

THE STRUCTURE AND CONTENT OF AN ACADEMIC RESEARCH PROPOSAL

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Introduction

The purpose of the present document is to provide an overview, based on my personal experiences, concerning how one creates a successful academic research proposal. I will explain issues that should be addressed in an adequate research proposal, how it should be structured, and how to present your arguments. This paper was initially written to support master students in devising proposals of their thesis work. I have, however, elaborated this toward also guiding doctoral students in planning their dissertations: Cutting-edge practices of doctoral education rely on article-based theses consisting of several internationally refereed journal articles. I believe that the guidelines given in this paper can be utilized and applied in both of these contexts; it is, however, very important to adapt the plan and its structure according to needs and requirements of your own study. While there are certain principles and good practices on which professional researchers rely, there are many different and equaling compelling ways of constructing a good research plan.

The purpose of research proposal is to crystallize to an evaluator coming from more or less different context, the core ideas of your investigation that assist in comprehending and assessing in concrete terms how the proposed study is going to be carried out. The research proposal play a crucial role in an investigative process; writing the proposal pushes and forces one to examine one's object of investigation with conceptual clarity and envision how the investigation will be approached. Because academic research often means jumping from the already known domains to an unknown territory (Holmes, 2004), the research project, set out in the proposal cannot be completed without improvising. Working out the proposal requires major efforts and preparations; you need to develop your proposals across gradually deepening cycles. A superb and exemplary proposal emerges only through a long series of such efforts, during which all aspects of the investigation from concepts, problems, methods, stages and expected results are clarified and repeatedly elaborated. A good proposal constitutes a coherent and concrete whole in which problems, theories, methods support one another. The present document is intended to outline the basic skeleton of a research proposal; my intention is that the reader should adapt the present example to fit in his or her own topic and preferred style of presentation so that the end result is both academically convincing as well as gives a personal and unique appearance of the proposed investigation.

In the academic world there are many situations in which the research proposal has an important role, such as pursuing thesis work, applying for a position as a post-graduate (doctoral) student, or applying for funding from public or private foundations. Creation of a coherent and believable research plan is an important condition for pursuit of a successful academic thesis or doctoral research project. A competent, engaged and persistent student, who has learned to construct research proposal and who is, in this regard, provided support by senior researchers, is likely to get academic funding – provided that

research ideas and design are of sufficient high quality. After completing a good Master thesis, it is always possible to start applying for funding for post-graduate studies from foundations and/or seek one's way to a research group (there is always a need for finding academically competent, committed, and enthusiastic doctoral students). There are also some sources of funding for Master theses; if you have a good proposal, it is not an over-whelming effort to apply for a grant. Only those who actually apply have a possibility of being funded. A firm starting point is to believe in yourself and that investigators who strongly build on knowledge and competence from academic traditions as well as reach toward novelty and innovation are worthy of academic support, funding, and guidance. You ultimately should not need the confirmation of external academic authorities for believing in yourself. Many beginning students lack academic self-confidence and do not dare to seek grants or funding without a respected senior researcher's encouragement and personal request; a beginner may not think that his or her or their research ideas would be worthy of funding. A part of my own supervisory activity is to immediately eliminate such uncertainties, which I may have once myself suffered, and try to promote students' confidence in their academic potentials and infinite possibilities. You can learn to fly only by daring to test your wings! The talent relevant in academic research is most of all collective giftedness that involves sharing of inter-generationally accumulated knowledge and competence with a young generation (Hakkarainen, 2013a; 2013b; Hakkarainen et al., 2013; 2014; in press; Holmes, 2004; John-Steiner, 2000); young students who have an opportunity to work with highly regarded professional researchers become "gifted" investigators because they have obtained access to concrete epistemic gifts cultivated by academic research communities, such as cultural knowing concerning how to construct a successful research proposal. Due to these concrete epistemic gifts, practically all students functioning in effective research communities and networks get funded and complete their post-graduate studies. Students who do not have collective models and scripts are not likely to do well in spite of personal intelligence and creativity. My research community has had, for many years, a practice of sharing with newcomers earlier successful research proposals with very good results. Creation of the present paper to share some of the collectively cultivated knowledge and competence, is my modest effort to share with external researchers planning their academic careers the collaborative knowledge and experience of making research proposals that we used to share only within communities. The former Finnish version of this document was downloaded 10.000 times from my website and English version 2500 times; this encouraged me to create a new version with better links to my own associated research.¹ I am also working for creating corresponding guidelines the first pursuit of journal article.

Disciplined creativity of academic research

Academic research in education and other social sciences, relies on "disciplined improvisation" (Sawyer, 2004). Pursuing an investigation and learning resemble one another; both processes start from questions and advance toward deeper understanding. It is essential to be aware that scientific practice diverges substantially from idealist and rational accounts provided by many introductory method books and from the summary of the process provided in official and published reports. Academic research may be interpreted to rely on an iterative and gradually deepening process described in Figure 1. I

¹ The present document is inspired by interview data that me and my colleagues have collected from doctoral students (Vekkaila et al., 2014, Hakkarainen et al., 2013) and research leaders (Hakkarainen et al., 2013b; 2014; a; 2014b; in press) from natural and social sciences. If you are struggling with challenges of creating an academic career, perhaps familiarizing yourself with my example encourages you to correspondingly stretch your abilities (Hakkarainen, 2008) by capitalizing on collective creativity.

depict research as a cyclic process because iterative exploration of target phenomenon characterizes social-scientific studies. Academic research does not advance linearly so that an investigation has a hypothesis and would be straightforwardly pursued and new scientific information produced. In many cases, especially when the target is not well understood to begin with, you need a long-standing research process through which investigators' understanding of the target phenomenon becomes clarified only gradually. This requires many trial-and-error efforts and pursuit of a series of mutually complementary studies. An individual study does not mechanically advance from one stage to another (problem - method – result), but investigators have to repeatedly to come back to earlier stages – for instance to redefining research problems to fit the actual, perhaps surprising, results of the investigation. From the perspective of an investigator, the research process may appear very chaotic in which it is not known exactly what the investigator is actually seeking. Such an epistemic situation prevails especially when you are seeking something new rather than confirming what is already known. Issues start appearing rational and logical only after an investigator has written a research report that provides a rational reconstruction of the process (so that readers get an impression that the researcher already knew what he or she was seeking during the process, Hanson, 1958). There is nothing wrong in providing a coherent narrative account of a complex research process that may have had so many different stages, failed attempts, and dead ends, reporting of which would only confuse the reader. Investigations are never perfect; each study reveals only partial truths and many complementing studies are required to deepen scientific knowledge and understanding. Academic research advances so that investigations across the world study similar problems and share their methods and findings through scientific journals.

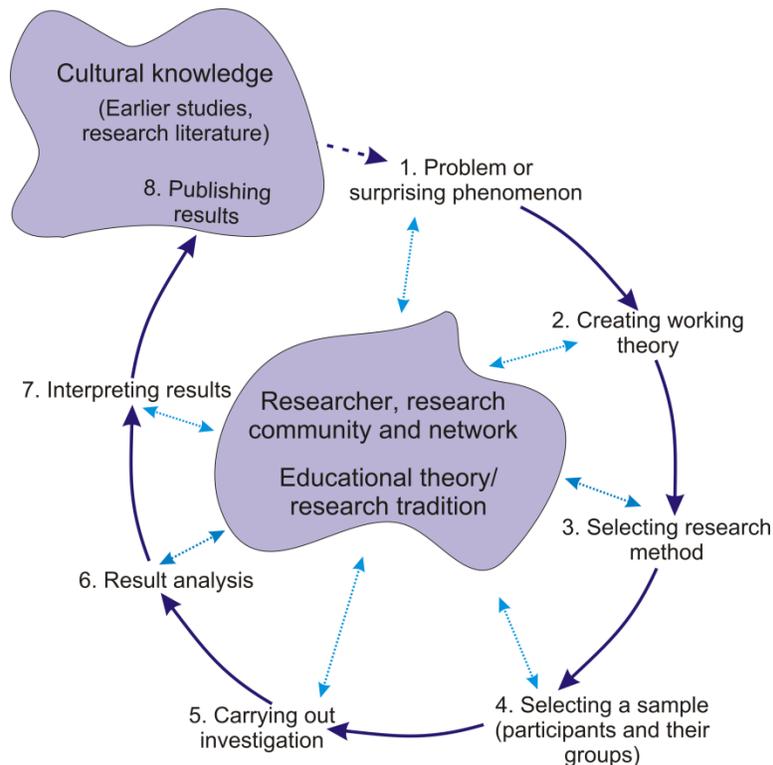


Figure 1. Spiral of academic research (adapted from Lonka et al., 2010)

A research proposal provides valuable support and guidance for implementation of an investigation. Simultaneously, it is essential to remember that plan is only a plan. Pursuit of research in practice, such

as collecting and analyzing data, reveals other problems and limitations that even the best researcher could not have anticipated before actually starting. Hence, it is essential already in the planning stage to carry out small pilots for exploring and testing methods, instruments and the research design. According to my experience, each investigation is messy; only after you have completed it, do you have better sense concerning how the study should have been done. Studies in social sciences represent creative research in the context of application, as separated from pure basic research taking place in a laboratory (Stokes, 1997). In many cases, phenomena being investigated occur only in the field, are complex and multi-faceted in nature and, therefore, hard to understand. Because of this it is a good idea to design one's investigations so that they constitute a series of sub studies. When completing these manageable smaller studies, an investigator is able to utilize lessons learned from encountered efforts, limitations, and constraints when planning new ones. A wise researcher is able to utilize surprising and unanticipated phenomenon and re-direct investigations accordingly. Occurrence of such phenomena is a sign that you have encountered a phenomenon that is outside of your original research approach and academic knowledge. If you are encountering only expected and familiar phenomenon, it is an indication that you have not succeeded to take your investigation deep enough to create new knowledge. In order to overcome this challenge, it is a good idea always to touch on novel and surprising issues, and if it is an academically sufficiently interesting issue for investigation completely for pursuing such novel research path.

As follows, I will explain how to do your literature review and share some experiences of academic writing. An academic text is very compact and dense in nature in terms of expressing clearly and concisely only relevant issues. When me and other senior researchers criticize a students' research plan or academic text produced by him or her, we do it from the perspective of academic genre (Bakhtin, 1986; Bazerman, 1988). Genre is a historically evolve and stabilized textual practice that determine content and structure of academic text. For those who have been intellectually socialized to produce texts anchored on the academic genre, all divergences are highly visible as weaknesses and limitations. Research proposal is anchored on similar genre that academic research reports. Nobody can produce compact and genre-adequate text right away, without years of practice; the desirable compactness and adequacy of academic prose can be achieved only through repeated cycles of editing, until the desired conceptual clarity, coherent flow of text and compactness have been reached (Kamler, 2008; Kamler & Thomson, 2007). It is typical for beginners to produce a few ad hoc sentences that approximately capture the desired meaning; a professional, in contrast, uses the draft text as a material that is repeatedly shaped and modified again and again, and again numerous times, deepening and clarifying ideas and refining their textual expression. There is often a divergence between what the beginner means and what the text actually says. Sometimes, it is helpful to read the text aloud so as to notice small unclear items and vague expressions. It is always a good idea to ask other people to read and comment on the text so as to borrow their eyes for improving the text. Learning to do academic writing is a messy struggle, and many people have problems in it; improvements take place through intensive practice of writing (Prior, 1998; Russell, 1997). It is essential to write a great deal and apply gradually tightening criteria for assessing the end result. Sometimes it is necessary to produce large bodies of text while pursuing an investigation; although such texts may be important for the investigator, the readers may not need to know his or her investigative path in detail; it may be advisable such to provide an concise description of the results of your investigative process to readers. An adequate academic text focuses mainly on your own conclusions rather than requiring a reader to go through your whole investigative learning path. If you are using the research proposal in several contexts, use each of them is an opportunity to elaborate the basic ideas and elements of your proposal; when you have started doing the actual research, you are likely to get many novel ideas for improving the research plan that

should be crystallized into the evolving versions of the plan. Repeated efforts to apply for funding are more likely to be successful if you elaboratively improve the plan and, when necessary, change your perspective.

In many cases, the maximum length of the text of the research proposal is predefined. Explaining comprehensively an envisioned research project is likely to be challenging even in a relatively simple case. Even a highly regarded expert needs space for explaining, comprehensively and concretely, all stages, methods, and processes of the research. The need for writing space is especially acute in the case of a beginner who is still learning competencies of academic writing. Because of that, my instruction of a beginner is to maximally use all the physical space (assuming there is a form) that has been given for presenting his or her proposal. If spacing of text is not defined, use single-spaced text (or space exactly corresponding size of your font). Have you adjusted the margins to obtain more space for explaining your study? If you feel that you do not have enough material to fill in all pages, it is a sign that the proposal is premature; it has to be deepened theoretically and methodologically. Although it is necessary to use all possible space provided, an adequate proposal does not have any unnecessary words; all extra space that could be released for compression of expression has to be used for eliminating fuzziness and vagueness and clarifying and sharpening the plan. Achieving a high quality end result may require writing many, sometimes tens, of gradually improving version until reaching a coherent plan that has neither too many nor too few words. If a grant proposal based on your research plan is not funded, take as a communication problem; you need improve and rewrite your proposal after each occasion of submitting it for evaluation.

In what follows, I will address the most important elements of a research proposal. Notice that many of these elements are also included in successful academic thesis so that these guidelines may also assist in structuring your research report. The present instructions rely on my own internalized experience and reveal basis elements of a research proposal. Read carefully instructions given to you and adapt the present guidelines accordingly.

Title

The Title should be compact and sufficiently expressive. It is worthwhile to put efforts into elaborating the title because it crystallizes the core of your study and arouses the interest of readers.

Abstract

This is a truly essential aspect of your study because writing it forces you to clarify and crystallize to yourself as well as to readers what is the core point of your investigation. In some cases people who evaluate your research proposal only read the abstract; because of that it need to be truly convincing and thoroughly understandable without reading the rest of the research proposal. Avoid using jargon and define and explain all complex concepts. It is important to reserve sufficient time for writing the abstract; sometimes several hours, across many editing cycles. It is important to reserve enough time for writing several versions; producing a satisfactory one can take a whole day. Construct as many versions as necessary until the end result tells what is essential about your study (what are the questions, broader content, methods and expected results and their significance?). An abstract is usually 150-300 words long.

Keywords

Create a compact list of key concepts concerning your study and use same concept systematically to refer to a target phenomenon (even if there is a danger of repeating). Your own interpretation and definition of the key concepts should be embedded in the introduction (sometimes it is appropriate to provide a separate glossary).

1. Introduction

In the introduction of a research proposal, a reader is presented with the research theme through a review of relevant aspects of earlier research literature so as to indicate a knowledge gap, the filling of which the planned investigation contributes. The first sentence or paragraph of the introduction includes a so called ‘problem statement’ that crystallizes the purpose of the study. You have to explain immediately the context and focus of your study so that the reader does not have to go through several pages before understanding what the study is all about. Corresponding problem (re)definition re-occurs also in other part of the study, such as research aims, methods, expected results, and discussion of significance of the study because the reader needs to be reminded several times what is the bottom line of the study. Crystallizing this key sentence of the study is often challenging and many require many iterative editing efforts (and you may need to get repeatedly back to re-defining it while pursuing the study).

The introduction represents a thematically organized theoretical framework of the study, which describes concepts, theories, and frameworks in the background of the study, addresses earlier studies and ends up with research objectives or questions. The introduction addresses only those theories that are relevant to the study. On the other hand, all relevant concepts of the study need to be introduced in the theoretical introduction. It is essential to define an economic set of basic concepts that are systematically used in the study; this may be assisted by writing down and listing the most important, compressing the list severely and writing a few sentence of explanation of each concept. Although use of varying and expressive concepts is a strength in fiction, it is not so in academic writing; it is desirable always to use the same concept (or technical term) for a certain phenomenon (even if appearing a bit boring) so as to convey your intended meaning to the reader (or use a few carefully selected parallel concepts). Academic theses are also tests of academic writing in which you need to find clear and comprehensive concepts for targeted phenomenon. Simultaneously, however, it is essential to learn sophisticated skills and competencies of academic writing that allow disciplined but still expressive and engaging presentation of ideas (Prior, 1998). Sometimes it is hard to communicate complex bodies of literature and associated studies to the readers. In order to overcome this challenge I have sometimes used narrative case descriptions (describe effects of intervention, illustrate the empirical state of affairs, highlight a striking piece of data) intended to capture the core of a complex target event. If a distinctive font is used in a case description, it can be separated from the rest of the text. The main challenge is to communicate the point of your investigation to a reader that may come from a more or less different context; sometimes narrative means are justified if the proposal is otherwise well conceived.

The research plan and its introduction should constitute one coherent whole so that the text flows from one theme to another in a natural and meaningful way without giving an impression of listing things or providing only fragmented view of the study. Do not copy sentences from one place to another but put some effort from expressing similar ideas in a fresh and inspiring way. Paragraphs have to be

integrated with one another by creating connecting sentences that bind issues together, lead to subsequent themes, and constituting an overall red line of arguments. It is good to use tables and figures for describing theoretical perspectives, concepts and their relations. Tables are useful to avoid lists within your text; long lists typically signal bad (half-finished) writing.

Although you may have a good idea regarding what you are planning to study, it is essential to make a compact literature review by going through both relevant sources (from classical studies of the field to newest investigations). If you have used several days for going through relevant scholarly literature and accumulated 20 cm's pile of material, with many new articles, you are likely to get to better result than someone doing a more hasty and surface-level information search. Literature research is a kind of detective work in which you follow epistemic trails of literate sources (from articles and books to their references and references of references) or virtual trails in which one reference lead to another. Google Scholar provide a good instrument for tracing recent research of your key sources; the Internet and various socio-digital tools provide valuable resources for tracing activities of interesting researchers and their communities (Rheingold, 2011). My philosophy is to stop a literature search only after I have found, by following such epistemic trails, material that, in an essential sense, forces me to change my view of the research object or target. Such a approach functions at least in social sciences. The scope and extensity of the literature review depends, however, on context. Even if you need to go through a number of sources, the resulting review section of the research proposal is brief and very selective. Accordingly, theoretical framework needs to be briefly sketched, but the reader may be referred elsewhere for detailed review of variant and related theories. Findings of previous investigations, including your own, will have to be mentioned, but only where they may be corroborated or disconfirmed by your study. Mention also the problems with and gaps in these previous and similar studies, if there are any. Finally concisely state your objectives or questions. This whole section should be, in general, no more than 20% of the total pages you have been allowed.

Doing literature review is extended across the whole process of writing the research proposal so that it continues across working with research problems, methods and other elements. It is not a good idea to use too many weeks for doing the literature review; otherwise you do not get to consider concrete implementation of your own study, but may get lost on a side-track. You cannot know before obtaining your own data what concepts and theories will actually be relevant. The novelty of your investigation emerges in interaction between theory and empirical phenomena. Because of this you need to work for creating your plan both top-down (from general ideas and conceptions to implementation of research) and bottom-up (from planning concrete investigations and collecting novel empirical data). If you get stuck at some issue, it is often useful to change your approach for while (leave unsolved theoretical problem to rest) and focus on planning concrete implementation of investigation or take some distance from concrete planning, and go deeper into the theoretical foundations of your study. My advice would be to carry out a few, ½ to 1-day information searches and reading selectively key sources simultaneously with working with other aspects of the research proposal. It is important to be well-informed, but sometimes people who read too much become so critical that they shoot down all potential research ideas. The purpose of reviewing research literature is to courageously jump into pursuing your research in which novel ideas emerge in crossfire of theoretical ideas, methods, acquired data, and accumulating research experience.

Reviewing earlier literature is important because it assists you to understand the broader context of your research and relate your study to the tradition of academic research. The point of scientific research is not to create something new out of the blue, but advance research traditions and a line of

inquiry established by former generations of researchers. Recycling preceding theoretical and methodological innovations is not forbidden (when using adequate scholarly references), but actually a crucial condition of making scientific progress. Only by building on already created lines of inquiry, can you can genuinely contribute to academic research. Inexperienced students try too often to reinvent the wheel in terms of creating weak and vague ad hoc research rather than following and extending model examples embedded in research literature that have already solved key challenges of methodology. A wise student tries to ground his or her studies to model examples provided by articles appearing in the highly regarded scientific journals; such articles have gone through peer review and provide high-quality models to be imitated (and extended to your own directions). Grounding your investigation on purposefully selected model examples is not plagiarizing, as long as the sources are adequately acknowledged. It is often productive to replicate earlier studies in a new context and elaborate them according to your specific interests. It is especially valuable to imitate research designs of high quality articles. Beginners often want to study an individual phenomenon by relying on a single research method; investigations produce often much more interesting results when the target phenomenon is ‘triangulated’ by using several mutually complementary methods. Remember that you will have enough opportunities to indicate your creativity even if you build your study on a research tradition that has already turned out to be fruitful and produce interesting results. Coming up with a completely new study would be like shooting to the dark; if you are very lucky, you may hit something interesting, but most likely you will not. Careful literature review allows you to build on inter-generationally accumulated rather than mere personal and local experience (Hakkarainen et al., 2013b; 2014b).

It is important to use references of central academic sources as well as so -called impact values of scientific journals (as well as citation records) for identifying high-quality researchers, research articles as well as academic journals.² Remember that academic thesis are not actually a part of the body of scientific knowledge; earlier master theses or doctoral theses do not, in general, provide sufficient basis for planning your research, beyond the most highly qualified (limited) one. Many of them do not meet professional requirements and accepted study theses may involve errors and weaknesses, so that such documents do not constitute adequate references, beyond exceptional cases. It is important to extremely critical and selective if using students’ theses as sources for identifying useful references. Familiarizing yourself with a research tradition enables you to build not only on your personal but also inter-generationally accumulated knowledge and competence of the research field; significant academic achievements are not possible without this. You may also get an access to scientific tradition and its collective creativity by trying to seek a way for you to attend a research group of project working in your academic department or supervision of a highly regarded processes (It is all right to go to ask if they would be interested in collaborating with you; toward that end, it is important to be willing to shape your problems and focuses in a way that fits in collective research pursuits going on). Only by

² In Finland, multi-disciplinary teams have categorized tens of thousands of journals according to 1) established journals, 2) leading journals and 3) journal with high international visibility. You can search for journal and their categorization from the webpage of the Federation of Finnish Learned Societies (<http://www.tsv.fi/engl/index.html>).

An evaluative classification of educational research journals has been carried out by European science foundation (see http://www.edu.utu.fi/tutkijakoulut/opmon/materials/IL_Pedagogy.pdf).

An easy way to roughly examine citation records of educational researchers is provided by Publish or Perish program freely accessible from (<http://www.harzing.com/pop.htm>); it utilizes data provided by Google Scholar.

joining the “long march” (Holmes, 2004) of academic research, you are able to significantly advance academic investigations.

Concepts and theories used in an adequate research proposal have been carefully tailored according to need of the specific study in question. This means that you are not just describing generally what research literature says about your topic, but literature is tightly framed from the perspective and problems of your study. When introducing background theories, it is a good idea to shape the text in a way that assists the reader to understand, in concrete terms, how these approaches are related to your own study. It is understandable that a beginning researcher has to rely on ideas and thoughts of various authorities; he or she may be unsure of him- or herself and, consequently, link a reference to each idea presented (leaving one’s own voice hiding behind reference). In academic writing, students experience themselves vulnerable in front of an infinite number of contemporary and future critics. The challenge is to produce authoritative text before feeling authoritative (Kamler, 2008; Kamler & Thomson, 2007). This is because academic writing is not such a matter of sharing knowledge but also transformation and building of one’s identity as a prospective builder and creator of knowledge; an overly deferential relation to academic sources may indicate that one’s academic identity has not evolved (Holland, et al., 1998; Kamler, 2008; McAlpine & Amundsen, 2008; Hakkarainen et al., 2014b). This challenge may be overcome by trying to bring one’s own voice to the front by creating meta discourse for inter-relating background theories with one’s own specific study. Although international English language editors tend to recommend using passive presentation, using a personal voice often assists you to bring your own voice to the front. This may assist in personalizing theoretical examinations as well as highlighting what is a matter of your own interpretation and theoretical view.

If the proposal is related to continuing a series of studies, it may be useful to synthesize already completed studies and their results in the introduction. Sometimes master’s or doctoral theses build, respectively, on bachelor or master studies; in such case, it may be relevant to explain an earlier study and how its results guide the planned investigation. Your proposal becomes more convincing if you can show that you have already investigated the theme by carrying out a pilot and other studies (making an actual pilot study for preparing a proposal is often a good idea). Also indicating your familiarity with the topic in terms of your academic studies, professional career or life experiences would strengthen your proposal and should be concisely indicated in the proposal and CV. If you are applying for funding for your study, put special effort for working through your CV; beyond the traditional list of your accomplishments, write a half-page resume explaining who you are, where you are coming from, what makes you tick (your interests and passions), and why you are the best person to complete successfully the proposed investigation. Indicating how you have struggles with and overcome various challenges in your life and have unique (e.g., multi-cultural) experiences may make a stronger impact on evaluators than highlighting mere successes. Simultaneously, such supporting personal stuff has to remain in the background so that everyday experiences do not run over academic perspectives.

Research aims

In the end of introduction you should present you overall research aims, as well as more specific objectives that may be numbered as separate research questions to be answered in the study. Although defining hypothesis is important when studying relations among well-known variables in laboratory, many social-science investigations are exploratory in nature so that it may not be possible or meaningful to determine definitive hypothesis. Educational phenomena are seldom understood so well that you need to explicitly test hypotheses in the way characteristic for experimental study; at least this

is not the way I am used to frame my studies. Usually there are several aims, objectives or questions to be addressed. Although it could be instructive to crystallize research questions to individual sentences, it is often useful to explain and specify content, meaning, and interpretation them by writing a whole paragraph for each of them. Sometimes this takes the form of subordinate questions (not too many; you have to answer them!). Well-conceived questions are sometimes comprehensive as such, but it is very hard for a beginner without experience in studying a domain to come up with very good questions. It is essential to acknowledge that problems of plans and final investigation may diverge from one another; research problems live and develop according to the actual results obtained; when reporting an investigation it is started from whatever results is in hand and inferred backward what questions you should have asked to have the result as an answer (Kirsti Lonka has described this as a process of climbing upside-down (legs first) to a tree). Only after acquiring and analyzing the data are you able to assess what questions your study finally provide answers (there is reciprocal influence between your plan that guides result analysis and the nature of data and results that reshape the questions). Although this relates to reporting your completed study, it is essential to be ready to change questions and perspectives of your study according to unforeseen hints and thoughts emerging during collecting and analyzing data. In many cases, it is instructive to explain in your thesis or publication how unforeseen findings or other factors may have changed your original perspectives and orientations.

2. Method

This is the second core section of research plan, which mediates the relation between theory and data. This section explains how the investigation is going to be carried out; thus the methods of data acquisition and analysis provide information that allows answering research questions embedded in the theoretical framework. The Method section explains the operationalization of the research concepts, i.e., how the investigation has been transformed to a coherent and meaningful research process having all elements and aspects of supporting one another. Even if shortening of other elements of the proposal are necessary because of length limitations, it is not usually smart to compress the method sections too much because assessing the overall feasibility of the study relies on adequately detailed presentation of methodology.

2.1 Participants

This section describes the participants (subjects) of your study and gives relevant background information (gender, age, education, etc.). The participants are selected to represent the population across which the research results are planned to be generalized. If you would like to generalize results of educational investigations across all high schools, the participants should not be selected from one elite school. Issues related to sampling and generalization are crucial in statistical studies based, for instance, on psychometrically justified Self-Report Questionnaires (SRQs). Many studies in social sciences are, however, case studies or multiple case studies (Yin, 2009) in nature that focus on analyzing classroom processes without intending to generalize results across other populations. In this case it is essential to select cases that include variation in relevant regards considering the research object. Pursuit of case studies or design experiments (researching and developing technology-mediated learning environments iteratively, Collins, Joseph, & Bielaczyc, 2004) is encouraged by observations according to which careful and in-depth investigation of a small set of cases often provides scientifically more interesting information than surface-level study of large number of cases. If the proposed investigation is carried out in an environment or context understanding of which requires

specific explanations, the method section may contain an added subsection explaining setting and/or process of the proposed study.

2.2 Acquisition and analysis of research data

In this section, you describe and justify methods to be used in the proposed investigation and briefly discuss their background and validation. Tell what kind of research data is going to be collected and acquired. Explain shortly but comprehensively how the research data are intended to be acquired, what they are in nature, and what kinds of data acquisition methods will be used (if space allows, you may put data-acquisition forms and schemes as appendixes). Are you planning to use self-report questionnaires, carry out interviews, collect video data, or documents created by learners? Although it is usually purposeful to tell something about the background of research methods, you should not engage in general philosophizing in the method section, such as reviewing various traditions of qualitative research. It is essential to focus on explaining in concrete terms how the research methods are going to be used in your own study (check that all paragraphs and sentences are related to and contextualized according to the needs and perspective of your own study). Simultaneously, it is crucial to indicate your familiarity with methodological research literature; toward that end, use carefully selected key references, in the method section, to reveal your understanding of challenges and possibilities of the most important methods to be used.

An inexperienced student wants usually to study one particular phenomenon by using one particular method. According to my experience, however, a successful investigation aims at producing new knowledge and understanding by ‘triangulating’ the target phenomenon using several complementary methods, such as interview as well as SRQ; interview as well as classroom observation, analyzing student-generated artifacts as well as peer interaction, and so on. Investigations relying on mixed methods (qualitative and quantitative) often produce very interesting results. In practice, this may mean, for instance, using interviews for supporting construction of a SRQ, using both structured and open-ended items, or using SRQ responses for identifying differing groups of participants to be interviewed or otherwise more closely followed. The basic sin of behavioral scientists is to go to a group of participants to collect data only once without truly learning to understand the activities of the target group in detail, withdraw to a laboratory to analyze the data, and make categorical assessment of this or that characteristic of the participants. Minimizing contacts with the target group may be an economical way of collecting research data, but it does not help us to make scientific progress. Social scientific data and their proper interpretation rely upon an understanding of context and history.

In order to overcome such weaknesses, good research proposals aim at capturing developmental processes in terms of making repeated interviews, sampling and recording repeated experiences of certain kinds of events (event sampling; Reis & Gable, 2000), keeping a study log or reflective diary (Bolger et al., 2003), or observing the target phenomenon across a longer period of time. Collecting repeated measures data allows using a participant’s earlier performance as a basis of assessing subsequent ones (each participant functions as his or her own control) so as to examine variation between situations (rather than merely reporting individual differences). Mixed-method approach (Creswell & Plano, 2007) may, however, require special efforts for learning and appropriating methods of acquiring and analyzing data. Using several methods and adopting a developmental orientation is, however, justified, because it increases the possibility of creating and producing new knowledge. Collecting rich and multi-faceted data enables you to recover from mistakes by using complementary bodies of data: Sometimes it may happen that data collected by one method are limited and insufficient

(e.g., response rate of SRQ is very low; people refuse to be interviewed because of external reasons) for purposes of an academic thesis. When you have carefully piloted your instruments, it is easier to anticipate problems, and you are less likely to run into problems. Moreover, if you have collected data using complementary methods, you may use one set of data to compensate for weaknesses of another. It is also, often, useful to record the whole research process (meetings with the supervisor, meetings with participant groups, all documents produced and so on); if everything else fails, this will allow you to tell an interesting story of the failed investigation and analyze reasons in the background of it. Academic success is most of all meaningful and creative recovering of failures.

Describe, in the Method section, the operationalized basic idea of your investigation; what are relevant variables, perspectives, and stages of investigation from which you examine the participant groups. Operationalization is a process of explaining how the target phenomenon is going to be measured by defining your research concepts and describing the basic design of your research. Basically, each social scientific investigation is a **comparison** (as my teacher Keith Oatley used to say); it is useful to consider what comparisons are relevant in your study. The challenge is to provide detailed and comprehensive description regarding how your study will be carried out in concrete terms. International evaluators have noticed that descriptions of methods in proposals of Finnish investigators are often very vague and fuzzy in spite of otherwise sophisticated academic plans. When commenting of grant proposals of my doctoral students, I almost always have to criticize their method sections because of vagueness, lack of details, and half-finished methodological ideas. It is very demanding to describe your research design concretely enough so that an external evaluator would understand it; yet, this is the most important aspect of your proposal, the perfecting of which you need to invest great deal of time. Often it is beneficial to use tables and figures to illustrate the research design. Use your imagination; in many cases one picture is worth thousand words. Working out visualizations assists you to explicate, clarify, and structure your research ideas as well. Efforts to create a table or figure, may reveal white areas or blind spots that you have not considered before; taking them into consideration helps to improve the proposal. Inability to concretize your design is a sign that your proposal is at an immature stage and needs a great deal of more effort to be completed. In many cases, it is essential to cross-tabulate research questions, methods, and data in a way that provides a reader a immediate overview of the study.

Table 1. Research design (*table title above table, figure below figure*)

Research questions	Methods	Data
Question 1	self-report questionnaire, theme interview	Self-report questionnaire responses of all target students; using questionnaire data to sample students for theme interview
Question 2	Social network analysis; Video recorded participant observation	Social networking questionnaire data of students in targeted school classes; video-recorded observations of targeted learning processes in classes A and B
Question 3	Qualitative content analysis of student-created knowledge; study logs	Documents created by students to database of a technology-mediated learning environment from classroom A; study logs of students from classes A and B

Note. In a footnote to a table you can provide specific information

The Method section includes descriptions of the research instruments used in the study. These include describing and explaining, for instance, instructions to participants, informed consent, SRQ forms, other standardized test instruments, interview schemes, categorization guidelines of qualitative content analysis. Each new instrument has to be piloted with a few participants or their groups (depending on the design). It is often essential to have supervisors, fellow students, or family members to go through the newer instruments – often mistakes and illogicalities that are hard to identify are obvious to outsiders examining the instruments from a fresh perspective (As Linus Torvalds says, All bugs are shallow when there are enough eyeballs). From the perspective of successful research, it is critical that you do not proceed with collecting data on your own with instruments that have not been validated or confirmed by your supervisors, but ensure and ensure again that the instruments are sound and feasible. In some cases instruments are presented as appendixes of research proposals.

2.3 Analysis of data

The research proposal should include an explanation regarding how the research data are planned to be analyzed and examined. If you have piloted analytic methods in an earlier study or carried out a literature review of the topic, you can utilize it here while explaining your data analysis. If processing and analyzing the data involve several steps, you can describe them in this section using visual representations, when relevant. If you are planning to use technology-mediated research instruments, such as statistical programs (e.g., SPSS), programs for qualitative content analysis (e.g., ATLAS.ti) or instruments of video analysis (e.g., ELAN, TRANSANA, INTERACT), these should be explained here. It is good to describe instruments (especially if not well known), explain their benefits, and provide concrete descriptions of their usage.

2.4 Reliability and validity of analysis

Reliability indicates how systematically and confidently desired interpretations and conclusions can be made from the research data with the method employed to answer the research questions. Reliable investigations are ones that rely on comprehensive concepts and methods (in academic research simplicity is often beautiful). In many cases, social scientists, however, have to deal with messy, heterogeneous, fragmentary, and interpretation-laden bodies of data and research designs. Methods of qualitative content analysis vary from data-driven grounded theory to hierarchical content analysis focusing on examining frequency distributions across groups of participants. In the latter case, it is adequate to examine inter-coder reliability of classification by using at least two independent coders. Whatever methods are used, it is very important to make inferences and interpretations of investigators transparent by presenting categories of your classifications, their explanations and transcriptions of your data at parallel columns (so that reader can assess meaningfulness of the analysis).

The concept of validity, in turn, indicates whether you have succeeded in capturing the target phenomenon; that you have actually measured what you intended to measure. Reliability does not imply validity; but validity depends on reliable instruments. There are numerous studies that use instruments carefully measuring something (without, however, capturing the phenomenon of interest). You need to reflect yourself how to justify validity of your investigation; on what grounds do you argue that different instruments developed study assist in assessing the target, and that they have, in fact, the same target. By reflecting on reliability and validity in the method section of your proposal, you indicate sophisticated understanding of challenges and constraints of scientific studies in a way that makes your investigation stronger.

3. Expected results

This section, where results are yet to be determined, includes a hypothetical analysis regarding expected research results. Make a synthesis regarding what kind of results your study is likely to produce, without repeating what was said before. When relevant, illustrate with tables and figures.

3.1 Utilization and significance of results

If your results have not already been obtained, reflect what they would mean by putting them into the context of other investigations. How would they advance research? What would be the novelty that you have come by? How can the results be utilized? Pursuit of a thesis is not an end-in-itself but should serve scientific knowledge creation. In order to make a genuine contribution, the resulting knowledge should be fed back to investigated communities, using the results for raising public awareness of the investigated area or jointly reflecting of them. According to Novotny (2003), traditional disciplinary-based basic laboratory research (mode1) is giving space to multi-disciplinary research taking place in the context of application (mode2); such investigations are expected to have a societal impact. A good example of mode2 investigation is research and development of technology mediated learning environments; such investigations cannot be pursued merely in laboratories because the phenomena studied occur only in the fields of educational practices (compare Stokes, 1997). Beyond mere academic criteria (publications and citations), such investigations are expected to create socially validated, “socially robust” knowledge through close interaction between academic researchers and various communities of participants and users. Because of such considerations, democratization of research appears to play more and more important role in academic investigations. Therefore, it is a good idea to include a paragraph or a few sentences regarding involvement of your participants in shaping the research plan, collecting and interpreting the data and giving feedback.

3.2 Publication plan

Only after being published in a scientific journal, do investigations become a part of the body of scientific knowledge and a potential subject of re-utilization and citation. Master’s or doctoral theses as such are generally not solid items of scientific knowledge, but artifacts serving academic studies; their process of external review is absent or usually limited. Nevertheless, many, well planned master’s theses are of such high quality that they can be published in respected international (as well as national) journals, and become certified, if provisional, items of scientific knowledge. It is a good idea to suggest to your supervisor, already when beginning the process, that perhaps your thesis would be intended to be published as a co-authored scientific article; this may require both a commitment to collect a bit more extensive as well as multi-level data as well as proving of intensive supervision and support. Many social-scientific research groups have cultivated corresponding practices; supervisors agree to provide intensive support and assistance, from the beginning, in creating sophisticated research design; they undertake to support efforts to publish the end results as an article (Hakkarainen et al., 2013b; 2014; in press). In accordance with this, a part of my work as a research leader is to pick up promising students for scientific careers; these are ordinary competent and hardworking students who are inspired by academic research and willing to invest in developing and cultivating expertise in scientific research in education and psychology. In many cases, these students are recognized through my own teaching or participation in my research seminar, which provides ample opportunities to develop joint research interests. On the basis of the master’s thesis, we co-author an article; this creates a good starting point for pursuing an article-based dissertation (it will be the first article).

A best practice of for doing a doctoral thesis is to do an article thesis that will involve about four internationally published, co-authored articles and an introduction. In many cases, the published master's thesis will be the first article. It is a good idea to co-author dissertation articles because learning to do academic writing and publication is a very complex and challenging process. If you have an opportunity to socialize to corresponding practices under the guidance of an experienced researcher-practitioner, you will be in a much safer position for pursuing an academic career, if that is what you want. In natural sciences newcomers are socialized to write like scientists (Florence & Yore, 2004), whereas social science students are often not given any support and guidance regarding academic writing (Kamler, 2008; Kamler & Thomson, 2007). The best predictor of later academic productivity is publication of the dissertation and associated articles. In absence of adequate guidance, the social-science students who have learned to publish are seeking safe heavens of publications with lousy criteria of peer review, instead of rising academic standards (Kamler, 2008).

In any case, having publications is an important asset and distinction in professional work and makes it easier to return to do doctoral studies later on when so desired. Developing a research proposal as well as carrying out investigations is critically dependent on seeking critique and academic feedback. Because of this dependence, it is essential to utilize all possibilities for getting feedback on your research ideas, methods, and findings. In a good research proposal, the author has envisioned various ways of seeking such collective support and facilitation, such as participating in national and international conferences for presenting research results. It is beneficial to indicate that you have been thinking these kinds of things, even if publication appears as a distant issue when starting to write your proposal. Many foundations provide grants for participating in conferences; sharing your research ideas and preliminary results often provide very valuable information concerning how to advance and direct future investigations. Especially useful are doctoral consortiums in which you may meet other students who are interested in similar issues. It is better to go to conferences as early as possible.

When applying for funding, it is important to have a good proposal based on the present guidelines as well as some sort of publication history indicating that the applicant is able to produce scientific knowledge. Those applicants who have presented their studies in conferences as well as published their investigations in journals will have much better possibilities of getting funded than those without any publications whatsoever. From the perspective of a beginning investigator, orientation toward publishing is a matter of life and death; because of that, you need to seek your way to conferences and publication forums as soon as possible and courageously seek assistance and support from senior researchers. It is a part of the payback ethics of academic research that senior researchers provide newcomers similar guidance to that they have themselves received (and without which they may not have succeeded in becoming researchers at all).

It is very essential to describe your publication plan in your research proposal, especially when functioning at doctoral level. In the case of an article-based dissertation, perhaps one or two pages of the proposal are dedicated to explain publication of each of the three to four investigations. If you are planning to become a professional researcher, making an article-based dissertation is usually the only adequate solution. Even in the case where you intend to do a monograph (for instance, because of a huge ethnographic data in national language), it is useful to organize your dissertation into a series of complementary studies because this facilitates subsequent publication efforts. In any case, it is essential to use some space for explaining how the results are going to be published. Accumulation of your publication record is ultimately the most important indication of your progress and determines to a

(exception: block quotations in APA). In order to save time and effort, it is essential to start keeping a list of your references already during the planning process so that you do not need to search reference information all over again. I am often working with references when feeling too tired to contribute to the development of content.

I am asking my students to use references to specific page numbers economically; basically give page numbers only when there is a direct quotation or other clear indications that some issue has been presented in a specific place. It appears to be a consolidated practice to refer to articles and book chapters as a whole if there are not specific reasons to point out the exact place where the target issues has been addressed. It is important to use relevant and selective references indicating your familiarity with the research topic. Many researchers have a habit of both digging out classical studies as well as the newest references. Check that all references listed are mentioned in text and that you do not mention references that you have failed to list at the end. Notice that the names of academic journals are always capitalized, 'headline style'. Regarding publishers, you need only present the main body of their name (Sage) without extensions (INC, Publications).

If you have only limited space available for presenting your proposal, it is sometimes useful to use footnotes or end notes to present references; this may save time. Sometimes it is useful to present an expanded bibliography at a website to indicate the depth and coverage of your literature review.

Appendixes

When space allows, you can put your research instruments, instructions, data samples and other resources as appendixes of your proposal so as to facilitate evaluation of your study.

- interview scheme
- SRQ (esp. where unique to the study)
- categorization guidelines
- Instructions and informed consent
- Large statistical tables
- Long transcriptions of data
- Other relevant materials

Concluding remarks

Pursuit of academic research is most of all collective activity (Delamont et al., 2000; Hakkarainen et al., 2013; in press; Holmes, 2004; Knorr Cetina, 1999; Pyhältö et al, 2009; Vekkaila et al., 2012; Walker et al., 2008). Even if you are personally responsible of completing a thesis or a research project, academic research is a collaborative process success of which requires building on achievements of earlier generations and social sharing of investigation within and between research collectives. Professional research more and more often takes place in research groups and communities rather than relies on mere personal contributions of individual researchers. Research communities involve both junior and senior researchers, which facilitates effective horizontal (between peers) and vertical (between juniors and seniors) learning. A research community is an epistemic culture in nature, and its competence relies on cultivation of shared academic knowledge practices (Knorr Cetina, 1998; 2008; Hakkarainen, 2013a. Communities function as a part of national and international research networks. Although research communities compete with one another, it is usually constructive competition that

does not involve deliberate hiding of knowledge and competence; investigations are usually willing to share their knowledge and instruments because it helps them to expand their influence as well as gain social recognition within the academic community. A central aspect of academic practices is maximal openness that allows effective sharing of achievements. Only in some special cases, is it justifiable (temporarily) to constrain sharing of your achievements. I have never regretted sharing of my investigations, but several times realized that it would have been more beneficial to be even more open to sharing so as to have other people collaborate for building and creating knowledge with my community. Sometimes master's or doctoral students are afraid that others will steal their ideas; usually problems and issues investigated are, however, so complex that no one can master them alone; it is useful to have people doing parallel studies. It may be hard but not overwhelmingly difficult to find a unique perspective that helps to distinguish your own approach from those of the others.

Building on a research tradition versus pursuing novelty and innovation is the principal tension of all academic research (Kuhn, 1959). An investigator may hope to create new scientific knowledge only by capitalizing on tradition created by earlier generations of investigators, but a satisfactory result cannot be achieved only by replicating and recycling the tradition. This tension is visible when beginners sometimes ask whether they are allowed to think for themselves while doing research. Own thinking and making of personal interpretations is both desirable and necessary in planning and implementation of research. One's own ideas have, however, to capitalize on concepts, theories, methods and findings of preceding investigations so as to contribute to advancement of scientific knowledge and inquiry. A starting point of even a beginning investigator has to be that you are as smart and creative as experienced researchers whose publications you are referring to and whose lectures listening to. Your own ideas have value and significance, and you are able to advance scientific inquiry through persistent research efforts. It is important to set your objectives as high as possible and consider all your investigations as significant knowledge-creation projects. In all investigation, your own thinking and interpretations play a crucial role, whether we are talking about making a synthesis of research literature, interlinking earlier studies with your own inquiry, defining research problems, and operationalizing methods. All things considered, doing academic research is an extremely inspiring activity capitalizing on collective creativity in which participants can, together with fellow inquirers, strengthen and develop their best characteristics as well as carry forward the torch of scientific knowledge creation.

References

(My publications mentioned below are available in draft-form at my homepage:

[www.http://helsinki.academia.edu/KaiHakkarainen](http://helsinki.academia.edu/KaiHakkarainen))

Bakhtin, M. (1986). *Speech genres and other late essays*. Austin, TX: University of Texas Press.

Barron, B. (2006). Interest and self-sustained learning as catalyst of development: A learning ecology perspective. *Human Development*, 49, 193-224.

Bazerman, C. (1988). *Shaping written knowledge: The genre and activity of the experimental article in science*. Madison, WI: University of Wisconsin Press.

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology*, 54, 579-616.

Collins, A., Joseph, D., & Bielaczyc, K. (2004). Design research: Theoretical and methodological issues. *The Journal of the Learning Sciences*, 13, 15-42.

Creswell, J. & Plano Clark, V. (2007) *Designing and conducting mixed method research*. Thousand Oaks, CA: Sage

Delamont, S., Atkinson, P., & Odette, P. (2000). *The doctoral experience*. London, UK: Falmer.

Florence, M. K. & Yore, L. D. (2004). Learning to write like a scientist: Coauthoring as an enculturation task. *Journal of Research in Science Teaching*, 41, 637-668.

Gruber, H. (1981). *Darwin on man: A psychological study of scientific creativity*. Second Edition. Chicago, IL: The Chicago University Press.

Hakkarainen, K. (2008). Toward a triological approach to learning: Personal reflections. LLine – Lifelong Learning in Europe, 13, 22-29. https://www.academia.edu/350293/Draft_of_Hakkarainen_K_2008_Toward_a_trialogical_approach_to_learning_Personal_reflections

Hakkarainen, K. (2013a). Academic knowledge practices and quality of higher education. In Y. Nordkvelle, T. Fosslund, & G. Nettelund (Eds.). *Kvalitet i fleksibel høyere utdanning – nordiske perspektive* (Quality in ICT-supported higher education – Nordic perspectives) (pp. 113-127). Trondheim, Norway: Akademia” Forlag.

Hakkarainen K., (2013b). Mapping the research ground: Expertise, collective creativity, and shared knowledge practices. In H. Gaunt & H. Westerlund (Eds.), *Collaborative Learning in Higher Music Education* (pp. 13-26). Surrey; UK: Ashgate.

Hakkarainen, K., Hytönen, K., Lonka, K., & Makkonen, J. (2014a). How does collaborative authoring in doctoral programs socially shape practices of academic excellence. *Talent Development and Excellence*, 6, 11-30.

Hakkarainen, K., Hytönen, K., Makkonen, J., Lehtinen, E. (in press). Extending collective practices of doctoral education from natural to educational sciences. *Studies in Higher Education*. A draft available at:

[http://utu.academia.edu/KaiHakkarainen/Papers/1873327/A_draft_of_Hakkarainen_K._Hytonen_K._Makkonen_J._Lehtinen_E._in_preparation_.Promoting_knowledge-creating_practices_of_doctoral_educationHigher Education](http://utu.academia.edu/KaiHakkarainen/Papers/1873327/A_draft_of_Hakkarainen_K._Hytonen_K._Makkonen_J._Lehtinen_E._in_preparation_.Promoting_knowledge-creating_practices_of_doctoral_educationHigher_Education).

Hakkarainen, K., Hytönen, K., Makkonen, J., Seitamaa-Hakkarainen, P. & White, H. (2013). Interagency, collective creativity, and academic knowledge practices. In A Sannino & V. Ellis (Eds.), *Learning and collective creativity. Activity-theoretical and socio-cultural studies* (pp. 77-98). London, UK: Routledge.

Hakkarainen, K., Palonen, T., Paavola, S. & Lehtinen, E. (2004b). *Communities of networked expertise: Professional and educational perspectives*. Amsterdam, Hollanti: Elsevier.

- Hakkarainen, K., Wires, S., Stubb, J., Paavola, S., Pohjola, P., Lonka, K., & Pyhältö, K. (2014b). On personal and collective dimensions of agency in doctoral training: Medicine and natural science programs. *Studies in Continuing Education, 36*, 83-100. DOI: 10.1007/s10902-013-9455-6.
- Hanson, N. R. (1958). *Patterns of discovery*. Cambridge, MA: Cambridge University Press.
- Holland, D., Lachicotte, W., Skinner, D., & Cain, C. (1998). *Identity and agency in cultural worlds*. Cambridge, MA: Harvard University Press.
- Holmes, F. L. (2004). *Investigative pathways: Patterns and stages in the careers of experimental scientists*. New Haven, CT: Yale University Press.
- John-Steiner, V. (2000). *Creative collaboration*. Oxford, UK: Oxford University Press.
- Kamler, B. (2008). Rethinking doctoral publication practices: Writing from and beyond the thesis. *Higher Education, 33*, 283-294.
- Kamler, B. & Thomson, P. (2007). Rethinking doctoral work as text work and identity work. In B. Somekh & T. Schwand (Eds.), *Knowledge production: Research in interesting times* (pp. 166-179). London, UK: Routledge.
- Knorr Cetina, K. (1999). *Epistemic cultures: How the sciences make knowledge*. Cambridge, MA: Harvard University Press.
- Knorr-Cetina, K. (2001). Objectual practices. In T. Schatzki, Knorr-Cetina, K., & Von Savigny, E. (Eds.) *The practice turn in contemporary theory* (pp. 175-188). London: Routledge.
- Kuhn, T. (1959). *Essential tension: tradition and innovation in scientific research*. Chicago: IL: University of Chicago Press
- Lonka, K., Hakkarainen, K., Ferchen, M., & Lautso, A. (2010). *Psykologia! Psykkinen toiminta, oppiminen ja vuorovaikutus*. Helsinki: WSOY
- McAlpine, L. & Amundsen, C. (2008). Academic communities and the developing identity: The doctoral student journey. In P. Richards, (Ed.), *Global issues in higher education* (pp. 57-83). NY: Nova.
- Novotny, H. (2003). Dilemma of expertise. Democratising expertise and socially robust knowledge. *Science and Public Policy, 30* (3), 151-156.
- Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Modeling innovative knowledge communities: A knowledge-creation approach to learning. *Review of Educational Research, 74*, 557-576.
- Prior, P. A. (1998). *Writing/disciplinarity: A sociohistoric account of literate activity in the academy*. Mahwah, NJ: Erlbaum.

- Pyhältö, K., Stubb, J., & Lonka, K. (2009). Developing scholarly communities as learning environments for doctoral students. *International Journal for Academic Development, 14*, 221-232.
- Reis, H.T., & Gable, S.L. (2000). Event sampling and other methods for studying daily experience. In H. T. Reis & C. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 190-222). New York: Cambridge University Press.
- Rheingold, H. (2011). *Net smart: How to thrive online*. Cambridge, MA: MIT Press.
- Russell, D. A. (1997). Writing and genre in higher education and workplaces: A review of studies that use cultural-historical activity theory. *Mind, Activity, and Culture, 4*, 224-237.
- Stokes, D. E. (1997). *Pasteur's quadrant: Basic science and technological innovation*. Washington, DC: Brookings Institution Press.
- Vekkaila, J., Pyhältö, K., Hakkarainen, K., Stubb, J., & Lonka, K (2012). Doctoral students' key learning experiences in a top-level natural sciences research community. *International Journal for Researcher Development, 3*, 154-183.
- Walker, G. E., Golde, C. M., Jones, L., Conklin Bueschel, A., & Hutchins, P. (2008). *The formation of scholars*. San Francisco, CA: JosseyBass.
- Yin, R. K. (2009). *Case study research. Design and methods*. Applied Social Research Methods Series, Volume 5. Los Angeles, CA: Sage.