

Full paper – System paper; practice focused report

ENHANCING DOCTORAL STUDIES OF PART-TIME STUDENTS – THE
INTERDISCIPLINARY RESEARCH GROUP FOR THE RESEARCHERS WORKING
IN COMPANIES

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INTRODUCTION

Doctoral studies are considered a patent way of training researchers. In practice, the completion of a doctoral degree is largely involved acquiring in-depth knowledge of one's own field, but it also forces one to look at matters from various perspectives and encourages searching for novel solutions. Such promotion of problem-solving skills and innovativeness is required not only in research at the universities, but also in a number of other professional areas. The doctorate has traditionally been acknowledged in the academic world (Usher, 2002), but has gradually also been recognised as an important factor in corporates (Park, 2007, Lester, 2012). A number of fields in industry, e.g., the chemical, paper and metal industries have increasingly adopted the recruitment of doctorate holders as a part of their corporate culture. Doctorates have significant value in organisational benefit (Costley & Lester, 2012), and are especially needed in fields with a significant amount of international cooperation.

To speed up the doctoral study process in universities, a number of doctoral programs have been established, each focused usually in a particular discipline, and offering financed junior researcher positions for full-time studies at the university. However, in Finland there are plenty of doctoral students who do not have this kind of position. Often, these doctoral students are already employed outside the university - an issue that has often been tackled inefficiently in the prevailing system. Without any promotion from the university, part-time PhD studies last longer, the student's connection to the academia may be thin, and a part-time student may feel outsider in his/her research group – if he/she even has any.

To promote postgraduate studies of part-time doctoral students in the world of work, it has to be noticed that they have different needs regarding supervision than full-time doctoral students do. Doctoral students working in companies have usually highly developed know-how and skills related to the professional world (Doncaster & Lester,

2002, Stephenson et al, 2006, Costley & Lester, 2012). On the other hand, academic skills, e.g. scientific writing, may especially need strengthening. The network would be important (Pilbeam et al. 2012), but working students often lack the support of the research community inside universities (Martinsuo & Teikari, 2008).

A project for supporting doctoral studies of professionals who wish to study their PhD alongside their work, was implemented during 2008 - 2015. The implementation, results and reflection of the project is presented in this paper. Also, some new ideas for the future projects are discussed.

1. THE PROJECT FOREST CLUSTER DOCTORAL PROGRAMME

The project started at the end of 2008. The Forest Cluster Doctoral Program (FCDP) was a new type of multidisciplinary doctoral program. The most significant differences compared to traditional doctoral programs in universities were that this project did not focus on just one discipline, and it was aimed to promote and boost postgraduate studies of doctoral students already in the world of work. The difference compared to doctoral programs run in corporations was that the students were not employed by one organisation but they were working in several different companies. As an overarching theme, doctoral students in FCDP were all working in forest based industry. However, they had different scientific views to the field of operation: their research topics covered several disciplines of importance to the forest cluster. The organisations involved included five Finnish universities, VTT technical research Centre of Finland Ltd and FIBIC Ltd. The project was financed by the partnering universities.

The FCDP doctoral students were able to prepare their dissertation in any of the cooperating universities and on a topic of interest to their employer. The original idea of FCDP is presented in Figure 1. A great deal of interest has been shown in this kind of doctoral education, when the concept was published.

Besides boosting doctoral studies, another goal was to offer novel perspectives and innovations through the several branches of science represented in the group. The multidisciplinary nature of the doctoral program and its close ties to the corporate world enabled the creation of continuous and fruitful cross-disciplinary discourse between students with different professional backgrounds.

To meet the supervisory needs of working students, the doctoral program aimed to establish a natural, regular means of interaction between its students and the scientific community. Moreover, the knowledge and skills required for scientific work were honed from the very start. Regular meetings, the support of a supervisor and peer group, and the functional coordination of studies helped students to pace their studies and make headway with their dissertations. The curriculum of the doctoral program was continuously updated during the project on the basis of feedback and students' progress. The final realisation of the program is shown in Table 1.

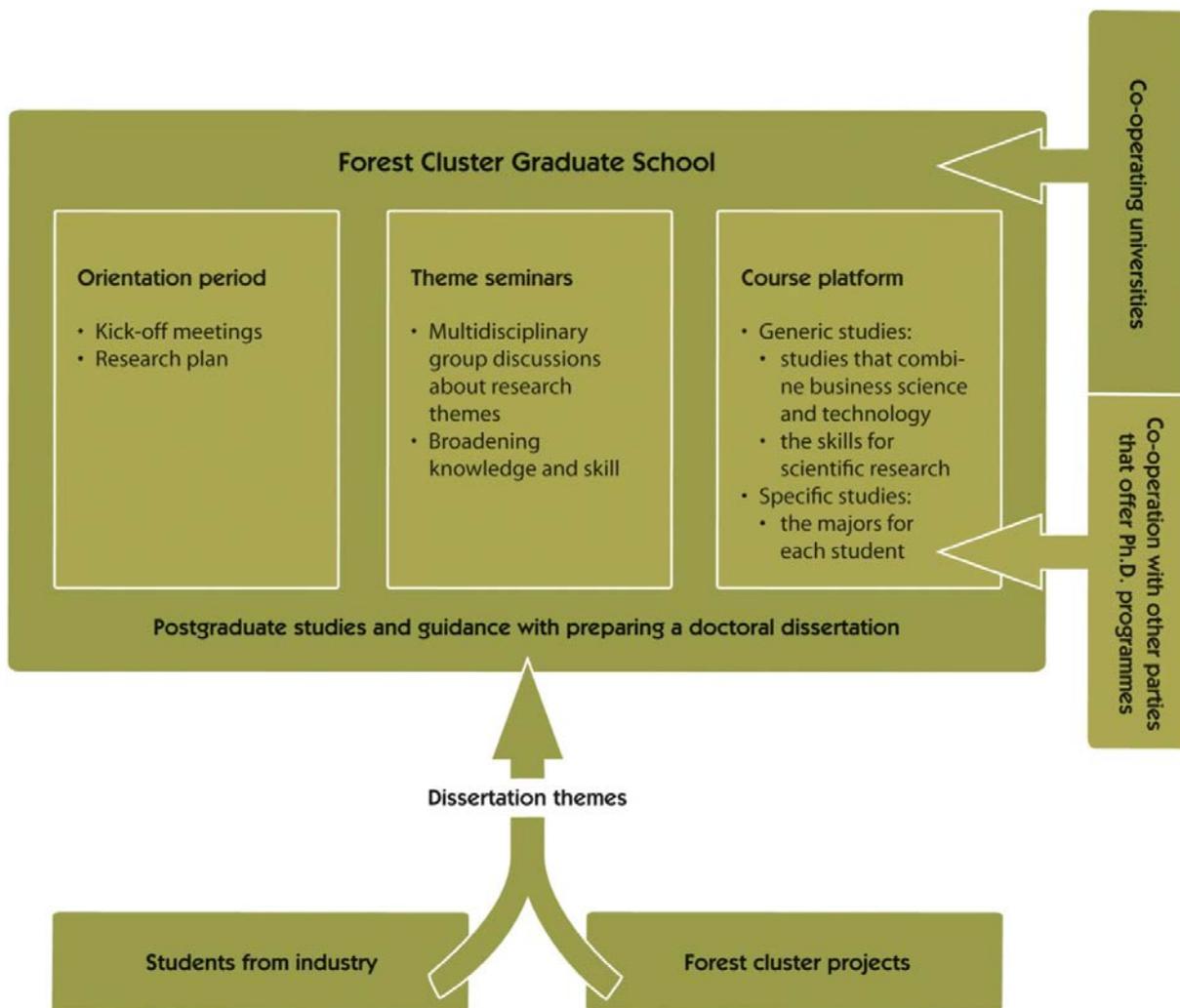


Figure 1. The original working idea of the Forest Cluster Doctoral Program (At the beginning named as Forest Cluster Graduate School).

Table 1. The activities offered by Forest Cluster Doctoral Program 2008 – 2015.

Year	Month	FCDP activity
2008	6 11 11	Publishing of the project concept Orientation period begins Orientation seminar 1
2009	2,4 8 9 9 1-12	Orientation seminars 2 & 3 Accepting students to the program Theme seminar: <i>Wood products</i> Annual FCDP seminar 4 generic courses
2010	5,9 9 1-12 3	Theme seminars: <i>Packaging innovations</i> and <i>Future solutions for energy</i> Annual FCDP seminar 3 generic courses Check-point for studies
2011	4 11 1-12 3 1-12	Theme seminar: <i>Bioeconomy</i> Annual FCDP seminar 2 generic courses Check-point for studies Virtual researcher meetings

2012	4 10 10 3 1-12	The Writing tube Theme seminar: <i>The Article afternoon</i> Annual FCDP seminar Check-point for studies Virtual researcher meetings
2013	5 11 11 3 1-12	The Writing tube Annual FCDP seminar Group participation in <i>Finnish Bioeconomy Cluster seminar</i> Check-point for studies Virtual researcher meetings
2014	8 1 3 1-12	The Writing tube Annual FCDP seminar Check-point for studies Virtual researcher meetings
2015	1 3 1-12 6	No funding anymore <i>Dissertation simulation</i> seminar Check-point for studies Virtual researcher meetings The first dissertation of an FCDP student

1.1 The kick start: orientation period

The doctoral students required the systematic planning of a tailored study program. In the beginning of the program, the students went through an orientation period that strengthened the students' skills in scientific research, e.g. through courses of research methodology and scientific writing. The aim of orientation was to support doctoral students in practical matters and to enhance their basic skills in scientific work. Orientation consisted of three two-day seminars during six months, three generic courses and homework.

Topics dealt within orientation period included information of dissertation process, the organisation and requirements of a dissertation, and what studies alongside full-time work require. The information sources, methods of information retrieval, databases and management of references were also discussed. One important theme was preparing a research plan and timetable. Also, the flexible right to study in other Finnish universities: application, schedule and costs, was discussed, as well as possible ways to apply grants, the ethics of science, and basics how to write and publish a scientific paper.

After the orientation period, the students were able to apply to the FCDP. Finally, a heterogeneous group of 14 talented doctoral students, who already had study right for doctoral degree in one of the five participating universities, supervising professor and an appropriate research topic, financing from their employers, and high motivation, were accepted into the program.

1.2 Seminars

Doctoral students in the program were working physically in different places and countries. However, a few times in a year they were invited either in theme seminars or annual seminars arranged by FCDP.

1.2.1 Theme seminars

The idea of theme seminars was to follow current forest cluster research and development trends continuously and dynamically. In addition to FCDP students, theme seminars were open to public, and thus, enabled networking with other

specialists in the field. In theme seminars, experts were lecturing and moderating discussions on current seminar topic. The seminar main subjects were selected to support key research topics or subjects related to FCDP students' dissertations. The themes of the seminars were, e.g., *Wood products*, *Packaging innovations*, *Future solutions for energy* and *Bioeconomy*.

1.2.2 Annual seminars

The doctoral students were supported also by offering annual FCDP seminars. In these seminars, students presented their own studies, and discussed on each other's research. On the first years, only doctoral students and coordinator were present in the annual seminars, but later also supervisors were invited, which boosted the discussion even more. In addition to student's own presentations, general topics concerning different themes about doctoral studies were presented and discussed in workshops included in annual seminars.

1.3. The course tray

In Finland, doctoral studies include 40 - 60 ECTS credits of studies in addition to conducting research and writing of a doctoral thesis in certain individual topic. FCDP students were provided up-to-date information on relevant postgraduate courses on a course tray.

Since FCDP students were completing their studies while they worked, their possibilities to take part in regular lectures at the university were limited. Therefore, they were offered intensive courses that were tailored especially for this group, as well as opportunities for distance learning and web-based instruction. The multidisciplinary nature of the project entailed that the provided courses were generic and thus, applicable to postgraduate degrees in a number of fields. The topics of these courses touched upon the methodology of conducting research, i.e. *Survey research*, and *Modelling and design of experiments*, or how to apply certain software in doctoral research, e.g. some decision support, simulation and word processing tools. Also advanced courses in scientific writing, creativity in design and operation, topical legislation concerning forest cluster area, and innovation management, were offered to FCDP students. A single doctoral student was able to include 15-20 ECTS credits in total of these generic courses in his/her individual study plan.

In addition to the generic courses, the course tray helped students to find other doctoral level courses that interested them and suited their field of expertise. This information was largely based on the current doctoral course range of the partner universities, and the role of FCDP was to disseminate information on these courses, i.e. details on the contents, place, time, prerequisites and possible costs, easily accessible to working doctoral students.

1.4 A virtual homeroom

The students had at their disposal a virtual homeroom first in Venla and later in Moodle environment: a closed homeroom brought students together between seminars and workshops, and allowed students around the world to keep in touch despite the distance. The homeroom was a communication forum, in which possible seminar materials and related links were published, and also links to generic FCDP courses and course materials took place. Also, the course tray was located in this environment. The virtual homeroom offered postgraduate students a sounding-board, an opportunity to share experiences and receive support from their peers.

1.5 Other supporting activities

During the project, feedback was asked and the activity was reflected continuously. The coordinator was actively contacting students, and helping in any questions. Also many other supportive practices were offered.

1.5.1 Supervision plan

When a doctoral student is carrying out a dissertation study in industry, he/she may encounter numerous difficulties (Strengers, 2014). To avoid trouble at a later stage of the research study, the students first were encouraged to arrange a meeting with their employer and their supervising professor, where all parties can discuss and provisionally agree about things like criteria of good doctoral research, supervision, possible different scientific views, issues concerning different costs of research and e.g. conference trips, schedule, and publishing. A supervision plan including memorandum of understanding between the student, supervisor(s) and the employer was written on the basis of this discussion.

1.5.2 Annual check-point of studies

Every spring, FCDP students were asked to report their credit points, publications, current research activities and what the next steps in their dissertation study will be. The students sent the reports to their supervisors, and to FCDP coordinator. This practice helped students and their professors to see clearly, what has been done already, what has to be done next, and when the doctoral thesis will probably be ready.

1.5.3 The writing tubes

In the last years of the project, especially scientific writing and publishing was taken in the spotlight and supported. Students were invited to *The Writing Tube*, few days in the university, when they had nothing to else to do except writing their articles or dissertations. Before the actual writing tube days, orientating virtual lectures about publishing were arranged and pre-assignments for constructing the writing project were sent. During *the Writing Tube*, all students were in their individual, peaceful rooms, but neighboring each other. During breaks, some scientific writing specialist either from library or from language center was having lunch or coffee with them, allowing students to ask topical questions about scientific writing issues.

1.5.4 Virtual researcher meetings

After few years from the start, FCDP students had their courses all done, and did not meet in courses face to face so often anymore. Besides to the asynchronous conversations in virtual homeroom, regular live virtual researcher meetings started, to maintain and boost the research enthusiasm of the students.

The virtual researcher meetings were arranged every second or third month. All two-hour meetings had a certain theme, and first a specialist gave a short introductory lecture about it. Sometimes, the specialist was one of the students presenting his/her research, and sometimes other expert. In every virtual researcher meeting, students' own issues and questions about doctoral research were also discussed and actively supported by the peers.

1.6 Steering committee

The steering committee was composed of advocates from partner organisations, representing different fields of science related to the forest cluster. The committee, together with director and coordinator, decided on the contents of the activity of the doctoral program and made important strategic decisions regarding its operations. In addition, it approved the budget and decided on appropriations allocated to different

items, supported the invitation of visiting lectures, and built and maintained contacts with industries. The director of the doctoral program acted as the chair of the steering committee. The coordinator organised the activities, acted as a contact person and developed the concept, since the model applied to FCDP was completely new.

2. THE RESULTS

The project with this particular doctoral student group ended in 2015, but the unofficial network between the interdisciplinary peers is still working in many ways; from cooperation and coauthoring projects to peer support in social media. Until now, two of the group members have already defended their dissertation.

During the project years, and finally after the project, feedback questionnaires were sent to students, supervisors and employer representatives. The answers, together with project coordinator's reflection of the project results are valuable information for developing doctoral education.

2.1 The feedback analysis

The feedback from doctoral students was all positive. However, without a-not-supported control group the results of FCDP activity cannot be scientifically measured or compared to any scale. Possible measures could be the scientific articles written by working doctoral students, ECTS credits they earned from courses or presentations of students' research results during FCDP project.

The lively discussions and ideas in seminars and researcher meetings, and that students were voluntarily participating to FCDP activities year after year, suggest that that kind of support was considered important.

In the final analysis of feedback, the crucial factors in successful doctoral studies seemed to be student's motivation, his/her resources for fluent studies, and the encouraging atmosphere at home and work, as well as at the university, see Table 2.

Table 2. The key factors to successful part-time doctoral studies.

Motivation: <i>"I want to do my doctoral studies"</i>	Resources for fluent studies: <i>"I know how"</i>	Encouraging atmosphere: <i>"Nothing prevents my studies"</i>
<ul style="list-style-type: none"> ◦ I have a good reason to study. ◦ I understand the importance of my research, and how it fits to the big picture. ◦ Career plans after a doctorate 	<ul style="list-style-type: none"> ◦ Time and financial resources ◦ Clear scheduling, follow-up and updating ◦ Knowing the methodology and information retrieval ◦ Understanding the whole doctoral research process 	<ul style="list-style-type: none"> ◦ Supervision plan <ul style="list-style-type: none"> - Responsibilities and roles of student, supervisor and employer - Consensus about a research quality - Agreement of e.g. time management, financing and publishing of research results ◦ Consensus at work and at home ◦ Commitment in research and peer group <ul style="list-style-type: none"> - Mutual support - Publishing research results as co-authors

2.2 Coordinator's reflection

From the coordinator's point of view, there were no pointless activities in FCDP. The generic courses were of important issues, even though some students could not include all these credit points into their personal curriculum. Students were actively participating in seminars and other meetings, but some of them seemed not to be so committed to their research in between the meetings. However, some others worked systematically with their research topic and participated also in doctoral level courses organised by other graduate programs by different universities. The FCDP coordinator contacted students at least every second month, but more frequent contact could have motivated especially those students who were not very self-directed.

All materials from seminars and meetings were gathered and stored in the FCDP virtual homeroom. In addition, the virtual homeroom was also used for informing issues besides e-mailing list. Virtual conversations were also possible in the homeroom, but the discussion between students was not very active, with the exception of some quite formal questions. The social media appeared to be a more comfortable place for free and unofficial chat, and the closed FCDP group in Facebook is still in use.

The intensive days in writing tubes were commended by the students; the writing tubes boosted their writing process well. However, the writing tubes should last maximum three days since all at once, it was difficult for the students to be absent from their paid work longer. Therefore, it could be a good idea to arrange short writing tubes several times a year. A few articles written in writing tubes have been published. However, publishing a scientific article may sometimes be a long-term process, and it is probable that some writing tube results are still on their way.

Finding a funding for FCDP activities was an annual problem to solve; the funding was given always for only one year time period, which reflected in planning the actions beforehand. Quite often, people found it hard to understand how FCDP was different from other types of doctoral schools; there was not one discipline like in traditional doctoral schools in universities, there was not just one employer like in doctoral schools in corporations, but there was a common industry field with several companies, universities and other organisations, and multiple disciplines connected to the industry field, e.g. business and administration, forest products engineering, chemistry, energy and environmental engineering.

Sometimes, part-time doctoral students felt underrated, while universities seemed to appreciate more the quick results gained from full-time 4-year doctoral studies. Also, the motivation of part-time students was sometimes questioned by the university, even though the encouraging atmosphere in universities would motivate part-time students better.

The employing corporations had different attitudes for doctoral students. Some were interested and participated actively in their employee's research, while some others just said: "you can study if you like, as long as it does not hinder any other duties". During the FCDP project years, a few students changed their employer. In these cases, their possibilities to finish their doctoral thesis required re-negotiations with all partners involved.

However, the FCDP support seem to be needed: especially virtual and face to face researcher meetings that were arranged several times in a year, the support of the peer group, and the active coordination of studies were the elements that activated students and made headway with their dissertations.

1.1 2.3 New ideas for future projects

The experiences with this project and group have given many tools and ideas how to support all kinds of doctoral students also in the future.

Belonging to a research community is not obvious for part-time doctoral students. To enhance the networking with peer students and university staff, and to increase knowledge about other doctoral students' research topics, the multidiscipline conference targeted to doctoral students would bring all doctoral students together.

Arranging virtual researcher meetings for working doctoral students is a practice that should be continued. It would be worth trying that all part-time doctoral students would be invited regularly in virtual researcher meetings, regardless of their discipline. However, the virtual researcher meeting groups should be small enough to enable all participants to discuss his/her own research and comment each other.

The possibilities provided by information and communication technology may be put to more active use. For example, info sessions, workshops and courses provided to doctoral students by the university, should also have a possibility for virtual participation that would make them easier to reach also for part-time students. Doctoral level massive open online courses (MOOCs) could be one issue to become more acquainted with.

An interesting project could also be to develop educational cooperation between universities and industry, e.g. exchange periods, when students who are normally working in industry could do their research at the university during some exchange period, and vice versa; temporary research visits from university to corporations would be possible. Also, a doctoral level mentoring system could be developed.

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