies include a range of different tasks and duties. To plan teaching and research, balance between different duties such as research, teaching and administration, make priorities when needed and find a healthy work-life balance is crucial for finishing the PhD in time.

Why? – Gender perspective
There is evidence that many women PhD students experience stress and pressure during their studies. Providing support to help students to balance, plan and prioritize will enhance students´ wellbeing and help them to work effectively and finish their studies in time.

From contexts and experiences in the FESTA-project
Interviews with supervisors at Uppsala University showed that many supervisors believe that academic cultures and norms do not align well with other private interests and a family life. Supervisors stressed that senior staff might act as role models for younger academics by supporting students in making priorities and realizing a suitable work-life balance.

Participants at a workshop on "Equal opportunities aware PhD-supervision" for PhD students at the Faculty of Science and Technology at Uppsala University pointed out that supervisors should help students to plan and make priorities. Thus, the supervisor might advise students to take postgraduate courses such as introduction to postgraduate studies, research ethics, academic writing and teacher training at an early stage. Attending these courses during the first phase of the PhD education not only facilitates a better foundation for students´ research, but also enhances students´ integration into the academic community and prevents the stress which arises when students are attending courses during the final PhD stages.

Recommendations for good practice
Research and other obligations (teaching, administration):

- As a supervisor, you might:
  - Be sensitive to gendered expectations concerning invisible work, teaching duties etc.
  - Talk with your students about how to organize courses, research and other duties in an effective way and help students to make the right priorities
  - Support an equitable distribution of teaching duties between women and men and protect women from a too heavy teaching workload

Preparing for regular follow-up / reviews:

- As explained in "Establish the PhD student – supervisor relationship" it is essential to negotiate and clarify expectations, roles and responsibilities and establish clear working routines. Regular follow-ups / reviews are necessary in order to ensure that these mutual agreements work well for both sides. Thus, regular follow-ups facilitate changes in working routines when necessary,

and prevent potential misunderstandings and conflicts. Moreover, a regular review on how work is proceeding reduces students´ stress and pressure by making explicit what has been achieved and what is still to be done. Thus, a British report on women in chemistry highlights that women were "more likely than men to have felt that the PhD has become an ordeal" and recommends that "individual students´ experiences are regularly monitored" (Newsome, 2008, p 9).

Initial agreements as well as reviews might be documented and made accessible for both supervisor and student, in order to make agreements and priorities transparent and facilitate regular follow-ups.

In Swedish Higher Education, the supervisor and the PhD student must draw up a so called "individual study plan" according to the Higher Education Ordinance. The individual study plan must be done jointly and include the obligations of the higher education institution and the doctoral student as well as a time plan for the student's studies. Furthermore, the individual study plan must be regularly followed up and revised by the institution when necessary, after consultation with the doctoral student and supervisor.

Work-life balance (example from University of Southern Denmark, Faculty of Science):

- Women in Academia at work juggle a job, writing, research, and teaching and, at home, they juggle partners, children, home life, and personal interests. Sometimes for a young researcher even thinking about timing a pregnancy can be overwhelming.

  An imbalance between work and life can be stressful. Supervisors can play an important role in helping the student achieve a balance between work and life, which ensures a satisfactory distribution of time by making it legitimate to reflect on the balance between work and life priorities.

  At the University of Southern Denmark, a PhD supervisor experienced that it is a challenge for female students to balance priorities ‑ work is fitted around private life and women are required to live up to expectations both at home and at work.

  The following are different recommendations for what to consider when (helping your student in) making priorities:

  - Encourage the student to reflect on how to make priorities to obtain a good work-life balance (for instance by going through the reflection exercises listed below).

  - Discuss the importance of establishing a balance between work and life with your student. Make it a legitimate topic for discussion by being open about your own priorities.

- Discuss Work-Life balance with your PhD student with respect to:
  - Realistic working hours - high ambitions
  - Expectations as a young researcher – see the structures
  - Work – part of the community – to work long hours
  - Highlighting what is expected and where there might be conflicts: expectations, dilemmas, conflicting values, signs of stress

Reflection exercise: work-life priorities

Step 1

The career cake model is an exercise providing you with an overview of your life. It can reveal the difference between the life you wish and the life you live. The model gives you a hint about the parts of your life you need to take a closer look at.

Fill in the cake with your values. Look at the cake. It is an image of your life. There are two ways to change a work-life imbalance; either you change your priorities or you change the time allocated to each area.

Step 2

Reflect and write down your thoughts on:

1. What does "Work-Life Balance" mean to you?
2. What is the impact of work-life balance and imbalance on you?
3. What are your values about work, family/friends and yourself and where it fits life as a whole?
4. How much should each area represent in your life, i.e., how much of your waking time and energy do you want to devote to each area?
5. How can you make sure that you honor your commitments?

Step 3
Defining the playing field:

1. Within the framework and the "life resources" you assigned each single area of life in the previous exercise: 1. Reflect and write down your thoughts on:
    - What specific main activities must be central to each area?
    - What should be your (life-strategic) pointers that you should prioritize?
2. Consider the fit between your current work role and your life outside work. You may give each main activity points on a scale from 0-10 according to how well you live your priorities.
    - Are you satisfied with your work-life balance?
    - What are the issues that you prefer ("wants") versus those that are absolutely non-negotiable?
3. Reflect on your main challenges
    - What are your main challenges or resistance in your institution, at work, at home and in yourself?
4. Making priorities - main challenges:
    - Are you ready to face your challenges?
    - What stands in your way of doing it?
    - How will you deal with it?

From literature and other sources
There is evidence that female PhD students experience stress and pressure during their studies to a higher extent than men. Thus, Swedish PhD student surveys clearly show that women are on sick-leave more often and during longer time-periods than men. Gendered expectations on women, particularly in male dominated areas, might put higher demands on women than on men and increase women´s demands on themselves as well as increase their actual workload. Focus interviews with female PhD students at Uppsala University showed that women more often than men are made responsible for "invisible work tasks" such as writing meeting minutes or organizing social events at the department. Similarly, a postgraduate student survey at the university of Lund / Sweden highlighted that women tend to get involved in common duties such as teaching or administrative and organizational tasks to a higher degree than men. Even if these tasks often are experienced as positive and stimulating, they do not count on an academic cv and are not always recognized and valued. Furthermore, the involvement in these collective duties might also lead to women falling behind with their own research.

Moreover, research into academic culture shows that long working days and a common belief in research as "vocation" are strong and well-established norms A British study on women in chemistry showed that women to a higher extent than men are "uncomfortable with the culture of their research group" which makes them prefer a career outside the academy, since an academic career is experienced as all-consuming (Newsome, 2008, p 18).

A recent study on female students´ wellbeing reports that "one of the hardest undertakings in the whole process of being a female PhD student was to maintain a healthy balance in life" (Schmid & Umans, 2014).

It is difficult to manage different tasks and different roles - as student, teacher, colleague, employee, mother, wife or partner, daughter, sister, friend, member of group etc. - which might lead to stress and feelings of guilt and shame (Schmid & Umans, 2014)

Charpentier Ljungqvist, F. (2014). *Utbildning på forskarnivå vid Stockholms universitet: resultat från studentkårens doktorandenkät 2012/2013: rapport från Stockholms universitets studentkår*. Stockholm: Stockholms universitets studentkår.

Holmström, O. (2013). *Forskarutbildningen vid Lunds universitet: perspektiv från doktorander, doktorsalumner och handledare*. Lund: Utvärdering, Lunds universitet.

Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *Proceedings of the National Academy of Sciences*, *109*(41), 16474-16479.

Newsome, J. L. (2008). The chemistry PhD: The impact on women's retention. *A report for the UK Resource Centre for Women in SET and the Royal Society of Chemistry*, 1-38.

Peixoto, A. (2014) *De mest lämpade: En studie av doktoranders habituering på det vetenskapliga fältet*. Diss. Göteborg : Göteborgs universitet, 2014.

Robinson, C. V. (2011). Women in science: In pursuit of female chemists. *Nature*, *476*(7360), 273-275.

Schmidt, M & Umans, T (2014), "Experiences of well-being among female doctoral students in Sweden", In: International Journal of Qualitative Studies on Health and Well-being, vol.9.

Foster good collaboration

What

Collaboration is one of the most important aspects of a research career; however it requires a highly responsible attitude and diligence. Good collaboration is based in the philosophy of positive behavioral interventions and supports. Within academia, various terms are used to refer to "good collaboration". A productive and well-established formal relationship between a supervisor and his/ her PhD students is important in initiating successful research collaboration.

Why? – Gender perspective

Gender differences are reflected in a range of features of academic life including PhD supervision and relationships between a supervisor and his/ her PhD students.

Recommendations for good practice

Encourage active participation

In one of the FESTA partners, some PhD students experienced difficulties participating actively in the life of the research team. To solve this problem, some PhD supervisors decided to formalize weekly meetings, in which all members of the group get together and discuss the activities that are taking place. The ultimate purpose of these meetings is to develop a team spirit that fosters "team-building" and makes all members feel they are sharing in the work of their colleagues. This has been useful for encouraging the active participation of PhD students. During these meetings PhD students can give seminars in which they present their research, results or related work.

Facilitate meetings

To foster collaboration between Supervisor and Student, it is very important to establish regular meetings between PhD students and supervisors.

The frequency of meetings will depend on several factors such as the topic of research and the stage in the PHD path that the student has currently achieved:

- Early stage: the choice of the subject requires a significant amount of time from the supervisor to help the student to formulate the research question of his/her thesis project
- Intermediate stage: once the project has been defined, supervision becomes less intense, so as to ensure greater autonomy and independence in research activities
- Final stage: during the writing of the thesis, there is again a greater need of the supervisor's time to be devoted to the PhD student

A large number of supervisors suggest that the supervisor and the PhD student ought to have regular weekly meetings, in which to:

- Explore the progress or difficulties the student has had during the week
- Monitor activities
- Provide feedback (and tips) to better approach the work that the student needs to carry out

Many PhD students emphasize the need to plan their meetings with their supervisors in advance. This because the interviews showed that the PhD who has as her/his supervisor a head of research unit (or a person having many responsibilities) has difficulties communicating with him/her and obtaining important information due to the lack of time that the supervisor can dedicate to him/her.

These meetings can be of different types:

- Individual meetings
- Group meetings with other students
- Group meetings with co-advisor

Supervisors deem individual meetings most profitable for two reasons:

- Difficulty of doctoral students to communicate, especially in public
- The "one-to-one" relationship motivates the student to achieve the intermediate steps during the week and this method favors the development of empathy, emotional and professional support, by helping the PhD student to focus

To encourage informal meetings, some supervisors use "pizza-meetings" - usually during lunch break - to facilitate informal discussion between members of research group concerning the work of a PhD student. Frequently these meetings are not scheduled. This type of meeting is considered very successful by the supervisor since PhD students feel freer to talk and feel less under-pressure compared to having a formal meeting in the supervisor's office.

Facilitate meetings (example from the Faculty of Science, University of Southern Denmark):
At the Faculty of Science, in one FESTA partner, meeting facilitation is an integrated practice. In connection with PhD-supervision, it is especially useful to pay careful attention to the facilitation of meetings in research groups. Facilitation includes paying attention to atmosphere, form and format of the meeting, so that the topic(s) and agenda of the meeting correspond to the dynamic and intended outcomes. Also it has proven helpful for group leaders to carefully plan regular presentation workshops to allow for a high degree of participation, openness and fruitful exchange in an otherwise very competitive culture. This can be done through a variety of measures ranging from careful planning and preparation, group or pair-discussions, facilitated rounds, formats for feedback, explicit conclusions at the end of every session with a clear sense of who does what when, and follow-up and follow-through after the session.

Useful facilitating tools can be found in the handbook for gender sensitive facilitation (to be published by FESTA WP6.1).

Facilitate teamwork/ Collaboration in research group
In another FESTA partner, some research groups have adopted strategies to facilitate collaboration between members of the same research group. In one partner, for example, some PhD students have to

work, in the early stages, with other people in the research group and only after some months, the PhDs can work with their supervisor. This mode of action has two positive implications:

- It helps acquire the knowledge about the environment and the context within which PhD students will have to work
- It helps increase the collaboration with the members of the research group

Another important element that emerged in this practice, concerns the inclusion of the PhD student in the community in which s/he is entering.

Some supervisors, especially those who work in laboratories, have adopted the strategy of entrusting the whole group with a task and having each team member carry out a part of the task. This way of working means that people are encouraged to work together. One can consider this practice as an "articulation of work" (Corbin and Strauss, 1993) where everyone does a part of the task and only orchestrating all parts of the activity will allow completing the work. It is essential to create shared objectives that will facilitate people cooperating with each other and that will develop a feeling of being included in the community of practice. Through collaboration, PhD students can develop the situated and tacit knowledge that will help them become legitimate members of that community of practice.

To facilitate collaboration in the research group, the majority of supervisors in one FESTA partner, involve PhD students in research group events, such as weekly meetings. Supervisors try to include PhD students in daily activities and avoid considering them as novices, but as peer researchers working in the unit. The know-how PhDs need to acquire in order to do the job can be developed through relationships, through direct contact and interdependence with the members of the group, who then become important sources of knowledge and from whom the students learn, in a situated and collaborative way.

Corbin, J., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. Qualitative Sociology, 13, 3-21.

Peer learning and peer support

The peer support is very important for PhDs, especially for those who start a doctorate.
To increase the collaboration between PhDs, some supervisors asked the PhD students at the second and third year to take care of the doctoral students of the first year. During the first period, the PhD students of second and third years help the new PhD settle in, meet people and know the different activities of work. This attitude has also served the purpose of creating a team spirit, encouraging communication and to make them feel part of a group. In this way the new PhDs are thus encouraged to interact because they do a peer training, asking the senior PhD students to help them in their work.

Another strategy used by supervisors for increasing the peer support and peer learning regards the allocation of office space to PhD students. The PhD student's desks are organised in an open space, an environment that allows mutual interaction because there are no physical barriers to peer relationships.

This setting fosters relationships and facilitates the development of a climate of friendship and confidence between all.

However supervisors comment that if on the one hand this spatial arrangement is positive because it encourages the collaboration between students, on the other hand this area should be located away from the offices of the students' supervisors. Otherwise students may perceive this setting as a means of increasing the supervisory control.

From literature and other sources

Supervisory relationships are central determinants that contribute to the success of the doctoral journey (Ives & Rowley, 2005; Sambrook, Stewart, & Roberts, 2008; Styles & Radloff, 2001; Zhao, Golde, & McCormick, 2007).

Ives and Rowley (2005) found that a constructive supervisory relationship was associated with students' progress and satisfaction with their doctoral studies and, hence, with their involvement in their thesis projects.

To ensure greater success in the doctoral graduate process, supervisors and institutions must have an understanding of the issues which arise through this task. Problems and issues can occur in many areas of the doctoral journey. Four issues are commonly discussed in the literature; these are attrition, supervisor relationship, supervisor quality, and social isolation.

Ives, Glenice[1]; Rowley, Glenn[2], Studies in Higher Education, Volume 30, Number 5, October 2005, pp. 535-555(21)

Jones, M. (2013), Issues in Doctoral Studies – Forty Years of Journal Discussion: Where have we been and where are we going? International Journal of Doctoral Studies, 8 (6), 83-104.

Sambrook, Sally; Stewart, Jim; Roberts, Clair.

Journal of Further and Higher Education, v32 n1 p71-84 Feb 2008.

Styles, I., & Radloff, A. (2001). The synergistic thesis: Student and supervisor perspectives. Journal of Further and Higher Education, 25(1), 97-106.

Zhao, C. M., Golde, C. M., & McCormick, A. C. (2007). More than a signature: How advisor choice and advisor behaviour affect doctoral student satisfaction. Journal of Further and Higher Education, 31,263-281.

Other useful resources

Murphy, N. W. (2004). Orientations to research higher degree supervision: The interrelatedness of beliefs about supervision, research, teaching and learning. (Doctoral dissertation, Griffith University, Brisbane, Australia).

Nutov, L., & Hazzan, O. (2011). Feeling the doctorate: Is doctoral research that studies the emotional labour of doctoral students possible? International Journal of Doctoral Studies, 6, 19-31.

Support Networking

What
Networks are essential for success in an academic career. The earlier one starts to build their network, the more successful they will be.

Why? – Gender perspective
The opportunity to obtain grants, travel supports for conferences and overseas study depends considerably on the ability of the academic to establish an appropriate network of contacts. PhD supervisors should invite PhD students into their own networks, advice PhD students on ways to develop networks and facilitate exposure of PhD students to people who will collaborate with them. As networks are male dominated, it is particularly important that supervisors introduce and promote female PhD students to ensure they are not excluded from networks.

Evidence / background - Gender perspective
Networking leads to visibility. The more visible you are, the more successful you are perceived to be (FESTA, WP 3.1 Presentation).

A woman in the Irish organization noted the male dominated nature of networks, in which she felt unable to participate and which limited her ability to achieve professional visibility:

> "It shouldn't be any harder [for women] but it does seem to be. But I think in terms of networking as a woman, because most of the networking is done in a social environment ...If I was at a conference on my own and I didn't know anybody, then I'd be very reluctant to go into the bar and network on my own".

The male dominated social locations in which networking takes place are difficult for women to access.

From contexts and experiences in the FESTA-project
Networking is very important. This is one aspect of an academic career: that you need strong network and these days a large, international network of people. Without this it is simply impossible. So it is very important to develop such a network. You have to be proactive you know, approaching people and building new contacts, also maintaining contacts' (male academic, FESTA research, 2014).

'It is important as a young scientist to go abroad, and at an early stage in your career, focus on developing an international network and contacts; it makes a big difference on your CV' (female academic, FESTA research, 2014).

Recommendations for good practice

Start your PhD students' network:

- Introduce the student to your own network of contacts
- Attend conferences with the student and introduce them to your network
- Write and present jointly with your student

Advise your PhD student on how to develop their own network:

- Start early to create your network
- Make use of every opportunity to enter into contact with your colleagues.
- Become a member of academic societies
- Attend presentations, conferences and colloquia
- Get involved in groups, teams and research clusters at your university
- Present at a group seminar, national and international conference,
- Follow up any contacts made with emails

Ensure your student is alerted to important events and networks:

- The student should be informed about important events related to the structure of the PHD programme through official, administrative channels. Make sure your student knows who to contact and how to access academic regulations. Encourage your student to be proactive in sourcing knowledge necessary to pursue and complete a PhD
- Encourage your student to subscribe to mailing lists, professional organizations, research groups and research-gate in order to ensure they are always aware of important events related to their research interests and which can help expand their networks (e.g. seminars, conferences, visitors, meetings)

From literature and other sources

'Establishing basic research credibility and visibility as an academic should be a top early priority'. Junkins (2012:42).

Bagilhole and Goode (2001) found that self-promotion is in itself gendered, and that women are excluded from male networks.

Bagilhole, B and Goode, J. (2001) The Contradiction of the Myth of Individual Merit, and the Reality of a Patriarchal Support System in Academic Careers A Feminist Investigation. *European Journal of Women's Studies* May 2001 8 (2) 161-180.

Junkins, J.L. (2012) *Engineering your Academic Career*. Texas: Lulu.com.

Foster independence, critical thinking and creativity

What
Creativity and independent critical thinking are core competences for academics and therefore important learning outcomes in PhD education; at the same time, these concepts might be discipline-based and realized in different ways. Anne Lee defines critical thinking as an "ability to understand critique and create the argument", which also means a "substantive thinking processes free from emotion." (Lee, 2012:70).

Evidence / background - Gender perspective
For many supervisors, independent critical thinking is the main objective of PhD supervision. Johnson, Lee and Green (2000) point out that the idea of scientific autonomy and rationality is gendered itself and historically rooted in 18th century. Thus, gender bias and gendered expectations concerning scientific independence and critical thinking may still influence students´ self-perception as well as supervisors´ perception of their students. Pedagogical literature emphasizes that critical thinking and connected qualities such as scientific creativity are skills that have to be trained and developed over time.

Lesley Johnson, Alison Lee & Bill Green (2000) The PhD and the Autonomous Self: Gender, rationality and postgraduate pedagogy, *Studies in Higher Education*, 25:2, 135-147, DOI:10.1080/713696141.

Lee Anne (2012). *Successful research supervision: advising students doing research*. 1. ed. New York, NY: Routledge.

From contexts and experiences in the FESTA-project
While discussing independence, supervisors at Uppsala University pointed out that independence includes a range of skills that have to be trained and developed over time rather than expected from the student from the very beginning. Furthermore, some supervisors had experiences with male students overestimating their own skills and independence. Based on that, supervisors discussed if gender stereotypes might influence students´ as well as supervisors´ perception of creativity and independence; there might be a gendered view on who is considered to be independent and creative and who is not.

Recommendations for good practice
Critical thinking and creativity:

Lee (2012) suggests different approaches towards "critical thinking" and points out that critical thinking is understood differently in different disciplines. According to Lee, students have to train their critical thinking skills by going through a "considerable amount of guided and independent study as well as a significant piece of research" (Lee, 2012 p. 84).

According to Lee, 2012, supervisors might foster student's creativity and critical thinking by for example:

- Raising questions that helps students to develop their ability to approach scientific problems

- Examine their belief of knowledge and help students to move forward by questioning and challenging their belief
- Provide opportunities for self-reflection and self-evaluation
- Arrange opportunities for peer discussion, e.g. on scholarly literature, that support critical reflection by offering different perspectives
- Adapt different supervisory strategies over time towards increasing independence by shifting supervisory roles from being an expert and advisor towards a guide and critical friend

Help student to obtain funds

What

One of the main activities of the supervisor is to help PhD students to find economic resources useful for their professional development during the period of the doctorate. Through the support of their supervisor, PhD students can obtain funds to carry out their research activities and to spend time abroad.

From contexts and experiences in the FESTA-project

The study circles revealed that supervisors who have a power, such as being heads of unit, have a greater ease of access to economic resources for their students' researches than other researchers:

> "In my unit the students complete their program with the realization of the chip that they designed during their PhD program. This activity is also very costly in terms of co-financing by FBK [...]. This creates diversity from us because if you are the head of unit and you have access to those funds, your PhD student has smoothed the way. Your colleague, who does not have access to the resource, will have the doctoral student that just makes simulations "(male supervisor).

The interviews showed that PhD students need greater support regarding the possibilities available to them for the future careers:

> "My advisor did not give me clear directions on what to do after my PhD. The school has never organized something about this, such as seminars or meetings. I received informally suggestions from colleagues who work in my own unit, like postdoc and junior researcher. They gave me some advices also on how to write a research proposal for obtaining funds and how I can go for a postdoc application" (female PhD student).

Recommendations for good practice

Support for research funding and for travel:

- The supervisor is a first point of contact for a PhD student. Is important that the student talks to others who have successfully won grant funding and makes use of their insight and expertise. Many universities have a Research Office, or equivalent, which is responsible for administering grants
- To help PhD students obtain funds, the supervisor should introduce them to his/her network and sponsor the work of PhD students with key persons in the scientific community. The supervisor, to help student to get funds, should:
    - Give information about how to write a research grant application and where to apply for money, as well as information about what is important when applying for a post-doc position and what to think about when planning a post-doc period
    - Insert PhD student into the network of the scientific community

- Allocate a part of own resources to travel of their students (if they have not available budget). In this way the student can present his/her work in front of an expert audience who could provide advice and tips.

To establish themselves & prepare their future:

- The supervisors must help and inform their students about the possibilities of future career during the doctoral program and not just at the end. Advising about careers and postdoctoral positions was clearly important, such as letters of recommendation and helping with the networking.

- Is important that the supervisor:
  - Gives information about how to pursue a career in academia and outside
  - Integrates students into her/his professional networks
  - Gives information about funding opportunities

The supervisor ought to help students to make the transition out of a doctoral program into the professional world.

From literature and other sources

"Assisting in finding funding to attend conference attendance at events of course requires funding for travel, subsistence and perhaps accommodations, as well as the cost of producing papers. Often part of any grant provided to a department or school to support the candidate will include an element of financial support for such activities, or alternatively there may be an internal fund for this purpose. Supervisors need to be aware of funding sources and able to assist candidates to tap them in appropriate cases" (Taylor, Beasley, 2005: 121).

Taylor, S., & Beasley, N. (2005). A handbook for doctoral supervisors. Abingdon: Routledge.

The help given by the supervisor to the student to obtain funds during the doctoral program has an impact on the student's future career.

Regarding that, a part of the literature shows that women are those who receive less support and information on future career development. Research carried out by De Welde and Laursen (2008) shows that a disproportionate number of women included in their research sample are not receiving career advice (close to 40% of the sample). Furthermore, all of the women who were considering leaving STEM reported they were receiving inadequate career advice. While lack of career advice does not spell career failure, the connection between inadequate advice and dissatisfaction with career advising, points to a potential loss of confidence and diminished awareness of options, which may impact women more acutely.

De Welde, K., and Laursen, S. L. (2008). The 'Ideal Type'advisor: how advisors help STEM graduate students find their 'Scientific Feet'. *Open Ed J*, *1*, 49-61.

Support oral and written dissemination

What
Excellent oral and written communication skills, good presentation skills with a focus on effective information dissemination.

Dissemination of research findings is integral to the research process. A PhD should qualify one for a growing independent research career. Supervisors should encourage their PhD students to participate in different conferences, seminars, round tables, and workshops where they can demonstrate effective oral and written communication skills in the dissemination of research findings.

Recommendations for good practice
Train writing skills
Writing and the production of texts are part and parcel of scientific and academic production. Different kinds of text have different styles and objectives, norms, challenges and limitations. It is important for future scientists to grapple with these different disciplines in order to eventually master them. It therefore serves PhD-supervision well to include training for various relevant text-production during the PhD-program. It is also important to firmly establish that writing is an iterative process and can only very seldom be accomplished in one sitting and without revision and review. At the same time, there are often so many opposing demands during a PhD-project that rigorously completing writing exercises simply is not an option. Even so since writing is central to academic and scientific production, it is necessary to practice writing skills and methods. As with all other acquisition of skills, hard work and training is essential. Also it helps to build up the tasks and challenges in a way that stimulates and motivates the learner, because various part-objectives are achievable and enjoyable.

A tip is to embed a cooperative and iterative approach by having PhD-students write parts of different subparts of a scientific article (methodology, discussion, data-explanation, background) in collaboration with other relatively more senior members of the research group (post docs), under the supervisor's overall instruction and with his/her frequent and direct feedback. This approach provides training in many areas during the same process: concrete training of writing different kinds of text; delivering to deadlines and to others who are dependent on the input; iteration; revision as well as the benefits of receiving and using feedback. Another tip is to give ever-increasing writing assignments from an early point in the PhD-project, starting out with more mechanical, descriptive texts and graduating by degrees to more discussion-oriented texts.

Writing retreats
One example of good practice is found in several Danish research groups who practice writing retreats on a regular basis, where the entire group goes away for a week to write.

Often these retreats have a daily rhythm with chunks of time to write individually or in small groups in the mornings and afternoons, fixed times where participants convene for updates, to solve problems or raise or answer questions, and for meals.

This is an efficient way to ensure that writing takes place and often provides welcome inspiration and enhancement of the often difficult and lonely discipline of writing. A well-established culture of writing retreats in a group can ensure a high output and can serve as a very intensive and efficient working time. Establishing such a practice as a norm and accepted culture requires that the initiators are structured and disciplined about the form, the times and activities and purpose. And that they plan ahead. It is useful to have at least two annual retreats.

Useful reference: Grant, Barbara M. (2006), "Writing in the company of other women: exceeding the boundaries", *Studies in Higher Education,* 31:4, s.483-495.

Train presentation skills
The presentation skill is central to academic and scientific career. Many PhD students experience difficulties with presenting their work to an audience. Many supervisors encourage their PhD students to present their work in front of the research group and also to visitors. In this way PhDs learn to modulate the communication based on the expertise level of the audience.

In one FESTA partner organization, both PhD students and supervisors expressed the necessity to include a course of public speaking in the PhD program curriculum. These courses should be given by experts who teach also how to behave in front of an audience.

From literature and other sources
Research dissemination, as the written or oral representation of project findings, usually happens at the end of a research project (BARNES, CLOUDER, PRITCHARD, HUGHES & PURKIS, 2003; WALTER, NUTLEY & DAVIES, 2003).

The main features of successful dissemination strategies can, therefore, be summarised as: tailoring approaches to the audience, in terms of the content, message and medium; paying attention to the source of the message; enabling active discussion of research findings (NUTLEY, WALTER & DAVIES, 2002; WALTER et al., 2003). [5].

Barnes, Vivienne, Clouder, Deanne Lynn, Pritchard, Jackie, Hughes, Christina and Purkis, Judy (2003) Deconstructing dissemination: dissemination as qualitative research. Qualitative Research, 3(2), pp. 147-164. ISSN (print) 1468-7941.

Nutley, S., Davies, H., & Walter, I. (2002). Evidence based policy and practice: Cross sector lessons from the UK No. Working Paper 9.

Nutley, S. M., Walter, I. C., & Davies, H. T. O. (2003). From knowing to doing: A framework for understanding the evidence-into-practice agenda. Evaluation, 9(2), 125-48.

Stereotypes and Gender Awareness

What
Gender role stereotyping occurs when a person is expected to enact a series of norms or behaviors based upon their sex. Gender is a social construction, and other social categories such as race, ethnicity, class, religion, and language also influence that construction.

Why? – Gender perspective
STEM disciplines are male dominated. Gender stereotyping maintains gendered cultures and gender inequality. Being aware of gender and creating awareness of stereotyping and unconscious bias within the work group can lead to more diversity and more inclusive environments for all.

Evidence / background - Gender perspective
Gender role stereotypes include the notion that girls are caring, nurturing, quiet, helpful, considerate of others, and place others' needs before their own. Boys are viewed as rational, logical, unemotional, and strong and are also expected to be outgoing, smart, and naturally academically talented. Thus in academia, gender role stereotypes attribute males' academic success to innate intelligence and girls' achievements to hard work. Unconscious gender-based assumptions and stereotypes are deeply embedded in the patterns of thinking of both men and women. Women and work performed by women consistently receives lower evaluations than men and work performed by men (by both men and women evaluators). Valian argues that each individual event in which a women does not get her due – is not listened to, is not invited to give a presentation, is not credited with an idea – is a mole hill. 'Mountains are molehills, piled one on top of the other' (Valian, 2005: 35). Valian (2005) also noted that the stereotype that women are nurturing, for example, can be recruited to rationalize a belief system that dictates that women's principal role should be childrearing and that maternity makes women problematic as researchers.

Implicit bias refers to the attitudes or stereotypes that affect our understanding, actions, and decisions in an unconscious manner. These biases, which encompass both favorable and unfavorable assessments, are activated involuntarily and without an individual's awareness or intentional control (Blair, 2002). Because 'implicit bias is an automatic and unconscious process, people who engage in this unthinking discrimination are not aware of the fact that they do it' (Wilkerson, 2013, p. 134).

Blair, I. V. (2002). The Malleability of Automatic Stereotypes and Prejudice. *Personality and Social Psychology Review,* 6(3), 242-261.

Valian, V. (2005) Beyond Gender Schemas: Improving the Advancement of Women in Academia. *Hypatia* 20 (3): 198 – 213.

Wilkerson, I. (2013, September). No, You're Not Imagining It. *Essence*, 44, 132-137.

From contexts and experiences in the FESTA-project

One male student noted gender bias among (male) scientists: 'Top flight male scientists wouldn't see females as having the same credibility as their peers'. However, another male student remarked on the absence of females in the discipline and men's discomfort around women in the workgroup: 'We are not used to being around women'.

While women were very aware of gender and recounted that their male student colleagues are more confident, regardless of their ability, and present material in a very convincing way, particularly at conferences where they win prizes. It was also noted that male students and academics are hostile to female presenters at conferences 'men ask questions much more harshly to women than they do to other men'. One female student noted that 'a strong woman is intimidating, a strong man is a strong man' in the academic environment, while other female students provided anecdotal accounts of both men's and women's unconscious bias in lab group interactions.

Recommendations for good practice

Ensure all members of your research group /team complete the Implicit Association Tests.

Provide Unconscious bias training, which:

- Incorporates unconscious bias assessment tools
- Focuses on specific, real situations, such as reviewing CVs, conducting interviews
- Addresses the topic of in-group favouritism and how it operates in the organisation
- Uses proven successful simulations, role-plays, and other interactive exercises
- Provides de-biasing, counter-stereotyping activities

Training should be allocated sufficient time; ideally, several short sessions or one full day as a minimum; and training should be provided in person: This topic requires interaction, trust, and the opportunity for people to meet in a safe environment. E-learning or Webinars are not appropriate delivery methods for unconscious bias training, nor will they produce measurable change.

Ensure all members of your team/group participate in the unconscious bias training.

From literature and other sources

Stereotypical cultural beliefs do not simply define men and women as different; they implicitly define men as superior to women. Experimental studies of curriculum vitae evaluations showed that both men and women rated the male candidate as more competent where the only difference on the application materials was gender (Moss-Racusin et al 2012).

Sheltzer and Smith (2014) found that academic leaders in elite laboratories were significantly less likely to hire female postdoctoral trainees than their male counterparts, with consequences for such women's subsequent careers.

There is substantial evidence of the existence of gender bias in academic contexts (van den Brink and Benschop 2012; Wenneras and Wold 1997).

Moss-Racusin, C. A., J. F. Dovidio, V. L. Brescoll, M. J. Graham, and J. Handelsman. 2012. Science Faculty's Subtle Gender Biases Favor Male Students *PNAS* 109 (41): 16474–79.

Sheltzer, J. M. and Smith, J. C. (2014) Elite male faculty in life sciences employ fewer women, *PNAS* 111 (28): 10107-10112.

Van den Brink, M. and Benschop, Y. 2012. 'Gender Practices in the Construction of Academic Excellence: Sheep with Five Legs' *Organisation*, 19 (4): 507-524.

Wenneras, C. and Wold, A. 1997. Nepotism and Sexism in Peer Review. *Nature*, 387 (6631): 341–3. http://sciencethatmatters.com/wp,content/uploads/2007/04/wenneras97nepotism.pdf

Other useful resources

O'Connor, P. and O'Hagan, C. 2015. 'Excellence in university academic staff evaluation: a problematic reality?' *Studies in Higher Education* DOI:10.1080/03075079.2014.1000292

Implicit association tests: gender-science test and gender-career test: https://implicit.harvard.edu/implicit/takeatest.html

Supervisor's Role

What
The role of the supervisor is important to support the professional and personal development of the PhD student. The role played by the supervisor in the professional and personal growth of the PhD student may influence future choices of the student.

Why? – Gender perspective
The supervisor and the support that he/she provides PhD students assumes considerable importance especially for female PhD students who work in environments totally dominated by men, as is the case of the scientific and technological fields.

Evidence / background - Gender perspective
The role of the supervisor is important for PhD students, especially for female students, who find themselves in an environment dominated by men. In some fields, such as mathematics, physics, computer science, and engineering, women are underrepresented at all levels. In all fields, the confidence of female students may be low, especially where they are isolated and have few female role models.

Literature shows that the role of female supervisors is important when it comes to supporting the academic and research careers of female PhD students. Some research studies show that gender matters when supervisory relationships are established. Data from a survey among all regular faculty members at Norwegian universities (Smeby, 2000) show that there is a significant same-gender tendency in graduate supervisory relationships and this trend is stronger among women than men. The tendency varies based on the fields of learning and on the different proportions of female faculty members in the departments.

One role of the supervisor is to give advice on career development and on the ability to undertake future academic endeavours. A study by De Welde and Laursen (2008) shows that a high number of women do not receive any advice on career development and are not "sponsored" by their supervisor. The absence of this sponsorship disadvantages women, while their male counterparts are supported to make a smooth transition from the doctoral school to the job market.

From contexts and experiences in the FESTA-project
Interviews with PhD students showed that the supervisor figure assumes an important role during the doctoral program:

> "She helped me a lot, both in terms of professional and personal growth. She helped me find the right questions for my research project. She was very useful also when I had personal problems. She was always understanding and helped me with the language, as early on I did not know English well" (male PhD student).

In the study circle, some supervisors highlighted the factors which lead to quality supervision and student support:

> "I think supervisors get the best results with their student when they manage to provide the student both with personal support, when they have personal problems, and professional advice. This also presupposes being straightforward and sometimes "brutal" with their students" (Female supervisor).

"The supervisor must be a guide, a reference figure for students. His/her role is to give advice and help the student grow, so that he/she becomes an independent researcher. In order for this to happen, the first element that must be taken into account is time. We have to have an appropriate amount of time to follow the PhD student and give them feedback to help them" (male supervisor).

Recommendations for good practice

Anne Lee's model: scientific guide, mentor, sponsor, career advisor

Supervisors should carry out multiple tasks such as the ones of scientific guide, mentor, sponsor, and career advisor. It is important that they embody all these roles as the right blend of all of them will provide the maximum support to the PhD student.

SCIENTIFIC GUIDE:

A common practice in almost all FBK's research units is to organize weekly seminars in which the entire unit, including doctoral candidates, present their work. This has proved to be a very important practice for the professional development of the student as both the student's supervisor and the other researchers assume the role of constructive critics. They seek to guide the PhD student in their work by offering feedback to conduct their research but allowing maximum freedom to the student so that he/she can determine the most beneficial ways for achieving his/her research goals.

MENTOR

At FBK, the role of mentor is played by junior researchers or post-docs, most of the time, these colleagues have proven to be even closer to the student, and are able to better understand the issues they may encounter. The function of the mentor, as mentioned earlier, is to give support, both professional and - above all - personal to the student. A fruitful way to establish good supervisor-PhD student relationships is to organize activities outside the work environment. FBK students are often well integrated into their research groups and, together with supervisors, organize outdoor activities like mountaineering or international dinners where everyone takes traditional dishes from their home countries.

It was noted that those students who have more opportunities to socialize and participate in informal activities, establish a deeper relationship with his/her supervisor.

SPONSOR

It is important, to further the goal of supporting their student, that supervisors present the work of the PhD student to their network and colleagues during conferences and meetings with the members of the scientific community. This way they can introduce the PhD student to the key people of their community. At FBK, supervisors often sponsor their students in several ways:

- Trying to get them to attend conferences or meetings where the participants are part of their consolidated networks
- Presenting the work of PhD students to colleagues during informal meetings
- Writing letters of reference for stays abroad

CAREER ADVISER

The supervisor is invaluable in helping students develop professional networks as they progress through their PhD program. One of the most important resources that supervisors can offer to their students during this period is their academic capital by introducing and recommending students for positions. Another important area is mentoring for different career goals both in academia and in industry. Supervisors serve as trusted advisors for students in their transitions to scholar roles where students can have misperceptions about the academic profession, and the job market.

There are many ways in which the supervisor can provide PhD students with help as far as careers are concerned, from encouragement and advice to direct recommendations:

- When possible, arrange a telephone call or face-to-face meeting, which can be far more persuasive than a letter
- Introduce students to members of your own network of contacts and urge them to extend that network themselves
- Recommend other search aids, including Internet sources, professional societies, and ads in major newspapers. Keep handy your own list of telephone numbers and addresses, especially of former students, that might be helpful

After spending years in graduate school, some PhD students might devalue their own abilities or feel that they are too specialized for many employment positions. Remind them that they have acquired not only a series of credentials and a vocation, but a range of transferable skills-including analytical reasoning, program design and management, communication, evaluation, integration, and objectivity-that can be applied in many occupations.

Nature of relationship (personal and professional)

There are many ways to facilitate students' professional and personal growth in addition to one-to-one counselling. The different strategies are:

- To create informal cross-disciplinary groups (such as women in mathematics and science)
- To use monthly meetings (with incentives like free pizza) as forums for discussing such topics as interview strategies, coping with negative reviews, and giving good presentations

- To organize interdisciplinary seminars with other departments to introduce students to new avenues of enquiry and to colleagues in related disciplines
- To make use of the supervisor's network of contacts to suggest internships and summer schools;
- To propose an active role in student chapters of professional societies, where students can strengthen their interpersonal skills, learn about career possibilities, and make valuable contacts among both peers and professors.

This type of aid in the professional field, creates a comfortable and informal climate, and helps PhD students to establish a trusting relationship with the supervisor at personal level.

Power differential

Many PhD students are profoundly dependent on their supervisor — often for a combination of financial, educational, and emotional support. This dependence makes it easy for the supervisor to abuse their power (sometimes unintentionally) and it can be difficult for students to contest an abuse. Supervisors might give inadequate credit for students' research or assign work of little or no educational value. They might impair a student's confidence by too much criticism, too little support, or emotional indifference.

An effective method to ensure that PhD students are not inhibited by the unequal distribution of power in relation to their supervisor would be to make them feel like colleagues, giving importance to their opinions and giving them trust in what they do. An important action would be to give them the responsibility of a task and let them operate independently. This way, the PhD students will be more motivated to do a good job and will not be discouraged by the inequality of power between them and their supervisors.

Advice for supervisors:

For most people, good supervision is a skill developed over time. Here are few tips:

- **Listen patiently**: give the student time to get to issues they find sensitive or embarrassing
- **Build a relationship**: simple joint activities – walk across campus, informal conversation over coffee, attending a lecture together – will help to develop rapport. Take cues from the student as to how close they wish this relationship to be
- **Don't abuse your authority:** don't ask students to do personal work, such as, baby-sitting and correction work of the students
- **Nurture self-sufficiency**: your goal is not to "clone" yourself but to encourage confidence and independent thinking
- **Establish "protected time together"**: Try to minimize interruption by telephone calls or visitors;
- **Share yourself**: invite students to see what you do, both on and off the job. Tell of your human side and encourage the student to reciprocate
- **Provide introductions:** help the student develop a professional network and build a community of mentors
- **Be constructive**: critical feedback is essential to spur improvement, but do it kindly and temper criticism with praise when deserved
- **Don't be overbearing**: avoid dictating choices or controlling a student's behaviour

- **Find your own mentors**: New advisers, like new students, benefit from guidance by those with more experience

Adviser, Teacher, Role Model, Friend: On Being a Mentor to Students in Science and Engineering
http://www.grad.jhu.edu/downloads/Adviser,%20Teacher,%20Role%20Model,%20Friend%20NAS.pdf

Advice for PhD students:
Which of the following resonate with you? Which do you have, and which do you need? You may use the checklist below to mark whether you currently "Have" or "Need" each item in the list, as well as to rate each item as "Important" or "Not Important" to you.

	HAVE	NEED	IMPORTANT	NOT IMPORTANT
Offers honest, frank, constructive feedback and guidance				
Provides encouragement and support				
Demystifies the graduate school experience				
Offers emotional support by relating to your experiences as a woman in a male-dominated field				
Engages you in ongoing conversations that are relevant to your life and work				
Serves as an advocate and ally in times of struggle				
Helps to foster networks of academic and professional support and opportunities				
Validates your experiences and feelings by providing a listening ear and respect				
Interacts with you on multiple levels (e.g., formally, socially)				

https://careerwise.asu.edu/?q=identify-the-problem/understand-yourself/what-you-want-in-a-mentor

From literature and other sources
A topic that very often emerges from the literature about supervision is the distinction between "supervisor" and "mentor", emphasizing the different aspects of the two roles. For example, Nettles and Millett (2006) explained that the term supervisor implies a formal conception of this figure, such as discussing course subjects or administrative matters, as opposed to the concept of mentor, which implies a more informal relationship between the two players, based on reassurance (both emotional and professional), encouragement and support.

Ideally, a supervisor is also a mentor, but the role of a mentor goes beyond that of a supervisor. Mentoring serves the main purpose of providing help to the PhD student and his/her development, whereas supervising is of mutual benefit to both PhD students and supervisors. In fact, a mentor is often described as playing the roles of an advisor, teacher, role model, and friend (National Academy of Sciences, 1997).

Much of the literature highlights that the supervisor has to perform two different, although complementary tasks. In addition to being a key figure for the student, he/she must also assume the role of constructive critic to ensure the student grows professionally (Knowles, 1999).

The supervisor should be:

- Critical Observer: questioning the certainties achieved by the student to "test" how he/she defends his/her project
- Constructive Observer: providing helpful feedback and guidance so that the PhD student will learn to present their work effectively, and convince the scientific community of their affiliation

The supervisor provides primary guidance on the academic requirements of the PhD program, the dissertation process, and is a vital source of academic and professional opportunities (e.g., publications and employment). He or she might also be the PhD students' boss and their viva sponsor.
It is important to separate the supervisor's official responsibilities from the PhD's own expectations. Official advisory roles will vary based on the different PhD programs, among them are:

- Official responsibilities:
  - Answering questions about academic and program requirements
  - Signing administrative paperwork
  - Serving on committee (usually as committee chair)
  - Advising on the dissertation process

- Unofficial advisory responsibilities:
  - Providing opportunities for co-authorship
  - Helping students find academic and professional opportunities
  - Helping students build a career network

Nettles, M. T., and Millett, C. M. (2006). Three magic letters: Getting to Ph. D. *JHU Press.*

Knowles, S. (1999). Feedback on writing in postgraduate supervision: Echoes in response–context, continuity and resonance. *Supervision of postgraduate research in education,* 113-128.

National Academy of Sciences. (1997). Advisor, teacher, role model, friend: On being a mentor to students in science and engineering. Washington, DC: *National Academy Press*. Retrieved from http://www.nap.edu/openbook.php?record_id=5789.

Barnes, B. J., and Austin, A. E. (2009). The role of doctoral advisors: A look at advising from the advisor's perspective. *Innovative Higher Education*, 33(5), 297-315.

Bøgelund. P. (2015). How supervisors perceive PhD supervision – And how they practice it. *International Journal of Doctoral Studies*, 10, 39-55. http://ijds.org/Volume10/IJDSv10p039- 055Bogelund0714.pdf

Sugimoto, C. R. (2012). Are you my mentor? Identifying mentors and their roles in LIS doctoral education. *Journal of Education for Library and Information Science*, 53(1), 2-19.

Woolderink, M., Putnik, K., van der Boom, H., and Klabbers, G. (2015). The voice of PhD candidates and PhD supervisors. A qualitative exploratory study amongst PhD candidates and supervisors to evaluate the relational aspects of PhD supervision in the Netherlands. *International Journal of Doctoral Studies*, 10, 217-235. http://ijds.org/Volume10/IJDSv10p217-235Woolderink0852.pdf

Other useful resources

ASU *Career*WISE – the anytime online coach for graduate women in science and engineering: https://careerwise.asu.edu/?q=home

https://careerwise.asu.edu/?q=identify-the-problem/understand-yourself/what-you-want-in-an-advisor

Supervisor's continued training and reflection

What
To support supervisors in continually developing their practice, a number of different approaches, activities and tools may be used.

Why? – Gender perspective
It is a general rule in Academia, that PhD supervision is not trained or otherwise systematically taught to those who practice this. Rather, it is more generally expected to be acquired implicitly through one's own PhD project and more indirectly through one's experiences as post doc and other more junior academic positions. This places a heavy emphasis on implicit and tacit knowledge – and reinforces existing practices – frequently such practices can be biased toward homosociability and stereotypical norms within academia.

The recommendations given here aim at supporting supervisors in continually reflecting on, differentiating and developing their supervisory practices in systematic and structured ways – both in more general terms and in terms of understanding and developing gender and diversity sensitive approaches to the supervisor-PhD student relationship.

From contexts and experiences in the FESTA-project
Please take a look at the attached examples of Masterplans for Supervisor study circles on: supervisor's task, role and responsibility and Mastering the art of beginnings. Moreover, we suggest doing the attached self-reflection questionnaire for PhD supervisors.

Recommendations for good practice
Collegial learning (study circles)
A non-hierarchical collaboration between the people involved in similar functions and interests lies at the heart of the concept of study circles. During study circle sessions, participants collectively discuss the topic by presenting different ideological viewpoints in relation to the issue. This collegial learning emphasizes the equality of participants and the main characteristic of the study circle is the collective nature of learning. It is a bottom-up learning methodology in which each participant contributes to creating knowledge.

Facilitated study circles provide a confidential time-space where supervisors can process their own challenges and situations and at the same time draw on colleagues' experiences and reflections. This type of peer group or collegial 'intervision' is a well-known way to enhance participants' reflection and practice and provides access to a wide and deep pool of knowledge and inspiration.

The best result is assured by ensuring these sessions are based on voluntary participation and by having them structured and facilitated by an experienced mediator. Facilitation can be done either by a person external to the group such as a trainer or consultant, or can be executed by participants taking turns, ensuring that the adopted supervision style and approach be maintained, and thereby ensuring that the

structure and disciplined interaction and focus are upheld. A number of different supervision styles and approaches are extant and can be accessed online (e.g., de Bono's thinking systems, peer coaching method, peer group supervision). It is also possible to have a HR-trainer introduce a few possibilities and from there on make a dedication to practice and experiment with different forms, methods, and styles.

During one of the FESTA partners 'study circle, the supervisors talked about their experiences of supervision, bringing out the most critical situations encountered and also the positive elements that emerged from past relationships with PhDs students. Discussing their own supervision experiences is an important factor in providing new supervisors with information on how to interact with PhD students and reducing the chance of repeating the same mistakes as other supervisors. These discussions are opportunities for informal training for the new supervisors who engage for the first time in the supervision.

It is useful to have these meetings facilitated by a mediator who knows the subject to be explored and who is able to direct the discussion on issues considered most important to improve the practice of supervision. Below we present two scripts for facilitated two-hour sessions for approximately 6-9 participants which were developed and adopted in the FESTA project.

EXAMPLE 1 – master plan for Supervisor study circle: *Supervisor's task, role & responsibility*

2-hour session, 6-9 participants, facilitated by trainer

Time	Activity	Comments
10.00	Opening and introduction to FESTA PhD supervision – study circle 1	
10.05	Participants' presentation • Questions, expectations and wishes for the Study circle • Own thoughts on responsibilities of a PhD supervisor (homework according to agenda) + where can we improve	Spiral – the word goes round in the circle – two rounds. It is possible to pass in either of the rounds without losing the right to speak when it is one's turn.
10.20	Post-it exercise: responsibilities of a PhD supervisor	Post its, pens and flip-over Alternatively: facilitator writes up keywords from discussion on whiteboard
10.35	Plenum discussion: reflections concerning Roles & responsibilities + gendered expectations • What stands out in the previous exercise? • What will you take with you as important considerations?	Spiral
11.05	The first phase as a PhD-student • Suggestion for topics: planning and monitoring, project planning, building network, establishing good habits, establishing relationship between supervisor – student	Short introduction by facilitator (points from focus group interviews/ other FESTA material concerning start-up, UU Slides 8,10,11)
11.10	Brainstorm on a PhD student's first time as PhD and how best to support him/her	In pairs
11.20	Plenum discussion: reflections concerning Professional – personal – private arenas Handling power relations	Spiral
11.50	Wrap-up: one word – what do I take with me? Prepare next time – theme/reading material	Round

Preparation:

Literature:

- Schnaas, Ulrike. (2014). *'Addressing a gender perspective in postgraduate supervisor's training in a scholarly way – an example from Uppsala University/Sweden'*. Unit for Quality Enhancement and Academic Teaching and Learning, Uppsala University, Uppsala, Sweden
- Robinson, Carol V. (2011). *'In pursuit of female chemists'.* Nature, Vol. 476, pp. 273-275
- De Welde, Kristine & Laursen, Sandra L. (2008). *'The "Ideal Type" Advisor: How Advisors Help STEM Graduate Students Find Their 'Scientific Feet'.* The Open Education Journal, Vol. 1, pp. 49-61
- Dickinson, Sarah. (2008). *'Change of heart – career intentions and the chemistry PhD'*. The Royal Society of Chemistry, Burlington House, Piccadilly, London W1J 0BA

Written reflection (send in approximately half a page a week beforehand):

- Advantages and challenges in your experience as PhD supervisor?
- Does Gender figure in your considerations and experiences? If yes, how?

(Agenda and written assignment to be sent out 3 weeks prior to 1st session, list of reading material sent out at least 1 month prior to the session).

EXAMPLE 2 – master plan for Supervisor study circle: *Mastering the art of beginnings*

2-hour session, 6-9 participants, facilitated by trainer

Time	Activity	Comments
10.00	Opening and introduction to FESTA PhD supervision – study circle 2	General introduction to beginnings/transitions
10.05	Gender and beginnings – reflections on Practical strategies to dealing with common problems (cover common supervisory dilemmas – handling polarities) Possible topics? - Handling frustration - getting the student to seek help when they are stuck - the student who never has enough time - treating the PhD as a job - keeping on going when the going gets tough - dealing with writer's block	Spiral
10.35	2 x 2 exercises: what strikes me the most from what I have heard today?	Gendered expectations
10.40	Short presentation of participant's cases	Write up keywords
10.55	The group selects 1 of the presented cases to dive into	
11.00	Case study: Special focus on: - "Doing gender" in PhD supervision - Professional – personal – private	Case is presented. Two groups reflect in turn, 10-15 minutes per group – 'fish bowl-style': the case-presenter listens on as if peering into a fish bowl, there is no obligation for him/her to respond or take suggestions or advice.
11.45	Wrap-up, evaluation and preparation for next study circle	Round

Preparation

- Bias test: The implicit Bias Test Harvard
- Prepare an example/case with a dilemma related to gender, beginnings or both

Training programmes for supervisors

Training programmes for supervisors are an appropriate means to prepare supervisors for the complex and challenging task of supervision – which is often practiced without any formal training.

Training should preferably include a gender- and diversity perspective in order to raise participants' awareness and reflections concerning gender- and diversity sensitive supervisory approaches and strategies.

Training programmes for supervisors might be supported by the institution in different ways: At Uppsala University, the guidelines for "Teaching and Learning at Uppsala University" states that: "If the teacher has tutoring tasks, training relevant to these tasks must be included." Thus, the Division for Quality Enhancement regularly offers the course "Supervising PhD students", see here for more information.

Supervisor's self-evaluation (at the start, after one year, at the end)

The Supervisor's self-evaluation is a tool that aims to help supervisors to reflect on their own style of supervision. This tool is composed of a self-assessment questionnaire that the supervisor will complete three times during each PhD-programme: at the beginning of the PhD programme, after one year and at the end. This allows the supervisor to make a self-reflection on his/her supervision, answering specific questions that show a realistic picture of how the relationship develops.

The recommendation is to fill out the self-assessment for each PhD student supervised. Therefore it might be useful to compare the different questionnaires for different PhD-students to produce other useful reflections on the supervisor-PhD-student relationship.

The self-assessment questionnaire is divided into seven different parts:

- Activities carried out with the PhD-student
- Relationship and communication with the PhD student
- Motivation and support given to the PhD student
- Collaboration with the PhD student
- Autonomy given to the PhD student
- Conflicts arisen with the PhD student
- Reflection on own supervision

Completing the questionnaire during the three phases of the PhD program and for each PhD student is important since the answers can then be compared and the supervisor has the chance to change the supervision style based on this analysis.

Below is the questionnaire that was developed at FBK based on interviews with PhD students and subsequent study circles with their supervisors.

Self-reflection questionnaire for PhD supervisors

This questionnaire was developed at FBK as part of the FESTA-project on gender sensitive PhD supervision based on interviews with PhD students. It has also been tested by their PhD supervisors, who found it to be a useful and helpful self-reflection.

NOTE: We recommend that supervisors fill out a self-assessment form for each PhD student they supervise – and preferably three times during a programme: at the beginning, half-way through and at the end. This allows for two kinds of comparisons: across students and at different times within each single process, thus allowing for useful reflections on the relationship between supervisor and PhD student to emerge.

Activities done with the PhD student

1) How many PhD students do you currently supervise?

1

From 2 to 4

From 5 to 6

More than 6

2) How often do you carry out the following activities with the PhD student?

	Very often	Fairly often	Not often	Not at all
Personal support				
Motivate PhD students while performing their tasks				
Professional support				
Guidance in research activities				
Monitoring thesis writing				

3) How much do you help the PhD student to be regular in planning and scheduling their activities?

A lot

Enough

A little

Not at all

4) How often do you assign the PhD student short-term goals?

Very often

Quite often

Rarely

Never

5) Do you believe that you define in a clear way the goals that the PhD student must achieve?

A lot

Enough

A little

Not at all

6) Do you believe that you define in a clear way the tasks and the assignments that PhD student must accomplish?

A lot

Enough

A little

Not at all

7) How do you evaluate your scientific vision about your PhD student?

Very clear

Quite clear

Not so clear

Not at all clear

8) Do you try to help your PhD student understand which are the open challenges in his/her research areas, where novel contributions can be given?

A lot

Enough

A little

Not at all

Relationship and communication with the PhD student

9) What kind of relationship do you have with the PhD student that you supervise?

Very informal

Quite informal

Rarely informal

Not at all informal

10) How would you rate your availability to communicate with your PhD student via mail and / or telephone?

High

Fair

Poor

Null

11) How often do you communicate with your PhD student?

Several times a week

Weekly

2-3 times per month

Once a month

12) Which is the most frequent way you use to communicate with him / her?

Face-to-face meeting between you two

Group meetings with the other PhD students

Meetings together with PHD student and co-advisor

Via email

By telephone

13) Usually, how often do you meet with your PhD student?

Once a week

Once every two weeks

Once a month

When used

14) When was the last time you discussed / revised with your PhD student the submissions plan to conferences / journal?

This month

Last month

3 months ago

From 4 to 6 months ago

15) When was the last time that your PhD student made a presentation?

This month

Last month

3 months ago

From 4 to 6 months ago

16) Do you consider yourself empathic with your PhD student? (Do you listen to her/his problems?)

A lot

Enough

A little

Not at all

Motivation and support given to the PhD student

17) Do you think to motivate your PhD student?

A lot

Enough

A little

Not at all

18) How do you motive the PhD student? (Enter the intensity with which you carry out the following motivating activities).

	Very often	Fairly often	Not often	Never
Consider the PhD student at their last year as a colleague				
Perform a critical review on their work, but also manifest proudness about their achievements				
Show concern for their wellbeing				
Involve them in your research group				
Listen to them when they need it				

19) Do you try to convey to him / her enthusiasm for research?

A lot

Enough

A little

Not at all

20) Do you ensure the resources for the completion of the project of your PhD student?

A lot

Enough

A little

Not at all

21) How much do you support your PhD student for the following aspects?

	A lot	Enough	A little	Not at all
Solicit publication of papers in scientific journals				
Support in the writing of the papers				
Assist in the preparation of papers for conferences				
Teach how to present the work to a public audience				
Give suggestions regarding choices for the future career				

Collaboration with the PhD student

22) Do you actively collaborate with the PhD student for the structuring of thesis?

A lot

Enough

A little

Not at all

23) Do you collaborate with the PhD student in research works outside of their thesis project?

A lot

Enough

A little

Not at all

24) Have you written papers together with your PhD student?

Yes

No

25) How many?

From 1 to 3

From 3 to 5

From 5 to 7

More than 7

26) Do you try to include the PhD student in the scientific community network?

A lot

Enough

A little

Not at all

Autonomy given to the PhD student

27) How much autonomy do you leave to the PhD student to conduct the research?

A lot

Enough

A little

Not at all

28) Do you encourage independent thinking of your PhD student?

A lot

Enough

A little

Not at all

Conflicts with the PhD student

29) Does (or did) it happen that you have had conflicts with your PhD student?

Yes

No

30) With whom in particular?

Women

Men

People with different cultures

People with different backgrounds

Other (specify)

---

31) Which are the most frequent reasons for those conflicts?

	Very often	Fairly often	Not often	Never
Different opinions on the work to be performed				
Different research approaches				
Skill differences				
Cultural differences				
Character differences				

Reflection on your own supervision

32) Do you accept and support innovative ideas that your PhD student proposes to you?

A lot

Enough

A little

Not at all

33) Do you reflect on your supervision style?

A lot

Enough

A little

Not at all

34) Do you ask advice to your PhD on how to improve your relationship?

Often

Quite often

Rarely

Never

35) Do you pay attention to gender similarities/differences during the supervision of your PhD student?

A lot

Enough

A little

Not at all

36) Do you pay attention to the ethnic and cultural similarities/differences of your PhD students?

A lot

Enough

A little

Not at all

From literature and other sources

Schnaas, Ulrike. (2014). *'Addressing a gender perspective in postgraduate supervisor's training in a scholarly way – an example from Uppsala University/Sweden'*. Unit for Quality Enhancement and Academic Teaching and Learning, Uppsala University, Uppsala, Sweden.

Brookfield, S. (1998). Critically reflective practice. *Journal of Continuing Education in the Health Professions*, 18(4), 197-205.

Spiller, D., Byrnes, G., & Bruce Ferguson, P. (2013). Enhancing postgraduate supervision through a process of conversational inquiry. *Higher Education Research & Development*, *32*(5), 833-845.

Bias test: The implicit Bias Test Harvard

Support for switching supervisor

What
Problems with supervisors are common among PhD students. In some cases it becomes necessary to switch supervisor, even if this may entail practical problems.

Why? – Gender perspective
There is evidence that female PhD students suffer more from poor supervision than men and that women more often feel powerless to solve serious problems in the supervisory relationship. Switching the supervisor might be the best solution in some cases, but support is needed in order to manage a smooth transition. Transparent information and clear routines for a switch might facilitate a smoother process for both student and supervisor and help to avoid a feeling of failure or ongoing conflict.

Evidence / background - Gender perspective
There is evidence that female PhD students are more often unsatisfied with their supervisory relationship and suffer more from poor supervision than men. According to a report from the UK on women´s retention in chemistry, a larger proportion of female than male students had been "deeply affected by what might be termed 'standard supervision issues'" such as lack of pastoral care or lack of interpersonal and management skills. (Newsome, 2008, p. 7)

From contexts and experiences in the FESTA-project
Clarity about the supervisor´s and the student´s mutual expectations, roles and responsibilities as well as well-functioning working routines with regular follow ups help to prevent irritation and disappointment and to avoid conflicts. In some cases, switching the supervisor might be the best solution in order to guarantee that the student is able to progress in time. Since the roles of the doctoral student and the supervisor are not based on equality, students need institutional help to support communication and find an acceptable solution for problems. Moreover, support is needed in order to mediate in an eventual conflict, end a non-functional relationship in a proper way and find a suitable new supervisor as soon as possible.

At a workshop on "Equal opportunities aware PhD-supervision" with PhD students at the Faculty of Science and Technology at Uppsala University, participants emphasized the fact that non-traditional students might not know that switching supervisor is an option. Therefore, the institution should provide accessible and clear information about students´ right to switch supervisors. Some students pointed out that switching supervisor might cause anxiety, stress and isolation, if the student is left alone and the process of finding a new supervisor takes a long time. Therefore, it is important that the institution, particularly at department level, helps the student to find a new supervisor as soon as possible.

Recommendations for good practice

The institution should provide clear information about rules and routines for switching supervisors addressed to both students and supervisors. Moreover, institutional support is necessary to avoid conflicts, prevent anxiety and isolation and to make the switching process as smooth as possible for both parties. According to the Swedish Higher Education Ordinance, a doctoral student has the right to change supervisor if he or she requests this. Moreover, the department or higher education institution is obliged to help. The Faculty of Science and Technology at Uppsala University gives the following advice on its website: "If a conflict occurs between a doctoral student and a supervisor, the doctoral student should request a meeting with the supervisor. If the meeting doesn't lead to anything constructive, the doctoral student should contact the head of school, dean or someone else responsible for third-cycle education. The union, students' union, doctoral student ombudsman and student health services can also provide advice. If there are serious problems it is important to act as soon as possible so that the student's studies do not suffer."

From literature and other sources

Newsome, J. L. (2008). The chemistry PhD: The impact on women's retention. *A report for the UK Resource Centre for Women in SET and the Royal Society of Chemistry*, 1-38.

In Swedish Higher Education, there is a legal right for PhD students to change supervisor, see http://studera.nu/startpage/doctoral-studies/rights-and-support/changing-supervisor/

Advice for students:

- How to tell your supervisor you want a divorce, http://thesiswhisperer.com/2011/03/15/how-to-tell-your-supervisor-you-want-a-divorce/
- Making the Switch: Strategies for Changing Supervisors, http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2000_11_03/nodoi.9164757171699763359

Handling career interruptions

What
Clear and comprehensive guidelines on how to administratively handle career interruptions and returns is part and parcel of an Academic work place and contributes to a culture of equality and transparency.

Why? – Gender perspective
Academia is known to be an opaque and difficult milieu to enter – especially for those who do not perceive themselves to have a good fit with the male dominated academic culture in STEM. Any process which makes the rules, conventions, norms and traditions more transparent, enables and empowers people to concentrate on furthering their interests and careers. The gender perspective here is that women – especially at the early stages of their academic career – often feel intimidated and flounder trying to navigate implicit rules and norms. Recommendations are designed to make the process of handling career interruptions easy and transparent.

Recommendations for good practice
Parental policy / parental leave
Parental leave policy and planning: In Sweden, employment on a doctoral studentship is the most common way of financing third-cycle studies. A person employed on a doctoral studentship has the same rights to parental leave as all other employees.
An example from Uppsala University of how to manage and support parental leave is the university´s "Parental Policy" (see http://regler.uu.se/digitalAssets/14/14391_3parental-policy.pdf). It states that directors should always view positively that parents, regardless of gender, make use of opportunities for parental leave and leave for care of children. Moreover, it states that postgraduate students should be afforded an additional tutor discussion/planning discussion in order to plan the research break concerning the leave.
Moreover, doctorate students at the Faculty of Science and Technology at Uppsala University are entitled to up to three months extension of their postgraduate appointment as compensation for the time taken to start up research after a longer period (min. 4 continuous months) of parental leave of absence.

Career interruptions guidelines
Guidelines for leave of absence planning: This guide was developed at the Faculty of Science, University of Melbourne (Courtesy of the Chair of the Faculty staff equal opportunity committee). It is presented here as inspiration, it should be adapted to fit the specific situation and context, if it is to be used.

Guidelines:
The key to handling the successful negotiation of a career interruption is an open, consultative and collaborative conversation with the supervisor and/or Head of School/Department. The timeline for this notification and conversation depends on the nature of the 'interruption'. In the case of maternity/parental leave the advice is that the staff member holds a conversation with the supervisor as early as possible

(ideally at least 6 months prior to the actual break, to allow some time for the School/Department to make alternative arrangements, for example regarding teaching load and student supervision).

While it is reasonable to expect that in the case of an unplanned break, such as to care for someone with a short-term illness, the supervisor has to be notified as soon as possible, it is understood that the level of planning cannot be as detailed as in the case of maternity/parental leave. Also, it is understood that it is not always known to the staff member at the time of the conversation how long exactly the interruption will be, but any changes in the plan should be discussed with the supervisor and/or Head of School/Department as soon as practicable.

The following checklist is designed for academic staff. It provides an overview of issues to be considered during discussions with the supervisor regarding planned and unplanned leaves of absence. The guidelines aim not only to assist work units to develop the capability to meet current and future needs and assist staff members in planning their academic career, but also to clarify responsibilities in managing all stages of a leave of absence. A flow chart that summarizes the various steps is detailed below.

It is recommended that the outcome of the discussions will be documented and copies remain with the staff member and Head of School/Department.

It should be noted that the University does not have an expectation of work during staff members' leave of absence. The staff members' "involvement" in work-related tasks (such as student supervision, exam marking, responding to emails, etc.) during their leave of absence is undertaken on an entirely voluntary basis.

- **Supervision of students (if applicable):**
  - Has an "interim" principal supervisor for the time of the staff members absence been nominated in consultation with the student(s)?
  - If necessary, can students be remotely supervised? Have arrangements been made regarding frequency of meetings?
  - Has a clear working plan between student/staff member/co-supervisor/Head of School/Department been finalized, which includes milestones and timelines?
  - Has a handover meeting been arranged?
  - Can staff member during his/her absence recruit new students, if the absence is only a fraction of the student's candidature? For example Honours: less than 6 months; Master: less than 12 months; PhD: less than 18 months. (Note that individual schools/departments may have different policies).
  - If the staff member is on the advisory panel of PhD students, has it been discussed how this will be managed during the time of absence (usually, the supervisor of the PhD student will nominate a replacement)?

- **Research**
  - During the lead up to the period of absence, has there been any planning (e.g., data collected, sections written for co-authored papers…) to enable collaborators to progress during the absence (if applicable)?
  - Similarly, have plans been established to help the staff member 'spin up' their research program on their return (for example, identification of a series of smaller, more achievable pieces of work that will aid in the transition back to work).
  - How engaged does the staff member intend to be in their research projects during the leave of absence?
  - How will authorship on publications be handles that arise during the leave of absence?
  - What support can be provided to enable the submission of grant applications during their leave and upon return to work?
  - Do they have live projects? If so, how will these be managed in their absence? To what extent do they wish to be involved? Ensure that responsibilities are clarified? E.g., can a Research Assistant (RA) be appointed to cover absence? Who will supervise the RA?
  - If a change in student supervision arises from the absence, have variations to grant agreements been put in place?

- **Fellowships and Grants (if applicable):**
  - Seek advice from the Faculty Agreement Administrator as to wether a variation to the grant is required and to arrange changes in the contract with the funding body.

- **Teaching responsibilities (if applicable):**
  - Have arrangements been made with the colleague(s) to cover teaching responsibilities during the staff member's absence, in particular provision of teaching material?
  - If the staff member plans to return on a part-time basis, has it been discussed how to align teaching/contact hours (request changes from University timetabling)?

- **Administrative responsibilities (if applicable):**
  - Membership on committees: Has the committee chair been informed? If it is a Faculty/University committee, is a temporary "replacement" from the same School/Department/Faculty required?
  - Have key contacts been advised that the staff member is going on leave and an alternative contact person nominated?

- **Clarify the staff member's wishes during their period of leave:**
  - School/Department: Does the staff member wish to be included on all school/departmental, faculty and group communication during her/his leave of absence?
  - School/Department: Does the staff member wish to be considered and consulted in any decision making related to her/his work?

- Does the staff member wish to negotiate and develop a plan for how they will keep in touch with her/his research students and if so, how often? If appropriate, agree in advance on work place visits.

- **Planning the transition back to work:**
  - Has the time fraction on staff members return been discussed (this may not be know at the time of the conversation).
  - If coming back from parental leave, has the Return-to-work bonus been considered
  - Is it possible to apply for a Career Interruption grant?
  - Has it been discussed how the School/Department could support the staff member when she/he comes back to work? For example:
    - Teaching allocations – if possible (and if timetabling allows), the lectures should be the same as before the absence to avoid preparation of new teaching material on a very short timescale
    - Grant applications (see also "Research")
    - Project management e.g. Research Assistant support
    - Consider having a buddy for six months after staff member return
    - PDF process/promotion application – will performance be measured relative to opportunity? Will the PDF review date shift due to length of absence?
    - If part-time: are responsibilities (in particular teaching loads and administrative responsibilities) reduced by the same fraction?
    - Will meetings be arranged at times that allow part-time staff members and staff members with carers responsibility to attend?

Further resources
http://policy.unimelb.edu.au/MPF1139

For more information on flexible work arrangements see
http://hr.unimelb.edu.au/advice/toolkits/equity-diversity/toolkits/flexibility

From literature and other sources

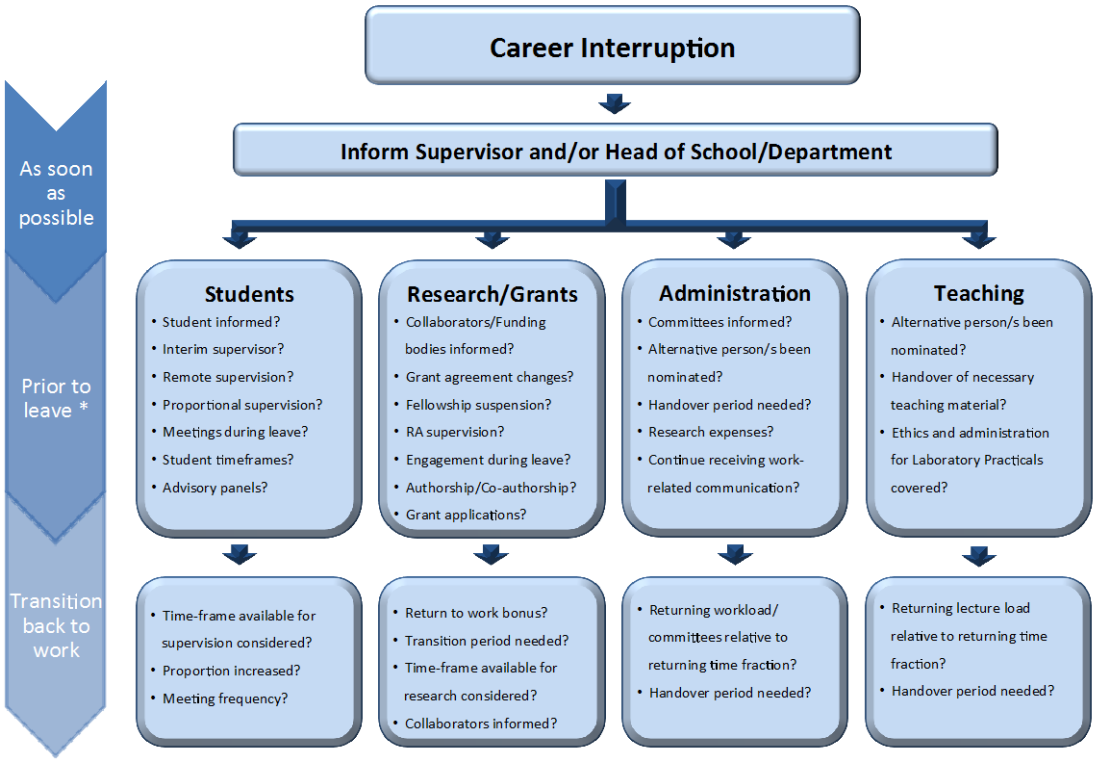
At various times in their careers, staff will need planned or unplanned career breaks or require work flexibility in order to accommodate a range of personal or professional demands. Career interruptions often occur in the early career stages, since these years typically coincide with the years of childbirth and parental and carer (for example for elderly family members) responsibilities. These early years are possibly the most crucial years for the development of an independent academic career.

Career interruptions, such as maternal or paternal leave, can often have a severe impact on young scientists' future careers. There is evidence that biases concerning familial obligations for women are widespread (Coate and Howson, 2014; O'Connor and O'Hagan, 2015). This seems to be internalized in both young women and men, with the result that ideas or conceptions of what is and is not possible go unchecked.

Ensuring transparency in how to plan and prepare for leaves of absence, and returns after leave of absence is an important step towards equality. This can be done administratively and here we present practices that we find useful. They each represent an established practice that is well adapted to the local context. If you feel inspired by this, please make sure that you adapt to your local context and specific situation before implementing it as a measure.

Coate, K. & Howson, C. K. (2014): 'Indicators of esteem: gender and prestige in academic work' *British Journal of Sociology of Education,* Published online 30 September 2014. DOI: 10.1080/01425692.2014355082

O'Connor, P. & O'Hagan, C. (2015) Excellence in university academic staff evaluation: A problematic reality? *Studies in Higher Education.* DOI:10.1080/03075079.2014.1000292



Checklist of possible tasks to complete prior to, and following a career interruption. * Some of the tasks may (if the staff member wishes) also relate to the period of time during leave.

Ensure transparency

Why? – Gender perspective
Transparency and accountability foster fair decisions. This also supports gender equality in the context of PhD processes.

From contexts and experiences in the FESTA-project
In the context of WP4.1 [gendering decision making and communications processes] interviews were conducted on decision making processes and transparency. In the Italian organization, one decision maker noted that more transparent processes are perceived to reduce the power of decision makers

"The problem is that it will take time to make people understand that there must be a big mental shift... I think it is right and important to do it [be transparent] ... We are not stealing anyone's power but we are helping people to work better. They have to understand that I'm not inventing forms of control but tools that work in their favor" (IT/41/X/M/5; Report 4.1.1, p. 63).

Recommendations for good practice
Recruitment and application processes as well as assessments in the context of research funding differ widely on an international and even national level. Nonetheless, there are processes which can foster transparency and gender equality in decision making processes.

Administration can establish clear processes as well as definitions of criteria and assure that the processes are equally applied to all. As there are subject specific criteria it might be helpful to set the definitions and interpretations in cooperation with the faculties or departments.

Some aspects that can be considered and adapted according to the specific process are the following:

- Is there a defined decision making process that defines the steps and who has to be included in which step? Are gender equality officers etc. involved from the beginning?
- In general, a group decision can lead to more transparency than a decision made by one person. But persons with strong positional and/or symbolic power can easily influence the decision making process. Is there a strategy to ensure a meeting culture that allows open discussions and involvement of every participant? Are the decision-making groups gender-balanced?
- Unconscious biases may disadvantage female scientists in evaluation processes. Are there any gender awareness initiatives or briefings for the decision makers, in particular for influential persons? Is every person involved in the process aware of gender equality issues?
- Are the criteria explicit, transparent and weighted in a standard way? Are they fixed for the entire process?
- Are the criteria assessed with respect to potential inherent biases? When defining the criteria in the beginning, are there any measures which define criteria in a new, unbiased way?

It is important that only the stipulated criteria have an impact on the decision and are applied equally to every candidate. Is there a routine process to ensure this?

Other useful resources

More on informal decision making and communication processes: http://www.festa-europa.eu/public/42-methodologies-and-measures-analysing-informal-decision-making-and-communication-processes

More on gendered decision making processes http://www.festa-europa.eu/public/deliverable-411-gendering-decision-making-and-communications-processes

From literature and other sources

Transparency is said to enhance women's chances of promotion and decreases the chance of gender-related bias (Ledwith and Manfredi 2000; Rees 2004; Academy of Finland 1998; Allen 1988; Husu 2000; Ziegler 2001; Martin 1994) cited in Van den Brink, Benschop and Jansen (2010). Transparency can lead to positive effects; among them are the willingness to accept decisions, decision making procedures and the perception of legitimacy that can increase people's sense of control by making decision makers accountable for their actions (O'Hagan et al 2015). Although micropolitics can reduce the effect of transparency (van den Brink et al 2010), clearly defined processes or a defined set of criteria are some techniques that can be used to improve transparency and accountability of decisions. However, interpretation of criteria is very relevant in decision making and unconscious gender bias can be relevant (ibid.). Current research shows that stereotypes have particular relevance, when criteria are not properly defined and the assessors use their own individual and personal images of an ideal candidate (Heilman et al. 2004). As technical subjects still are male-dominated, and stereotypically masculine, female applicants in many STEM subjects might face unconscious biases that disadvantage them in assessment processes.

Academy of Finland (1998): Women in academia: Report of the working group appointed by the Academy of Finland. Helsinki: Academy of Finland.

Allen, N. (1988): Aspects of promotion procedures in Australian universities. *Higher Education 17*, 267–280.

Heilman, M., Wallen, A., Fuchs, D., Tamkins, M. (2004): Penalties for Success: Reactions to Women Who Succeed at Male Gender-Typed Tasks. *Journal of Applied Psychology 89*, 3, 416-427.

Husu, L. (2000): Gender discrimination in the Promised Land of gender equality. *Higher Education in Europe 25*,2, 221–228.

Ledwith and Manfredi (2000): Balancing gender in higher education. *The European Journal of Women's Studies* 7/1, 7-33.

Martin, J. (1994): The organization of exclusion: Institutionalization of sex inequality, gendered faculty jobs and gendered knowledge in organizational theory and research. *Organization,* 1/2, 401–431.

O'Hagan, Lübke, Aye, Wolffram, Apostolov, O'Connor, Chizzola, , Tan, 2015): FESTA expert report: Gender Issues in Recruitment, Appointment and Promotion Processes – Recommendations for a Gender Sensitive Application of Excellence Criteria.

Rees, T. (2004): Measuring excellence in scientific research: The UK Research Assessment Exercise' in *Gender and Excellence in the Making*. EUR 21222. Brussels: DG-research, European Commission.

Van den Brink, M., Benschop, Y. and Jansen, W. (2010): Transparency in Academic Recruitment: A Problematic Tool for Gender Equality? *Organization Studies 31,* 12, 1‑25.

Ziegler, B. (2001): Some remarks on gender equality in higher education in Switzerland. *International Journal of Sociology and Social Policy 21*, 1–2, 44–49.

Clear information about rights and routines

What
Very often PhD students who start a doctorate are not aware of detailed information about what they are going to do during their doctoral program. They do not know all the activities that are associated with the position, or the duties to which they must adhere. It is therefore necessary to provide PhD students with detailed information of the concrete activities that will be carried out.

Why? – Gender perspective
There is evidence in literature that female students who perform a PhD program have a higher number of "extra" activities than their male colleagues, in addition to working on their own research. These additional activities include administrative tasks, organizing events and "baby-sitting" for visiting guests.

Evidence / background - Gender perspective
It was noticed that most of the female PhD students are invested with greater workloads compared to their male counterparts. This is because they are often assigned tasks that are not connected directly with the doctoral student role. It is a commonly held view that women are perceived as better suited to carry out work other than sheer research such as teaching and administrative tasks.
The literature shows that the different distribution of tasks has an impact on the scientific achievements of women. On the other hand, these tasks do not count on an academic cv and are not always recognized and valued. Their involvement in these collective duties is also sometimes the reason why women fall behind with their research, which can have a negative influence on their career opportunities and their well-being. There might be a need to encourage men to get more involved in these duties (such as administrative tasks, teaching, etc.) while women might be encouraged to focus more on their own research.

It was also noted that women who work in academic and/or research settings appear to be disadvantaged compared to men. This because the academic and research work is usually expected to be all-invasive, spilling over from the professional sphere into other aspects of the academics' lives, making the distinction between "work" and "leisure" somewhat blurred.
An in-depth analysis of people in the early stages of their research career that took place at the University of Trento (see garciaproject.eu) showed that the research workload is intense and requires a total commitment to research.
This requirement to be available for research at all times unveils a male-oriented organization, designed to work in a masculine way (Gill, 2009), i.e. based on a work organization that does not provide for work-family balance options.

From contexts and experiences in the FESTA-project
The interviews with PhD students show the need for greater clarification of the "implicit and informal" rules of the game that mark the doctoral program, as well as the need for a service that provides practical helps to PhD students during their doctorate.

"I wish there were more clarity in saying things. I wish there were someone who would tell me how to get the right perspective on what is the activity of a PhD student, what is he/she required to do, what are his/her tasks. Specify this information well, because I felt that many things are taken for granted when, in fact, they should not be - because a doctoral student does not come usually from a previous experience of PhD "(Male PhD student).

"I felt the need for greater support, especially in the beginning when I first arrived and did not know anyone. I did not know where to turn, I had no idea how to do things and how these were carried out both at work structuring level and how to behave, etiquette, how to ask for things, of what I had to do specifically ... it is a stressful sense of being inadequate [...]. If I had had a service to ask these things to, it probably would have been easier to overcome this moment" (Female PhD student).

Recommendations for good practice

Mentoring service: Interviews with PhD students conducted showed that they would appreciate more information about the activities they are expected to carry out during their PhD course.
They would like structured mentoring service to be introduced.
This mentoring service, in addition to providing basic information for new doctorate students, should:

- provide support and give information to solve the various issues that can hinder the success of the doctorate;
- give information about activities PhD students are expected to carry out during their program;
- inform PhD students about their rights and duties;
- provide guidance on how to relate to colleagues and supervisors;
- organize formal programs that provide structured opportunities for professional skill development – for teaching, research and administrative tasks;
- provide support by publicizing students' research interests, publications, and presentations within the program or across the institution;
- give tangible support when issues arising from motherhood and PhD course requirements need to be balanced;
- work in collaboration with development offices, or public relations offices to further publicize student achievements and scholarly activity.

All these activities should be structured by adopting a gender perspective and giving information, particularly to women, on how to deal with problems that may arise when students find themselves working in an environment dominated by men (as is the case of science and technology) and also dealing with issues of work-life balance.

From literature and other sources

In many instances, literature points out that administrative support is necessary throughout student programs, and may be particularly important in recruiting and retaining students in the initial stage. Formal orientation is of particular value at the first stage of the doctoral program (Lovitts, 2004).

Administrative support is crucial for student success during their doctorate program. Administrative personnel can arrange social and professional events that are particularly relevant for students. As students make the transition to independence, they may feel disconnected from the department or program. Providing a reason to remain connected to the community and be physically present in the space where they can interact with peers and faculty can help counter feelings of transition and isolation.
Support from administrative personnel is important because they can give up-to-date, accurate and accessible information about what activities PhD students are required to do during their program, what routines they should follow and duties they have to observe (Pifer et al., 2016)

Administrators are key in establishing and fulfilling the mission, purposes, and processes of doctoral education. They are particularly well positioned to serve leadership roles in strengthening doctoral programs within their academic and research areas. Administrators might also be deliberate about discussing the challenges of doctoral education with faculty members to educate and inform graduate faculties and to foster a shared commitment to support students (McAlpine and Amundsen, 2012). It may be particularly helpful to educate supervisors on how to best support diverse students from different backgrounds and genders.

Such practices may help faculty members to best serve students through the variety of roles they serve in doctoral education, including the ones of advisor, supervisor, instructor, and colleague. Given the importance of personal and professional competence, administrators can establish opportunities for dialogue with PhD supervisors about admission processes, student retention, and challenges to doctoral education that faculty members observe first hand. Administrators can also demonstrate a welcoming environment to students from all backgrounds (Lovitts, 2004).

Gill, T. G., and Hoppe, U. (2009). The business professional doctorate as an informing channel: A survey and analysis. *International Journal of Doctoral Studies*, 4, 27-57.

Lovitts, B. E. (2004). Research on the structure and process of graduate education: Retaining students. In Wulff D. H. and Austin A. E. (Eds.), Paths to the professoriate: Strategies for enriching the preparation of future faculty, 115-136. San Francisco: Jossey-Bass.

McAlpine, L., and Amundsen, C. (2012). Challenging the taken-for-granted: How research analysis might inform pedagogical practices and institutional policies related to doctoral education. *Studies in Higher Education,* 37(6), 683-694.

Pifer, M. J., and Baker, V. L. (2016). Stage-based challenges and strategies for support in doctoral education: A practical guide for students, faculty members, and program administrators*. International Journal of Doctoral Studies*, 11, 15-34.

Other useful resources

In defense of academic freedom, the Italian Higher Education reported that all higher education institutions have the right to establish their own regulations independently, within the limits set by national legislation.
http://www.miur.it/guida/guide.htm

Regolamento di Ateneo in materia di Dottorato di Ricerca dell'Università di Trento
http://web.unitn.it/files/download/2395/regolamentodottorati5.pdf