

**Career pathways and problems of
professional socialization in doctoral
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Professional socialization is the process of learning a professional role, aspects of professional culture and development of professional identity, values and behavior and has a significant impact on a professional carrier. This paper seeks to highlight some issues and problems of doctoral academic education in context of professional socialization in order to increase the understanding of professional socialization in medical biology.

During last decades higher education became massive (Deuchar 2008), (Gatfield 2005), the number of students at universities expanded heavily and continues to grow. Number of doctoral students and doctoral environments has also dramatically increased; nowadays all professors must have several of PhD students (Mulvany 2013). Current population of students is very heterogeneous: they differ in age, nationality, culture, background, personality, interests and ambitions (National Agency Annual Report 2011, Felder 2005, Zusho 2005, Gustafsson 2010). Many of doctorates prepared for academic carrier have no possibility to stay in academia due to limited number of fulltime positions faculties can offer, economic or other numerous reasons. Besides that, population of students who do not desire an academic career is growing.

Nowadays only a small number of PhDs are ending up in academies and even less became supervisors for others in future. According to statistics Centre for R&D Monitoring” Research Group at Ghent University, Netherlands, Belgian Postdoc Survey 2012, data from several universities Belgium (summarized by Hendrix at <http://www.smartsciencecareer.com>) only 30% of all doctorate holders stay in academia – mostly as postdocs with temporary positions depending on outside grants. The vast majority of all postdocs (65%) are in the Life science (Powell 2015). In some years many postdocs will move to non-academic carrier, some will turn to so called “*permadosc*” doing multiple postdoc terms (Powell 2015). Only 10% of all postdocs end up in higher education (as postdoctoral researchers or take over staff positions) Of these postdoctoral researchers only 1 in 10 finally reaches a long-term academic position as a professor, so 3% (or even less) of all doctorate holders become professors and supervisors. Thus, about 90% of the postdoctoral researchers find a job in the industry outside academia. (<http://www.smartsciencecareer.com>).

In Sweden the same trend is observed: 70% of all new doctorate holders leave academia (Forskningens framtid: karriärstruktur och karriärvägar I högskolan, Vetenskapsrådets rapport 2015).

As it is stated at the homepage of Medical faculty at Linköpings University (where I am currently employed): *”Doctoral students at the Faculty of Medicine and Health Sciences are trained to conduct research, develop products and services, and solve problems in academia, as well as the private and public sectors”*. The Swedish ministry report from 1996 declare: *“There is an increased need for research educated people that from the start are directed towards a career outside the academy and aim to make use of other people’s research rather than performing research of their own”* (Ds 1996:25, p. 61) (cited from Jansson (2016)). *“The 2004 government report suggested a label change from ‘Research education’ (forskarutbildning) to ‘doctorate education’ (doktorsutbildning), thereby declaring that doctoral education not only produces researchers (within and outside universities), but in addition qualifies labour for doing things that are not primarily research activities (such as white-collar work in industry and in public institutions or teaching inside and outside of universities)”* (Jansson 2016). Indeed, this is a part of international process. In the document *“Standards for PhD Education in Biomedicine and Health Sciences in Europe”* (released in 2012 by Organisation for PhD Education in Biomedicine and Health Sciences in the European System together with The Association of Medical Schools in Europe and World Federation of Medical Education) a set of standards for PhD programs and the level of a PhD degree in biomedicine and health sciences is proposed: *“PhD programmes must also now take account of the fact that a large proportion of PhD graduates develop their careers not only within institutions, but also in non-academic positions, and that the programmes should provide them with the skills necessary to do this”* (ORPHEUS/AMSE/WFME Task Force 2012). Thus, PhD education became massive since high number of PhDs is thought to improve the economic competitiveness of countries and supervisors are expected to assist with career development (ORPHEUS/AMSE/WFME Task Force 2012).

Academic supervision is aimed to promote independence, originality and creativity, however *“efficient and within timeframes”*. Research groups are funded for scientific excellence with focus on competitiveness in research and efficiency which leads to supervisors are more concentrated on finishing next theses on schedule; time for activities that give no scientific results is limited. (Helm 2012). Supervision is a crucial component of doctoral education and basic supervision styles and models were well identified in literature. Dysthe (Dysthe, 2002)

(Malfroy, 2005).(Gatfield 2005). (Franke 2011) (Lee 2008). There are many factors that influence the doctoral journey and there are supervisory characteristics and traits that can facilitate the doctoral journey. Each supervisory relationship is unique and different students ideally would require different styles of supervision (Gewin 2005). In reality most supervisors have a preferred supervisory which may vary depending on different factors (Lee 2008), (Firth 2008) (Gatfield 2005). The one of the strongest factors influencing selection of supervisory style is the supervisors' own experiences when they themselves were students have significant impact on how they now supervise. (Lee 2008). Effective supervision requires not only subject/task knowledge, but also contextual expertise, knowledge and understanding of the institutional and disciplinary context. Supervisors are expected to prepare students to future roles as fully functioning and independent researchers, to mediate academic self-identification, "*What I do as an academic*" (Halse 2010).

Professional socialization was defined by Weidman, Twale, & Stein (Weidman 2001) as a process through which '*the knowledge, skills, and values necessary for successful entry into a professional career requiring an advanced level of specialized knowledge and skills*'. They identified four different stages (anticipatory, formal, informal and personal) depending on levels of understanding and commitment to the professional roles, and core elements of socialization process (knowledge acquisition, investment, involvement), through which higher degree of knowledge acquisition and involvement in the academic culture can be achieved (Weidman 2001). The various definitions of professional socialization were summarized by Page: "*Professional socialization is the acquisition of values, attitudes, skills and knowledge pertaining to a professional subculture*" (Page 2004). The education process, that shapes professional socialization, consists of the two parts, which cannot be separated: formal part (acquisition of practical knowledge, technical skills), and the informal part (taking place unconsciously through the process of leaning and participation). This informal part "*is responsible for the development of professional behaviour, attitudes and values. Through the process of learning prescribed knowledge, the student also learns about appropriate professional behaviour and attitudes. Individuals are developing professional values that guide their behaviours and define their sense of belonging to a professional group*" (Page, 2005). Jansson & Roman (2016) has analyzed historical and contemporary frames in Sweden for professional socialization through doctoral supervision and conclude that during last 45 years the framing of professional socialization is shifted from emphasizing efficiency of doctoral education as a matter of compliance to efficiency as a matter of

interaction and cooperation. Thus, professional socialization is a long process which has significant impact on future professional career.

However, it is far from clear how supervisors can provide professional socialization through doctoral education. In general a professional socialization in academic institutions is not really aimed at preparing candidates for an outside career (Helm et al., 2012). Thus, modern society requirements and expectations of academic environment and supervisors to prepare candidates for an outside career are rather difficult to fulfill since supervisors are not familiar with alternative nonacademic carrier pathways, requirement of skills which are important for careers outside academia and with culture different from academic (Mulvany 2013), (Powell 2006). This leads to dissonance between professional identity and role behavior that PhD students were educated and prepared to with who they are becoming” (Helm et al., 2012).

Since future career goals for PhD students are changing, the issuers involving preparation of students to wide variety of career options should be addressed by the university. I believe that this is of high priority for doctoral students at preclinical/biomedical, lab-bench research departments, such as the one I am working at (Department of Clinical and Experimental Medicine at Linköpings University). In contrast to clinical doctoral students, preclinical doctorates do not have any experience in own professional area and career path for them is far from clear. It seems to me rather challenging for supervisors to take the responsibility for nonacademic career support for students, therefore university should offer specific activities tailored for biomedical PhD students as well as provide up-to-date information about careers possibilities inside and outside academia and different types of appointments. Seminars and workshops, organized in collaboration with Swedish Life Science companies, invitation of alumni, who are currently working at different areas, to speak to students would hopefully bring some clarity in up-to-date biomedical career pathways roadmap valid for current economic climate.

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