

GUIDELINES FOR WRITING AN INTERNATIONAL JOURNAL ARTICLE

Kai Hakkarainen

Institute of Behavioral Sciences, University of Helsinki

Email: kai.hakkarainen@helsinki.fi; Twitter: @kphakkar

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

(January 2015)

Preface

The purpose of the present guide is to share my experiences as a researcher and scientific supervisor regarding how to go about publishing one's research in an international journal article. An investigator's competence is more and more often assessed in Finland and elsewhere according to international publications, especially those in well-known internationally refereed journals. A significant proportion of a department's funding is provided according to its international publication record, notwithstanding whether we approve of this practice or not. Simultaneously, learning effective practices of international publication is extremely challenging for those young scholars (e.g., doctoral students) who are 'academic orphans.' I use this term for students who have been forced to learn principles and practices of scientific publication through their own trial and error efforts on self-defined projects, rather than appropriated them, in apprenticeships, from their own supervisors in existing, collective projects. Numerous personally promising, talented researchers fail—because they are so much on their own—to develop creatively intelligent academic knowledge practices related to academic publication; largely unassisted, they experience the challenges they encounter as insurmountable. Although it used to be possible, in some domains of social science, to function as an academic expert focused on teaching and national research (as it was possible in medicine in the 1950s and 60s), such an approach does not constitute an adequate strategy for adapting to the future. Rather, any young student seeking a career as professional researcher (which is required in most university teaching posts), must, by necessity, learn academic practices of international publication, that is, the associated processes of personal and collaborative publication described in the present or similar guides.

I will share, in this document, my experiences of developing practices of international publication within the domain of learning sciences (education and social sciences). These experiences aroused my interest in collective creativity in the process of academic knowledge-creation. By *collective creativity* I mean the productive capability that comes from cultivating (in this case) shared academic practices. As young students are socialized to these — undertake a kind of apprenticeship, in other words — they are assisted in reaching a higher level of academic performance than they would have achieved by merely building on individual talent and personal creativity. This higher level, of course, is the foundation for internationally recognized contributions to the body of knowledge in one's field. The apprenticeship of these students critically involves formulating research problems and methods and taking part in the production of co-authored articles in professionally organized, research communities. Natural sciences have cultivated such practices over many decades; one line of investigation of my group has focused on examining to what extent such collective practices of doctoral training may be extended from natural to social sciences. Together with my colleagues, I have collected interview data from scientific research leaders regarding how they are guiding and coaching their doctoral students to international publication. Nine interviewees represented leaders of highly regarded research communities of natural sciences (medicine, physics, and neuroscience). The others functioned in the field of educational research, being either oriented toward supervising article-based dissertations (12) and monograph dissertations (9). In addition, my collaborators and I have interviewed doctoral students from natural and educational

sciences (Hakkarainen et al., 2014b; Vekkaila et al., 2012) concerning the process of ‘growing up’ to be a researcher, especially in relation to scientific publication.

Simultaneously, I have functioned over the last couple years as an associate editor of the *Journal of the Learning Sciences*, being responsible for the informal learning track. This has given me a new editorial perspective on scientific publication, complementing my experience of writing articles and taking part in peer review. Some aspects of the present guide have been inspired by a presentation by Gruber, Sinatra, and Säljö (2012). The purpose of the present guide is to share my experiences with young researchers of social sciences who are submitting their first manuscripts for publication. Simultaneously, I hope that the ideas presented will also inspire more experienced researchers. I have formerly written a Finnish version of this guide, but wanted to make this document available also to international students studying in Finland and elsewhere. I have constructed also another guide regarding the structure and content of an academic research proposal that is available at my academia.edu site (Hakkarainen, 2014).

This is not merely a technical guide regarding the processes and stages of academic publication. My intention is also to introduce readers to the results of scientific investigation and concepts regarding the process of academic *knowledge creation* in general and to publication-related knowledge practices in particular, and to the associated framework of *collective creativity* we have been developing. In short, I believe it will be of benefit to new researchers to gain a social scientific understanding of the process in which they participate. This paper, further, will focus extensively and in detail on giving guidance regarding publication of empirical research articles (as distinct from theoretical or review papers). I would be very happy to receive feedback regarding this guide; what aspects of it appear to function well and where there are areas in need of improvement. Let me know your ideas of how this guide could be concretized and deepened.

I will first address the principal aspects of academic writing and different types of scientific publications. After that I will address the following phases of publication: transformation of a research report toward an article submission, selection of a publication forum, understanding and responding to peer review, and making review corrections. After that, I will examine collaborative authoring and the role of collective creativity when reaching toward more demanding publication forums.

Academic writing as an expansive knowledge practice

In the academic world, a significant part of interaction and discourse is mediated by writing. In social sciences, writing is the most important intellectual tool on which learning of scientific thinking relies. I will examine **writing as an academic knowledge practice, i.e., an innovative social practice related to creative working with knowledge** (Hakkarainen, 2009; Ritella & Hakkarainen, 2012). Academic writing is a central aspect of scientific work whether one is talking about posing research questions, framing investigations, reporting results or publishing articles (Pare & McAlpine, forthcoming). There are no workplaces where workers write as intensively as at the university. Publication-oriented literate activity is not, however, mere production of text but is anchored in a whole network of related activities, such as reading and discussing, searching for information, and analyzing results (Prior & Shipka, 2003). Publication-related academic knowledge practices are multi-layered and distributed in their nature; investigators work with their texts across multiple places (home, office, library), engage in successive cycles of producing, reflecting, and modifying text, as well as complement their personal efforts with collaborative processes discussing, commenting on, and getting feedback on the texts produced. Scientific seminars organized around texts produced by students play an important role in socializing newcomers to

academic knowledge practices and facilitating their growth toward becoming academic experts of their fields (Dysthe, 2002; Kamler, 2008). Tacit knowledge of academic practices is mediated by various academic practices, such as seminars sessions and supervisory meetings between students and their teachers. Extended working to develop more refined versions of shared epistemic artifacts, here, also called *objects* (e.g., texts created by students;) play a crucial role in knowledge-creation efforts (Paavola & Hakkarainen, 2014; Ritella & Hakkarainen, 2012).

Academic writing calls for extended socialization into collective disciplinary practices (Prior, 2006). Learning academic writing is an extended, messy struggle for acquiring embodied, implicit, and tacit capabilities, rather than mere assimilation of some well-specified skills (Russell, 1997). Cultivation of the competencies of academic writing requires long-standing efforts to work at the edge of one's competence and gradual consolidation of emerging capabilities. In social sciences, it is not hard to find experts in methodology (Hakkarainen et al., 2014a), but growing up to become a writer who is able to produce well-structured texts, reasoned arguments, and sophisticated academic texts, is much harder. Also in natural sciences, one of the most important key competences is to be able, through writing, to construct good accounts (essentially 'stories') that integrate in a coherent way research problems, methods, and results. Problems and challenges of scientific writing constitute one of the most common reasons for failing to complete academic studies (Lonka, 2003) and obtain a degree. Thus it will be beneficial—even life saving—to learn to reflect on various practices of academic writing using concepts and theories of knowledge-creation research.

Research on human intellectual evolution indicates that scientific thinking is not possible without writing, i.e., elaboration of ideas by External Memory Fields (EXMFs) provided by paper and pencil or a computer screen (Donald, 1991; 2001). **Only external representation of knowledge enables systematic construction of complex conceptually and logically coherent epistemic artifacts and their systems on which knowledge creation relies.** In order to become an effective academic researcher-publisher (i.e., researcher oriented toward effective publication), you have to engage in sustained efforts to develop capabilities of giving written form to your ideas and thoughts. Writing is not so much a process of externalizing internal thought as a process of creating, developing and extending novel ideas in successive and mutually supportive internal and external processing of knowledge. Externalization is a creative process so that, in many cases, new ideas emerge at the boundary surface of constructing knowledge documents. When the Nobel-winning American physicist Richard Feynman gave a manuscript full of text and diagrams to Charles Weiner, who was investigating the history of his thought, the latter asked if this was "a record of the day-to-day working". "I actually did the work on the paper," Feynman responded. Slightly confused Weiner specified: "Well, the work was done in your head, but the record of it is still here." "No, it's not a record, not really. It's working. You have to work on paper, and this is the paper. Okay?" (with minor modifications quoted from Gleick, 1992, p. 409 and Donald, 2001, p. 301). Going through a demanding thinking process is not possible by internal processing alone but requires extended intellectual and creative resources only provided by writing-based working with externalized knowledge. Simultaneously, intensive participation in academic writing gradually also remediates and reshapes academic processes related to the internal processing of knowledge as well as social interaction (Ong, 1982).

Academic writing plays a central role in *object-oriented* knowledge practices. By this term, I mean practices mediated by documents (diagrams, and so on) created, developed, and extended by participants; such epistemic artifacts constitute—we say--objects with which we can be in interaction (Bereiter 2002, Ritella & Hakkarainen, 2012; Paavola, Lipponen, & Hakkarainen 2014). We are talking about object-oriented knowledge practices because externalization, crystallization, and materialization of intellectual and creative processes to shareable epistemic artifacts

appear to constitute the essence of such practices. Such *objects* can be shared and further elaborated through personal and collaborative processes. In pursuit of novelty, deliberate efforts in using externalized textual objects as a stepping stones for reaching beyond current epistemic horizon play a crucial role. As Knorr Cetina (1996; 2001) has proposed, **representing ideas as externalized texts, graphs or models gives implicit hints regarding what is missing from the picture as well as tacit directions regarding promising lines of subsequent inquiry**. Textually represented ideas can be infinitely elaborated, refined, extended and risen above, and used as a basis of new interpretation (Bereiter, 2002; Paavola et al., 2004). Creating an extended network of epistemic artifacts elicits and grounds subsequent pursuit of deepening cycles of inquiry. By relying on externalized ideas, a participant may, so to speak, propel themselves from the known to unknown territory of inquiry. This appears to constitute an essential aspect of the material foundations of scientific thinking.

Academic writing relies on historically evolving, but relatively stable discipline-specific practices of creating and producing knowledge. i.e., genre (Bazerman, 1988; 2004b; Hyland, 2004; Prior, 1998; Swales, 2004). Scientific genre may be seen as a socially and culturally recognizable form of textually mediated practice of creating, representing, structuring, and warranting knowledge and presenting arguments (Bazerman, 1988). How is scientific knowledge to be represented and investigations framed, argument presented and interpretations justified? An academic researcher has to master a whole set of complementary genres from scientific research reports from journal articles to conference papers and presentation representing various aspects of their activity. Each research field has its own norms and principles guiding and regulating knowledge production. In order to participate in the practices of a scientific community, it is essential for students to learn the conventions and ways of thinking typical of that specific literary tradition. They have to learn how to use the language of their own specialty in accordance with disciplinary norms and regulative conventions. Such practices play an important role in representing knowledge, thinking conceptually, making scientific interpretations, and pursuing theory formation. Internalizing genre simplifies a researcher's tasks and channels his or her efforts in a way that elicits and fosters scientific publication. When other senior researchers or I am criticizing students texts, we do it from the perspective of scientific genre. Those aspects of text that diverge from genre are easily visible and conspicuous to us although deviations from the genre could be hard for a newcomer to perceive.

Genre norms support mutual interaction and communication between researchers because they assist in determining what information is presented in each part of an article and how various kinds of knowledge claims are to be justified and interpreted. As stated latter on, an crucial aspect of scientific genre is structuring article manuscripts according to **Introduction, Method, Results, and Discussion (IMRD)**, Bazerman, 1988; Johns & Swales, 2002) structure. A central aspect of genre anchored on this structure, is separating knowledge claims from their evidence, reasons or justifications. In spite of many other differences, similar practices of structuring scientific publications are used across disciplines. The shared structure enables researchers to find relevant information regarding theoretical framing, methodological choices, and significance of results from various articles without having to read them sentence by sentence. Although it is possible to diverge from the structure when you have a good reason to do so, the IMRD structure provides a productive framework for reporting various kinds of studies. Because of that my instruction for newcomers is to focus on internalizing the IMRD structure before trying to change it. Genre can productively be changed only after it has been learned. Newcomers' challenges of scientific publication are partially explained by the fact that it hard to appropriate a disciplinary genre that is, to a great extent, based on implicit and tacit knowledge. Rules for production are often not directly taught. Learning the genre is also challenging for newcomers because they do not have meta-language (e.g., concepts) for reflecting on various aspects of their academic knowledge practices. I

have created this guide to provide junior researchers with meta-level concepts and associated practices that support articulation and reflection of various aspects of academic knowledge creation. These concepts and practices derive from the social scientific investigation of the knowledge production process itself.

Academic writing is an intertextual (Bakhtin, 1981) process involving rich relations of a given text to other texts surrounding it (Bazerman, 2004a; Prior 1998). Scientific knowledge cannot be created from scratch but emerges from building on, extending, and rising above earlier knowledge. Intertextuality implies that all scientific texts refer to other texts explicitly (references) or implicitly (e.g., similarities in terms of style). It is challenging to present ideas on your own words, when each word "is half someone else's" (Bakhtin, 1981; as mentioned by Prior 1988). In order to learn how to publish, the PhD students have to learn how to relate their own arguments to other investigations and how to adequately frame their own study in their text. Framing implies anchoring your own investigation to a certain paradigm, theoretic framework, or line of earlier empirical investigations. Knowledge claims have to be anchored in scientific references. Citation has been characterized as domain-specific "scholarly bricklaying" that assists in making justifiable knowledge claims and acknowledging disciplinary borders (Florence & Yore, 2004). There is a great deal of disciplinary variation in the shared frame of reference. Intertextuality is constantly and historically developing. For instance, natural sciences often rely on well-defined shared assumptions, whereas in social sciences, skillful contextualizing of one's claims and arguments is highly valued (Bazerman, 1988). Although academic writing requires acknowledging your sources by reference, general expressions of scientific prose do not belong to any individual researchers but represent a collectively shared, linguistic repertoire of the field constituting an essential part of the genre. Through sustained academic socialization such a disciplinary repertoire of linguistic instruments gradually is internalized as a part of an individual's own thinking and academic activity.

Academic writing serves both creation of new ideas and communication of one's own investigations to an audience. Newcomers have to learn to separate their theory from supporting evidence and justify their knowledge claims in a transparent and defensible way. Such rhetorical aspects of scientific texts tend to remain invisible for novice writers, who often take scientific knowledge as given content to be memorized and internalized (Bereiter & Scardamalia, 1987; Geisler, 1994; Olson, 1994). It is typical for a novice to simply tell what they know about issue they are writing about, whereas an expert in writing aims at transforming and extending knowledge in interaction between their own knowledge and argumentation and toward anticipated readers. Novices function, until very far of their academic studies, in a content space and give only minimal attention to rhetorical aspects of communicating with an audience (Bereiter & Scardamalia, 1987; Geisler, 1994; Lonka, 2003). **Experts work constantly with content in relation to how to frame, structure, and justify arguments in such a way that ideas can be effectively be communicated to external experts. Such cyclic efforts of working with content and argumentation lead to generation of new ideas and transformation of knowledge.** Hence it is important to cultivate one's awareness of rhetorical aspects of knowledge creation so as to be able to frame, justify, and communicate one's ideas in a scientifically acceptable way (Bazerman, 1988; Hyland, 2004; Pare & McAlpine, forthcoming). As argued later on, scientific publication in refereed journals is a process of socially (inter-subjectively) validating how well authors succeed in communicating their ideas to readers coming from another context. Critical peer review comments explicate which aspects of one's study do not communicate very well (Gruber, Sinatra, & Säljö, 2012).

As investigations of Lonka and her colleagues (2003; 2014) have revealed, students often experience academic writing as an anxiety-laden process. Challenges of writing make students reportedly feel frustration, incompetence, confusion, and burnout; such negative experiences lead easily to withdrawal from writing tasks, extended procrastination, and immobilizing perfectionism (see, e.g., Boice, 1993). Associated with such writing blocks appear to be unnecessarily rigid writing routines, a propensity of engage in early surface-level text editing, and constrained strategies of managing complex knowledge structures (Kamler & Thomson, 2007). Learning academic writing is demanding because it is not only about adopting disciplinary concepts and theories, but requires practical mastery of disciplinary knowledge practices and associated methods of activity. It is challenging to learn to a) give written expression to one's ideas (often students' texts do not say what they mean), b) produce text adequately anchored in disciplinary genre, c) find one's own voice in spite of the profound intertextuality of academic writing, and d) orient toward transformative working with knowledge, e) effectively communicate ideas and thoughts to readers coming from more or less dissimilar contexts. Students also need to learn how to adopt the corresponding authoring role and respective social position in the community. Academic writing has been characterized as a parallel process of textual and identity work taking place "in and through" writing (Kamler & Thomson, 2007; McAlpine & Admunsen, 2008); only through such a process, is it possible to develop one's identity as a potential builder and creator of knowledge (Kamler, 2008, Kamler & Thomson, 2007). At the same time, students have to learn "how to take an authoritative stance in a field of expert others, and assert their contribution to that field before they feel authoritative" (Kamler, 2008, p. 286). Epistemic artifacts produced by writing often become public, and this is likely to make junior authors feel vulnerable. Writing for publication presupposes a student taking an authoritative position in front of an infinite number of present and future critics before he or she experiences being authoritative at all. In many cases, students produce weak texts because they do not have the courage to improvise and develop their ideas but instead reproduce knowledge created by others. It follows that they end up in reproducing and describing information, rather than generating advanced, knowledge-creating discourse. As argued latter on, co-authoring involved more experienced researchers carrying a part of the socio-emotional and intellectual burden, supporting students doing the identity work that growing up to be an effective knowledge creator requires (Hakkarainen et al., 2014a; Kamler, 2008; Kamler & Thomson, 2007).

Writing for publication is especially challenging for those who are using English as a second language. Many European senior researchers, within fields of social science, do not have strong experiences in international publication. Although the young generation has better competencies of international communication than older ones who have grown up in homogeneous cultures, it is challenging to learn to produce English text based on scientific genre. Experiences indicate, however, that writing in English will gradually develop when you engage in intensive and resilient production of text; when you initially capitalize on distributed support and resources of supervisors and more skillful peers, and obtain the assistance of a professional native English-language editor. It appears essential to initially focus on maximal productivity and only gradually raise standards in relation to quality of English language writing in early drafts. Most nonnative researchers who are actively engaged in international publication have to utilize external English language experts for perfecting the use of articles, prepositions and other technical aspects of text produced.

Three types of publication

Merja and Mauri are doctoral students applying for grants from a well-known Finnish private foundation. Both of them have impressive academic records, including highest marks from their master's theses in the field of education. They have pursued doctoral studies for several years and hope to get funded in order to complete their theses. They are writing scientific monographs in Finnish on innovative topics. They also have ambitious post-doctoral plans. Nevertheless, there is one obvious limitation to an internationally oriented investigator. Neither of them has any internationally refereed journal articles. As "refereed" articles, they have listed several conference presentations and two or three research reports published within a departmental publication series. While the content and quality of their work is at the international level or close to it, they are not themselves full participants in international scientific discourse communities. The focus of their activity has been to produce scientific information within national fields of knowledge. In spite of research ideas and designs compatible with a more ambitious plan of international scope for advancing scientific knowledge, simple completion of the doctoral degree, per se, appears to be the main object of their activity.

I used the above case description as an introduction to a successful research proposal to the academy of Finland (together with Kirsti Lonka and Kirsi Pyhältö); the project focused on examining collective creativity of academic research, especially in relation to scientific publication. I had encountered people like the above described young researchers, when evaluating a grant proposal for a well-known Finnish private foundation. I was wondering why individually, most intelligent and talented investigators are not fulfilling their promise because they rely on suboptimal knowledge practices; the collective aspect of their endeavor does not embrace communities of experts outside the students' own university. I acknowledged being myself among Merja and Mauri, but later on I developed, within my research community, new practices of collaborative academic knowledge creation. It appeared to me that many doctoral students' publication efforts, when occurring, emerged as continuation and extension of knowledge practices spontaneously developed in earlier (somewhat dissimilar) academic studies. In my own case as well as in context of other students, practices of creating textual objects in earlier academic studies appeared to mainly serve one's own learning and crystallize its results, without the textual objects being deliberately intended to communicate ideas and thoughts to a larger community of external readers. In the case of Merja and Mauri, it was also evident that they did not adequately understand the nature and significance of peer reviewed journal publications. They did not have a clear understanding how documents produced without peer review, for local purposes and with local criteria, differed from peer-reviewed articles.

Recognition of various types of publication is cultural knowledge that publication-oriented research groups share with newcomers. When international publication practices are not adequately rooted in the domain of social scientific investigation, the supervisors cannot transmit to their students concrete understanding of the process of international publication. That was the situation in natural sciences in the 60s, psychology in the 80s and educational research in the 80s; an extended process of inter-generational learning had to be gone through before publication cultures changed first in natural sciences and then in psychology (Hakkarainen, et al., in press). In relation to international publication, students in domains of social scientific research are generally still academic orphans, which is unfortunate.

In what follows, I will examine a learning trajectory of scientific publication and associated challenges by using as an example the three waves of publication that occurred in the history of my

own research group; 1) cemetery publications, 2) who-you-know publications, and 3) journal articles (Hakkarainen et al., 2014a; Hytönen et al., 2012; Figure 1). Although my own and my community's learning took place relatively slowly, I hope that by capitalization on guidelines crystallized to this document, you will be able, so to speak, to jump to appropriating the most advanced practices of publication. I created my own research group (Centre for Research on Networked Learning and Knowledge Building (see http://www.helsinki.fi/science/networked_learning/en/) after returning from doctoral studies at the University of Toronto. My group was completely funded by external research grants; initially there were 2-3 researchers, but then the group grew to more than 10 doctoral students and a postdoc community. Because of inexperience as academic researchers, we were not initially able to make a clear differentiation between different types of publication, but tended to see all publication as equally valuable in relation to impact and being a potential subject of citation.

The first wave of publication was constituted by non-refereed research reports that we have, just like many other social scientists, learned to produce for departmental series and purposes of external funders. My own teachers at the Department of Psychology had guided me to produce such reports; only some professors were oriented toward international publication at that time. In many cases, external public organizations (e.g., provincial school authorities; EC) funding our research valued collaboration with university and were motivated to publish research reports in the own publication series. Production of such reports was very labor-intensive in nature because those were in many cases hundreds of pages long and included numerous tables and figures. Some of them were pretty very well written, and knowledge produced was considered to have a great deal of local significance. The problem was, however, that these research reports did not involve any sort of peer review. There was varying readership but, in most cases, it was rather limited. After completion of the associated project, such reports tended to disappear to “cemetries of knowledge”; they become very hard to find. I call these publications ‘**cemetery publications**’ because they do not have permanent value in relation to academic merit or, subsequently, to citation and reuse. The first publication wave of my research community consisted almost completely of the cemetery publications (Level 1, Figure 1).

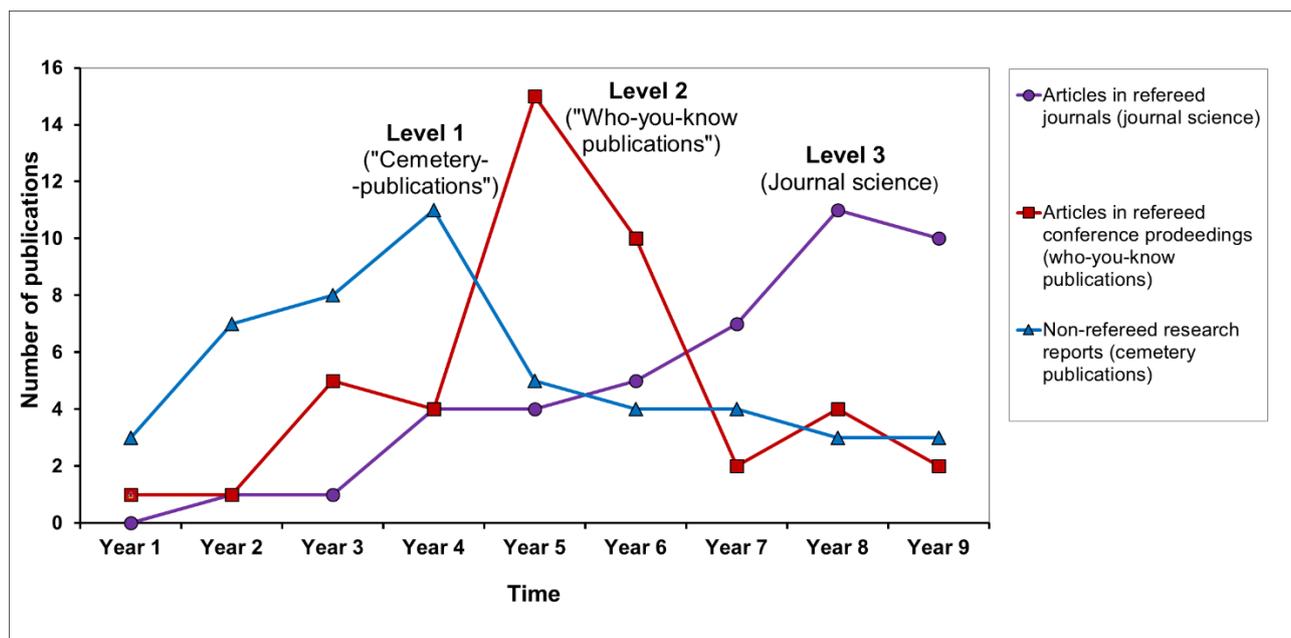


Figure 1. Cultural learning of scientific publication at the Centre of Networked Learning and Knowledge Building (Hakkarainen et al., 2014b; Hytönen et al., 2012).

My department had a very productive practice of requiring every researcher, from an individual doctoral student to a national centre of excellence, to take part in an annual workshop for publicly reporting their productively. It was not too easy to go there and report merely a conference abstract or a non-refereed research report. Simultaneously, the workshops provided an access to a collective zone of proximal development (Engeström, 1987), i.e., more advanced publication practices of more professionally organized research communities in a way that pushed people to stretch resources for learning to do international publication. In spite of being constrained by external funding for applying research, we had learned to participate actively in scientific conferences of our domain. On the basis of that, it was natural to orient next to production of conference papers. By conference papers I mean full papers (8-10 pages, 5000-7000 words) published in proceedings volumes of conferences as separated from mere conference abstracts or presentations that are not actual publications. This category could also involve chapters in edited books.

The value of annual or biannual conferences is that you come to know investigators from other countries working in the same field. It follows, however, that peer reviewing of a conference is carried out by investigators who likely already know you and your supervisor. So these publications may be called '**who-you-know**' publications. Many conferences are dependent on a large number of participants, and they tend to accept some mediocre and weak submissions. The level of peer review varies from superficial and ritual to averagely rigorous. Even if only 20% of submissions would be accepted, there are many weak and half-baked among the accepted ones. In spite of highly regarded conferences requiring submissions to be corrected, there are only a few procedures or mechanisms for ensuring that corrections have actually been completed. When I applied, for the first time, an academic position, most of the evaluators did not consider tens of conference papers as having any kind of merit. A common academic practice in many fields is that conference papers are not usually cited at all because of not being considered as a validated aspect of scientific knowledge. Nevertheless, there appear to be some differences between domains of knowledge. In some rapidly evolving domains, such as computer science, a great deal of knowledge production takes place through conferences, and criteria of acceptance is claimed to be higher. All things considered, I would not count on such conference publications being considered equally valuable as journal articles.

On the basis of such experiences, I decided to focus efforts of my research community on creating a third wave of publication consisting mostly of internationally refereed **journal articles**. A journal article represents a more compact epistemic artifact than a research report; their lengths vary from 5000 to 12000 words. Journal articles appear in journals shared by various research communities and networks. "Journal science" (Fleck, 1979) is a very different academic ball game because article manuscripts go through more or less rigorous peer review. Peer review is carried out by academic investigators who come from a different context or framework and do not personally know authors submitting an article or their research tradition. In order to be published, the manuscript has to convince investigators beyond the local community, communicate also to those not familiar with one's own tradition, and inspire interest of investigators who represent different research paradigm. The evaluators are investigators who have themselves gone successfully through peer review process at the targeted journal. The manuscript goes through 2-4 cycles of corrections that could altogether take 6 months to more than one year during which the manuscript is repeatedly corrected and improved according the reviewers' criticism. Comments require and oftentimes also "kick" participants to take their inquiry deeper than they would have originally been willing to go. From the perspective of the researcher, it makes sense to go through all this trouble because only a manuscript that has been "pressed" through the review process will become a durable part of the academic record and subject to citation also in distant future.

Moving to successively more demanding waves of publication was initially very demanding for the participants who were struggling with many external and internal constraints. It was necessary to practically explore and gradually test whether it was possible to reach the more demanding level of journal science. We did not have any difficulties in the beginning to understand that you either "Publish or Perish" in academic work; this cognitive belief did not, however, enable us to produce even a single journal publication. After appropriating academic knowledge practices supporting journal science, however, we were able to focus our limited resources more meaningfully and reach at a higher level of cultural accomplishment, in spite of our basic academic skills and the nature of our investigations remaining otherwise pretty similar. After going through the above described expansive transformation from cemetery to journal publications, we did not any more understand what had been so difficult about it. Production of articles became an integral aspect of our everyday activity so that whatever we did, tended to produce publications. I see such a demanding process of expansive (Engeström, 1987) or cultural learning (Tomasello, 1999) in terms of appropriating a novel cognitive-cultural operating system of knowledge creating activity (Donald, 2001); **it is a matter of gradual cultural reprogramming or formatting of activity to elicit deliberate pursuit of publication.** After you have adopted cultural models or scripts (Schank, 1999) partially based on implicit or tacit knowledge, international publication may become your second nature; an integrated aspect of your everyday activity.

Many excellent researchers, who well understand how important it would be to learn to publish, experience learning of international publication as an insurmountable challenge. Partially because of this reason, a small proportion of researchers, approximately 20%, produce most of scientific publications.¹ The best predictor of learn publication rate is publication of doctoral dissertations; **participants who do not learn to publish while pursuing their doctoral studies, are not likely to learn it later on** (Kamler, 2008; Kamler & Thomson, 2007). I became interested in collective creativity of academic research after noticing that newcomers of my groups did not have to go through as long-standing and demanding development as was required from me and the other original members of my group. It was possible to socialize the newcomers immediately to the most advanced knowledge practices and associated implicit and tacit knowledge that orientation toward journal publication required (Hakkarainen et al., 2014a). A central aspect of my academic practices is early socialization of master's students to journal science by writing a co-authored international article on the basis of their master's thesis. When given sufficient collective support and guidance, almost any innovative and motivated student (one who met the admission criteria of their program) may learn to become an international researcher-publisher. A central motivation of writing this guide has been to provide junior, but perhaps also some senior ones, scaffolding that assists in reaching toward demanding practices of journal science within the field of social science. In what follows, I will describe, in a more detailed way, practices and principles of publishing an empirical research article, so as to explicate a part of the associated tacit, implicit, and hidden knowledge that you need to appropriate for successful pursuit of journal publication.

¹ It is possible to examine various investigators publications and citations by installing open-source based Publish or Perish program (<http://www.harzing.com>) to one's computer; it used Google Scholar data. In spite of certain limitations, such including unqualified sources and not excluding self-citations, the program gives a rough picture of an investigators publication and citation record. This program provides one of a few ways of comparing citations across disciplines.

From an innovative investigation to a manuscript of international article submission

The first challenge of scientific publication is to carry out a scientific investigation that is a potential target of international publication. Although any kind of innovatively implemented study would do, I will examine in the following sections how to transform a master's thesis to a manuscript of an international article. This is because a master's thesis constitutes, in the case of many junior researchers, the first sufficiently ambitious research project. Although international publication in general and journal science in particular, is only currently becoming stabilized in many fields of social science, Finnish academic education is of a high quality. As a consequence, approximately 1/3 of master's theses of those domains (psychology, education, teacher training) I am familiar with produce rigorously analyzed and interesting enough results to be internationally publishable. The proportion of cutting-edge studies could be deliberately extended with supervision orientation toward publication. With those students who are willing to publish their theses as a co-authored international journal article, we agree about collecting somewhat more extensive and multi-level data (see Hakkarainen, 2014 for instructions of creating an associated academic research proposal). Rather than collecting data with only one method (e.g., interview), we usually use several complementary methods, such as using self-report questionnaire to identify people to be interviewed or combined resources of social network analysis, interview, and diary method; this allows us to access interesting social science phenomena otherwise beyond reach. Sometimes a student has an innovative idea that is expanded with those of my own; other times the student actually joins one of my research projects, so that there emerges a shared object of inquiry (about importance of shared research objects, see Hakkarainen et al., in press). Many of these students, later on, become my doctoral students.

The genre of the traditional master's thesis, within the field of social sciences, however, differs from journal articles. Although master's theses have evolved in many disciplines toward journal articles, they are often 50-70 pages long (approximately 15,000-30,000 words). Such study documents involve an extensive theoretical introduction or literature review involving a large body of references going in divergent directions; often in a less-than-integrated way. Also the results section is likely to be very extensive and multi-faceted, so that it is not easy to force it into the format of an article manuscript. Innovative departments and faculties allow also making master's theses whose structure, content and length corresponds to that of scientific articles. Some students are willing and capable of writing their theses in English, and there have not been problems in their acceptance. I supervise my students from the very beginning to produce texts that correspond closely to the structure and content of journal articles. From the perspective of learning academic knowledge practices, it would be best, in my opinion, if a master's thesis generally would be, essentially, a manuscript of a co-authored international journal article. Even if a supervisor did take some part in writing such an epistemic artifact, participation in international scientific discourse through the manuscript would require the student to stretch his or her abilities much more than would usually happen in the case of a high-quality traditional thesis. I consider such an article-based master's thesis to have merits and benefits going beyond those that commonly come from producing a monograph thesis relying on local criteria.

In many cases, students are, however, academically socialized to produce extensive research reports corresponding to the traditional master's thesis. In such cases, I give my students a framework presented in Table 1 for transforming the master's thesis toward a journal article manuscript. The structure of this framework corresponds to the Introduction-Method-Results-Discussion (IMRD) structure addressed above. In Appendix A, I present a more extensive description of the structure of an article manuscript and the content of each section; it correspond to guidelines given

to my students. Although the basic structure of master's thesis and article manuscript correspond closely to one another, the latter is a much more compact and coherent epistemic artifact in nature.

Table 1. Basic structure of article manuscript in social sciences

Sub section of article	Length	Content
Title	(words)	Simple and striking (memorable) but expressive
Authors		Authors in order of the importance of their contribution to the investigation and writing of article. Authors in order of importance are: 1. author, 2. author, last author (usually research leader), and then other authors from 3. to the rest.
Abstract	150-200	Crystallize the purpose of the study, methods, results and significance. Usually written after everything else has been completed.
Keywords		A set of key concepts anchoring the study to a research tradition or line of inquiry
1. Introduction	1000-1200	A few-page introduction summarizing earlier research and determining the gap of knowledge, filling of which is the aim of the research. The introduction explains theoretical foundations and defines key concepts to be used in other parts of the study. Introduction starts by crystallizing the purpose of the study (problem statement) and ends up at research aims (goals) which are made specific in posed research questions or hypotheses.
1.1 Theoretical framework		
1.2 Research aims (goals)		
2. Methods	2000-2300	Research methods should be described in a so-detailed way that the study could, in principle, be replicated by an external researcher. Although other parts of the investigation have to be compressed, it is essential to describe research methods details (participants, context, design, data acquisition, data analysis). Research methods should be structured according to methods (what methods answer what questions).
2.1 Participants		
2.2 Data acquisition		
2.3 Data analysis		
3. Results	2500-3000	Presenting main research results with tables and figures. In social scientific studies it is often important to describe side-by-side results of quantitative and qualitative analysis as well as let one's data to speak by presenting transcriptions of them. The results should be structured according to the research questions. When necessary, research questions should be restructured and reconstructed so that you ask in questions whatever remain as the results of your study. The results section focuses on merely describing results with local synthesizing comments; higher level interpretations belong to discussion. A low-level summary of the extent to which the research questions were, respectively, answered by the results is properly put at the end of the results section.
3.1 Research question 1		
3.2 Research question 2		
3.3 Research question 3		
4. Discussion	1000	The discussion looks over, at a higher level, the extent to which research questions were answered by results and possibilities why. The discussion involves rising above the results in terms of synthesizing them in relation to earlier studies and theories and assessing their significance. It is also essential to assess methodological limitations of the study, especially reliability and validity.
4.1 Synthesizing results		
4.2 Significance of results		
4.3 Methodological limitation		
Contributions by all authors		In this section, it is explained authors' division of cognitive labor, acknowledged sources of funding (project numbers), and thanked collaborators.
References	500-1000	It is essential to refer to earlier studies, ones actually mentioned in the text, to anchor the study to the research tradition that it aims at extending. References should be carefully selected because you have only limited space and need to acknowledge earlier investigations functioning in the field.
Appendixes		Put larger tables or figures as appendixes
Total	7000-8000	The length of the manuscript depends on the targeted journal (read instructions for authors provided by journal websites carefully). Most journals publish very compact studies (5000-6000 words), some others accept longer contributions (10,000-12,000 words). In natural sciences articles are, of course, much shorter.

Although the basic structure of master's thesis and article manuscript correspond closely to one another, the latter is a much more compact and coherent epistemic artifact in nature. This means that a master's thesis' extensive 20-30 pages literature review has to be compressed to a two- or three-page introduction that crystallizes results of earlier research and explains central concepts of the study. A good master's thesis already has well-defined research questions. The method section usually does not have to be so much compressed. The results section usually needs to be radically compressed because in an article you cannot have too many results with associated tables and figures. The discussion also needs to be compressed to a few pages. In an article you cannot have any other than the most important references. Although Finnish master's theses sometimes involve references to secondary sources and general method books, you need to anchor a journal article on original and preferably international references. Carefully selected references assist in building a firm foundation on which theoretical and methodological assumptions rely.

Although transforming a master's thesis to an international article may require considerable efforts, including those needed for translating it, creating a rough manuscript do not usually take more than a few weeks (and much less from an expert). This is because in a high quality master's thesis, many problems have already been solved that are required in writing an international journal article: The author has been found an interesting and significant problem, reviewed an associated body of international research; researched and developed well-functioning research methods, and obtained significant results that an international audience may also be interested in. Making the rough manuscript publishable requires, however, considerable effort. **In is essential to ask as early as possible for comments on the manuscript, from your supervisors, peers and anybody else (family members) who cares about you and your manuscript enough to lend their eyes for improving it.**

Writing an article follows a reversed logic in relation to that of planning an investigation (Lonka et al., 2005). As a starting point of article writing are not usually assumptions and plans created before conducting the study in question but emphasizes new and interesting results that were not fully anticipated. When writing an article, the researchers considers what question the surprising result he or she has obtained is an answer to and reframes (re-orders, revises, or changes the emphasis of) the research questions accordingly. From the surprising results, the investigator reformulates the research questions and further develops associated theory along the way. In order to be coherent, the questions posed have to correspond 1 to 1 with research results. Even if the research process was pretty chaotic most of the time and the investigators experienced being lost, a reader of an article gets an impression that the investigators knew from the very beginning what they were searching for. From the perspective of academic research this is nothing to be ashamed of; this is just a part of scientific creativity and accepted practice of presenting results. Sometimes books of scientific methods have been written from a very rationalistic perspective so that they give misleadingly rational and logical picture of the process of academic research. Become a practicing researcher, however, necessitates understanding the actual investigative process and learning to rationally reconstruct it when reporting studies as journal articles. **The presentation of an article must have a logical sequence and structure, an obvious thread, regardless of byways and dead-ends of the actual process.**

I think that it is important to value scientific genre anchored on the IMRD structure as a cultural historically evolved framework of knowledge creation (Bazerman, 1988). Its creation was once an extremely demanding achievement in which Isaac Newton played an important role. Article genre enables an investigator to communicate, in disciplined ways, the results of his or her investigations to a novel audience. Toward that end, it is essential to explicate the assumptions and starting points

on which the investigations relies. The researcher has to anchor his or her study to a certain research tradition and earlier studies. This is the task of instruction. Then the researcher has to explain in a transparent way how his or her data have been acquired and how they have been analyzed. In results, the author describes the data and findings emerging from the result analysis and summarizes them. In discussion, in turn, the author interprets the significance of the results and puts them to a broader context. References anchor the investigation to the context of associated former results. Although the genre of scientific journal articles varies from one discipline to another, the IMRD represents an internationally stabilized way of reporting scientific investigations. The article genre channels and directs investigators' efforts and gradually is internalized to guide their academic activity.

Each subsection of an article manuscript is modified through repeated cycles until the desired conceptual clarity and methodological rigor have been reached. Initially, a shortened manuscript is likely to be too long; it has to be rewritten repeatedly until it fits in the length determined by the target journal. Shortening of scientific manuscript cannot be completed by mechanical cutting and pasting; you need to learn to produce densely packed and compact academic text through gradually progressing cyclic work. The text needs to be repeatedly gone through so that the shortened text says approximately the same things that the longer one does, only in a more compact way. This means that, in many cases, you need to come up with new sentences saying the same things in a very concise (compressed) way. During such a process, you may have the feeling that it is not possible to succeed in compressing the manuscript, but the target is reachable assuming that you work with the text persistently enough. As mentioned in the section addressing co-authoring, it is useful to have a student and supervisor working with the text in successive cycles. Many supervisors actually work with their students in front of a computer and work with a shared text. This is important because in many cases a student's text does not say what he or she means, but working together it is possible to find words for the intended meaning of a student in relation to the manuscript being elaborated. Writing-related academic knowledge practices can be transmitted to newcomers only by such collaborative practices.

Each subsection of the manuscript is repeatedly modified until all are streamlined and express the intended meanings in a comprehensive way. The text has to be very explicit so that a reader can understand ideas presented in each section without reading the others. Implicit background assumption may have to be explicated so that a reader coming from another context will understand the intended meanings. Figures and tables with their captions and footnotes have to explain their topic without requiring reading of the main text. Simultaneously, it is essential to edit the manuscript as a whole so that each subsection becomes seamlessly integrated with the others. The manuscript has to convey to a reader a coherent story that integrates the parts and provides a comprehensible path through them. For creating such a red line, it is essential to provide in the beginning a problem statement that crystallizes the purpose of the study; moreover, the reader needs to be repeatedly reminded of the main purpose in research aims (goals), questions, methods, results and discussion. From the perspective of coherence, it is essential that the research questions emerge naturally from the introduction, structure the methods, results and discussion. In each subsection, you need to have meta-text that assists readers in moving forward and reminds them repeatedly of essential issues, helps to keep the main focus in mind, relates various themes addressed to it, and anticipates subsequently emerging themes. The purpose of repeated cycles of editing is to ensure that the manuscript constitutes one coherent whole in which all elements support one another and serve to communicate ideas to readers coming from more or less different contexts. As a reviewer as well as an editor, one often encounters manuscripts that consist of obviously cut and pasted pieces from some larger documents apparently without evidence of any serious effort at ensuring coherence.

I described, above, identification of an innovative investigation that could be used as a basis of writing an international research article. I explained how a monograph can be transformed to a manuscript of a scientific journal article by gradually compressing an extended research report. Another route to an article manuscript is to create a gradually extending epistemic artifact that is step by step upgraded toward a journal submission (Hakkarainen et al., 2014a). Accordingly, it is good to start from creating a conference abstract regarding one's study and submitting it to evaluation. You may gradually grow up to journal science by working with production of successively more and more complex documents. Writing an abstract with support of a supervisor may not be an overwhelming challenge for a newcomer, although crystallizing the core of one's research in a few sentences could be challenging even to a senior researcher. From the perspective of scientific development, it is critical to establish early contact with the international scientific research community and learn to deliberately seek criticism for advancing one's own research. When starting with such relatively small epistemic artifacts, it is possible gradually to test how various aspects of one's research can be communicated with external researchers and how one's investigations and their results are received by the scientific research community. If writing in English is initially an obstacle, it is good to start with producing manageable documents with senior researchers. At the next step, it is possible to produce extended abstracts, associated posters and presentations and, after that, actual conference papers. According to my own experience, conference presentations require constructing supporting documents that can easily be extended to article manuscripts. Scientific journals usually require that article publications are original studies never published before (if you are not writing a review article); to make an investigation already published as a conference paper suitable for journal submission, may require getting new data or reanalyzing the main results. Thus many experienced investigators go to conferences primarily to get feedback from their presentations so as to test ideas to be included in journal submissions rather than to achieve publication in the conference proceedings.

Selection of a publication forum

It is important to consider potential publication forums early along, when you are preparing your manuscript for publication. In what follows, I will share a few ideas of potential publication forums and assessment of their quality before going to the actual selection of the target journal. When I was starting my own scientific career, educational researchers explained lack of international publications by claiming that international journals do not like to publish studies concerning Finnish learning, teaching, and schooling. After many Finnish educational researchers have broken the boundaries of outdated academic practices and gotten their articles published in most of the highly valued journals of the field, such perceptions appear naive. In the age of Finnish PISA (Programme of International Student Assessment) success, it appears that articles and books regarding Finnish educational system are even "ripped out" of researchers' hands and published most eagerly. There are tens of thousands of academic journals in the world, and new ones are emerging every day. In most research fields you can identify many potential publication forums suitable for your purposes. For publication-oriented researchers and research groups, it is useful to keep a record of the most important publication forums of the field, i.e., the journals in which the central and most valued investigators of your field are publishing their studies.

The quality of scientific journals varies to a great extent both within and between disciplines. For a novice, it may not be a good idea to immediately target the most highly valued journals of one's field but still aim at quality journals. When assessing scientific journals, it is possible to utilize information of their impact as well as results of national and international assessments and categorizations concerning qualities of journals. Journal impact is a quantitative measure for assessing

the quality of a journal on the basis of information concerning how often an average article appearing in the journal has been cited during a certain time period (Gruber, Sinatra, & Säljö, 2012). It is assessed by measuring how many times articles appearing in certain year have been, on average, cited during the subsequent two years following the publication.

A (the number of citations for articles appearing in target journal across two years following their publication)

Impact I = -----

B (the number of articles appearing in the target journal at certain year).

When determining the impact, assessors take into consideration only citations occurring in journals that meet certain criteria or quality standards, based on how well established a journal is, how regularly it is published, what kind of peer review standards it is following, and how well it is respected by scholars working in a field. Homepages of many journals involve information of their impact values, and you can find lists of high impact journals of a field from the Internet. Impact value provides a general measure regarding how valuable participants working in a field consider articles appearing in a journal. It is possible to utilize impact to compare quality of journals within a field, but it does not support between-field comparisons (Gruber, Sinatra, & Säljö, 2012). Although the impact of best science journals could be about 40 (*Nature*), there are not many journals in the field of educational research with more than 3 impact. Across-discipline differences in impact and citations are affected, for instance, by the size of the field (how many investigators are working in the field around the world) and how well-established journals of the field are. Most of journals functioning in the field of technology-mediated learning have emerged over the last two decades so that many of them are not yet included in assessments of impact.

In the academic world, standing (personal, departmental, or university) is more and more based on quality rather than quantity of research. Although investigators who have just learned to publish are likely to be happy when getting their submissions accepted to any journal, it is not going to be good enough later on. Because of challenges concerning assessing quality of journals across disciplines, multi-disciplinary teams have categorized tens of thousands of journals in Finland according to their quality. The Federation of Finnish Learned Societies (<http://www.tsv.fi/engl/index.html>) ended up with the following categorization of journal quality, in order:

1. Established scientific journals
2. Leading scientific journals, most of the international (20% of established journals); and
3. Journals with high international visibility and impact (25% of the leading scientific journals).

From the webpages of the Finnish Learned Societies, it is possible to search for journals to determine their quality level; it is also possible to suggest new journals for categorization. In social sciences, there are many journals that have been left without quality categorization because of being so new, appearing irregularly, having national or regional focus or following not-so-trustworthy practices of peer review. In addition, we have used, in our own work, the categorization of European Science Foundation for three levels of journal quality: a) Leading international journals of a field, b) Intermediate level international journals, and c) Significant regional or national journals (see <http://www.edu.utu.fi/tutkijakoulut/opmon>).

A researcher who is oriented toward tightening academic requirements that will come to be, in the future, selects as their publication forums journals which have reached a respected position in the field, if there are not specific reasons for doing otherwise (e.g., a new field without many quality categorized journals). Outside of the quality categorizations there may be (as yet unrecognized)

decent and good journals, but before submitting one's manuscript for publication, it is important to consult your supervisor or some other senior researcher. In the Internet there are also many questionable journals that are aggressively seeking submissions without having adequate quality of peer-review or otherwise achieved respective position in a field. Some, in fact are shams or frauds soliciting money for publication. Many university departments support English language examination of manuscripts submitted to journal publication, but, in many cases, only when the target journal has quality categorization. Students and researchers publishing in high-quality journals often encounter colleagues without experience of international publication, who do not understand what boundaries they have crossed and what achieved (Hakkarainen et al., in press). In natural sciences, it is common to ask the authors to pay for their publications. and it appears that such practice is extending to social sciences in terms of open-access journals (i.e., publishing an article in a way that allows the final version of an article to be freely distributed). This means that the authors may have to pay 1000-2000€ for open-access publication of their article; this may be a selective option or a general policy of the journal.² Note: Authors have been solicited by fraudulent journals with deceptive titles similar to those of high-quality journals.

Gruber, Sinatra, and Säljö (2012) instruct junior scholars planning a publication to start from the community whose discourse they would like to contribute through the article submission. This is in accordance with a philosophy that the main purpose of scientific publications is to contribute to academic discourses in your own field (see section related to peer review). Toward that end, it is useful to go through journals in which the most highly cited (or otherwise interesting) researchers of your field publish. Their articles provide also valuable models of designing investigations, framing arguments, or constructing manuscripts. It is worthwhile to do some detective work and trace forums in which those investigators publish who are most interesting from your perspective. Google Scholar provides valuable tools in this regard. Familiarize yourself with webpages of key journals identified and examine their focus, theoretical and methodological preferences and practices of peer review. What are the most important articles from the perspective of your topic, where have those been published, and how much have the articles in question been cited? Many research groups and doctoral students collect their own archives of journals and socially share information about the quality and speed of peer review as well as where what kinds of manuscripts should be sent (Hakkarainen et al., 2014a). The journal webpages include critical Instructions for authors that determine formatting, lengths, and other relevant aspects of manuscripts to be submitted. It is meaningful to select a journal in which articles relevant from the perspective of your study have been published over the last couple years. I would warn against immediately targeting the absolutely best journals because publication could be difficult and take a long time even when successful.

After you have finally selected a certain journal, it is important to familiarize yourself with the genre of articles that have appeared in the target journal. Participants in the research seminars directed by my colleagues and me have to complete, at this stage, **a journal task, i.e., use a journal's webpages for familiarizing themselves with the target journal, its focus, content of articles, and instructions for authors.** Each journal may be seen to represent the shared efforts of a smaller or broader community; in order to get published you need to understand the nature of such community. What is the higher-level mission of scientific research community in the background of the journal? On what kind of theoretical assumptions does the journal appear to rely? What kinds of methodologies does the target journal appreciate? What kind of discourses are going on related to your own investigation? Secondly, the author has to go through articles published in

² Nowadays, it appears to be very important to make your publications available for a broad audience. Beyond open access publication, it is possible in most cases to publish the last Word version of your manuscript at sites like academia.edu or Research Gate after your article has been accepted.

the target journal across 2-3 years. It is especially important to familiarize yourself with articles that are significant from the perspective of your own research. How have the articles been structured and composed? What is the style of argumentation? What kind of data is analyzed and how are the results reported? What kinds of repeated themes occur across articles and how does your own contribution relate to them?

Many scientific journals, including the *Journal of the Learning Sciences*, are cumulative in nature so that articles published are expected to advance discourse in one way or another. Your challenge is to frame your study in a way that offers a new perspective in the ongoing discussion. These issues cannot be too much emphasized because a large proportion of manuscripts are rejected because they do not fit in the focus of the target journal. It is quite common to send qualitative studies to statistically oriented journals and quantitative ones to qualitative journals. As an editor, it is my impression that these submitters have not at all familiarized themselves with the journal website, its publication policy or earlier articles appearing in the journal. If you are unsure whether a submission fits in a journal, it is a good idea to send an abstract to the editors and ask their opinion whether your piece would fit in. According to my experience, we social scientists are usually too focused on our own research; we approach the publication process as a way of simply placing *our* manuscript in a journal so as to move to the next submission. Getting a manuscript published in a demanding journal appears, however, to require so-called relational expertise (Hakkarainen et al., 2004, Edwards, 2005); in order to be able to tailor your own ideas for advancement of scientific discourse, you need a great deal of meta knowledge of other investigators' achievements and the relations between your own and their inquiries. Only by relying on such relational knowing, may it be possible to construct your article in a way that genuinely advances scientific discourse. Getting to that level may also require carrying out new literature searches.

It follows from the above presented ideas that a manuscript has to be related to and customized according to the target journal already when you writing the manuscript. After selecting a journal, you need to adapt the manuscript to the target journal in terms of structure, style, length, and argumentation. It is essential to ensure that your references anchor your investigation to relevant earlier studies appearing in the target and related journals. This is important because peer reviewers are experts who have earlier published in the target journal; hence it is important to indicate awareness of their achievements. It should not, however, be a matter of trying, as a tactic, to please the reviewers or editors wanting to increase journal impact, but genuinely anchoring of your investigation to the appropriate discourse through references. According to its references, your manuscript can be located in a certain tradition and discourse. In some cases, acceptance of your manuscript may be precluded if the manuscript appears to be more centrally located in another discourse community. As mentioned above, tailoring a manuscript to advancing discourse is especially critical in cumulative journals.

Sometimes selection of target journal is made at a rather late stage so that you could have a manuscript but not have made a decision regarding the journal. This kind of situation emerges when your manuscript is rejected by the originally targeted journal. Although it is important to rapidly and efficiently to resubmit your manuscript for publication, it is important to do the background work described above to familiarize oneself with the discourse of the new, targeted journal and adapt the manuscript accordingly. The manuscript needs to be rewritten repeatedly after possible changes and modification across several cycles so as to again reach the desired coherence. Effective publishers send their article after rejection successively to even 4-6 journals, before finding a final home (you can submit your manuscript to only one journal at a time but need to learn rapidly to resubmit it to another one after rejection).

A basic orientation of a publication-oriented researcher is that all decent academic studies can be published in a journal, it is just a matter of finding a suitable publication forum. Practically all investigative academic activities can be transformed to scientific articles. My habit is to translate international articles to national ones and vice versa; across such processes of creative translation there often emerge novel ideas. Once in a while, you need to dig in your archives and take half-finished manuscripts and prepare them for publication. In principle, all your academic work should lead to publication, ranging from contributions to scientific popularization to journal articles. Knowledge produced becomes a potential target of citation after it has been published in a peer-reviewed forum. If you do not have material for submitting such objects, perhaps there is a reason for reconsidering your academic practices.

A manuscript has to be formatted according to publication standards (e.g., American Psychological Association, APA) defined in Instructions for Authors. I did not originally know anything about publication standards and used to format my documents in various ways to make them more impressive. When learning to publish articles, I had to unlearn such a practice and learn to use publication standards instead for formatting manuscripts to suit myself. There are many publication standards, and journals may have their own local modifications and stylistic practices. Publication manuals can be purchased from book stores and the Internet contains webpages that guide newcomers in formatting their manuscripts. Useful are, for instance, example manuscripts formatted according to a certain publication style. A journal's instructions for authors define what standards are to be followed, the format required of the manuscript, the maximum length, the required structure and the acceptable formats of files submitted through online submission portals. Publication standards simplify a researcher's task and channel his or her efforts in the way that submission requires.

Formatting the manuscript for submission requires great deal of rather technical work. Instructions for authors include detailed local formatting guidelines and practices that submitting authors are expected to follow. It is quite common to return a manuscript for preparation because of its being too long or otherwise diverging from formatting requirements. You need to take care that the manuscript is perfected in terms of appearance and quality of written language. If English is not your mother language, you should submit your manuscript for English language editing (by a native speaker) before submitting it for evaluation. According to common experiences, the result of peer review is most negative in cases when a manuscript submitted for review is clearly unfinished, ill-structured, and incoherent in nature with many conceptual and methodological weaknesses and grammatical mistakes that make understanding difficult. Experience indicates that British journals are stricter regarding their English language requirements than American ones and may require repeated re-editing of even rather good quality manuscripts. In the Internet, there are many kinds of English language editing services (of varying quality), which are fast but charge a couple hundred euros per article. In many cases faculties and departments compensate their employees' English language serviced at language centers but it is often a relatively slow solution. Many English language editing services provide only technical support (e.g., perfecting articles and prepositions). Although this may also be important, the most valuable are professional editors who are able to assist in improving rhetoric style, argumentation, and coherence of your manuscript at multiple levels. It is a good idea to contact the head of your department and negotiate about supporting English language editing of your manuscripts; In Finland university departments get a part of their funding from article production.

The manuscript submitted to publication should involve a cover letter that details the title of the manuscript, authors of the submission, their affiliation, length of the manuscript (in words as well as in manuscript pages), as well as number of tables and figures. In the cover letter, it is assured

that the manuscript has not been published before or submitted anywhere else (simultaneously) for publication. As mentioned above, you can submit your manuscript only to one journal at a time for consideration. If you decide to change the journal, it is important to inform the editor of the former one of the change in publication forum. In many respected journals, scientific evaluation is double blind so that reviewers do not know whose manuscript they are evaluating and authors do not know who the evaluators are. Anonymizing means leaving your own references out of the manuscript (with text “references omitted because of blind review”) until the manuscript has been accepted). In some cases, getting your manuscript accepted could marginally be affected if the editors know who you are and where you are coming from (university). Because of that it could be useful to say in the cover letter something about the context of your investigation (e.g., project in the background of it; in whose laboratory or under whose supervision that study was conducted). Some American authors appear to have mastered these kinds of practices very well.

About the process of peer review

Although Finnish academic education is of high quality, the process has not been very good at transmitting the academic self-confidence that orientation toward international publication requires. Many innovative students have appropriated and developed sophisticated practices of academic research and writing on the basis of which they skillfully produce academic products (essays, reports). Simultaneously, academic orphans may not have courage to submit their manuscripts to publication. Consequently, an important aspect of their academic potential may never be realized.

In what follows, I will share an associated personal experience. I was pursuing my doctoral studies at the University of Toronto under guidance of many highly regarded professors. Foreign students were asked to complete many extensive courses as a part of the doctoral studies. In one of the courses, I used 2-3 months for conceptual-theoretical analysis of Bruno Latour and his colleagues’ actor-network theory that appeared to represent some sort of “sociological reductionism”. In his feedback, my teacher David Olson wrote that the essay was of same quality that articles appearing in highly regarded scientific journals. Because I did not, at that time, have any idea about publication, it did not occur to me that I could submit the manuscript somewhere for publication. Writing the essay had most of all served my own learning; I was happy about completing the theoretical investigation to my own satisfaction and was not oriented to engage in public discussion concerning the topic. I was, however, encouraged from the feedback and sent the manuscript to a professor for comments--one whose work I had partially relied on in the essay. He never responded because professors do not spend time reading unknown students’ long essays. After about eight years I returned to Toronto as a visiting scholar and dug the manuscript out of my archives. In a few days, I worked through the manuscript relying on my recently acquired journal practices (see Figure 1), tailored the manuscript for a certain journal, added a few new references and sent it off. After couple months, the editor contacted me; the manuscript was not only accepted (see Hakkarainen, 2003), but I was also asked to join the editorial board of the journal. The lesson learned was that sometimes the quality of epistemic artifacts that doctoral students create is higher than they themselves are aware of. What is missing is confidence that our efforts could, when framed in a suitable way and presented at adequate forums, be published and achieve not only national but also international recognition. Because of that, it is strategically important to develop academic knowledge practices that guide young students, supported by their supervisors and peers, in trying out their wings in the field of international peer review.

Peer review is a complex cultural practice that has been cultivated across an extended period of historical development. The result of the review process is determined more by the nature

of these cultural practices than by weaknesses and strengths of an individual manuscript. Peer review means that a manuscript is sent to 3-4 senior researchers who are familiar with the research topic or field. Sometimes, there could be a postdoc among them. The reviewers do their work on a voluntary basis without getting any financial compensation for their efforts. In highly regarded journals, the reviewers are top experts of the field. A significant percentage of a senior researcher's activity goes to scientific evaluation from peer reviewing to reviewing of dissertations and grant proposals. Peer reviewers are usually researchers who have published before in the target journal, often during the last few years. So they appreciate if young investigators submitting their manuscripts indicate, by citation, familiarity with their work published in the targeted and related journals. The reviewers function under time pressure and may become frustrated and irritated when encountering unfinished, incoherent, and sloppy manuscripts (Gruber, Sinatra, & Säljö, 2012). They do not always have patience enough to think how a weak manuscript appearing as a student essay or a piece of a dissertation, not edited according to the genre of journal science, can be transformed to a publishable one. Often, they do not have time to soften their criticism. When familiarizing yourself to review statements, these issues should be taken into consideration. Simultaneously, it is important to know that highly regarded scientific experts, who have centrally participated in development of a scientific theory, a methodological approach, or line of research function essentially as academic gate keepers. They have developed, in their research field, exceptionally tight criteria of academic performance; consequently, they may sometimes be over-critical in relation to submissions of newcomers who are just entering the field and examining it from novel perspectives.

The reviewers read the manuscript carefully, usually more than once. They write 1-2 pages of detailed evaluation characterizing the manuscript in general and assessing its theoretical anchoring, methodological solutions, interestingness of findings, and overall significance. An editor responsible for the submission in question reads all the reviews as well as the manuscript and produces a meta review or editorial cover letter that provides guidelines regarding how the manuscript should be improved and which comments from reviewers are most crucial to address. After the authors have made the changes, they send to manuscript to a new review cycle. Usually, the same reviewers read the manuscript again, although there could also be new reviewers. In that way, the reviewers can make sure that the authors have made the requested change in the intended way. Different evaluators may present somewhat different requests so that fitting them together may require both the editor's and author's agency, giving some degrees of freedom. Having the same evaluators to participate in subsequent cycles of corrections is important from the perspective of coherence and systematicity of evaluation – so that new reviewing cycles do not involve requests that would be in conflict with earlier ones. Review statements and editorial meta review of highly regarded journals are expert-laden, substantial, and innovative. They provide a good basis for improving the manuscript even in the cases where one is not accepted to the target journal. Hence it is sometimes useful to submit your study to a top journal even without hope of success. A doctoral student may not, however, have time for additional cycles. In weak journals, peer evaluations are not always very good and may not provide good guidelines of improvement (although any external review is, epistemologically, usually valuable).

Scientific peer review is a cultural practice of critically evaluating targeted epistemic artifacts. Although manuscripts that investigators create are once in a while criticized for weaknesses and limitations, peer review, considered deeply, does not, in fact, produce criticism that is primarily a response to the target manuscript's features. **Production of criticism is the mediating mechanism through which any manuscript has to be modified and corrected so that to advance scientific discourse.** As an editor, my starting point is that regardless of the features of manuscripts, my evaluators are doing their job only when they are producing criticism that assists in

improving the target manuscript. For whatever epistemic artifact (manuscript), we can find weaknesses that can be criticized in a way that improves the quality of the manuscript and communication of its ideas to readers. This is certain already before even seeing a manuscript. A starting point of peer review is that if a reviewer does not have any criticism to present, then—assuming some effort has been made-- a) he or she may not be an expert of their field in question or b) the reviewer has not read the manuscript carefully enough and, thereby, contributed to quality assurance of academic research. In my view, good reviewers never suggest a manuscript to be accepted without substantial corrections; perfected manuscripts emerge only through repeated cycles of criticism and correction. Practically, the only exception is constituted by manuscripts that have already been repeatedly corrected through review cycles of another journal. In decent journals, practically all manuscripts go through major corrections (see below) before being accepted for publication. In highly regarded journals, this may imply 2-4 cycles of corrections before final acceptance. A significant percentage of manuscripts become rejected at some point of the process.

Simultaneously, it is very typical for social scientists without strong community support (i.e., we academic orphans) to take review criticism personally. Nevertheless, peer review is an assessment of the nature of the manuscript regarding how it contributes to a certain scientific discussion rather than an evaluation of the investigators' personal characteristics. A good piece of advice, which is easier to give than follow, is never to become personally hurt because of anything that is said in review statements. Because taking critical feedback is always somewhat painful, **internationally oriented research groups in both natural and social sciences often have a policy of always reading the review statements together with a senior researcher or a whole research group, never alone** (Hakkarainen et al., 2014a). This is important because a more experienced investigator a) may determine on the basis of even pretty critical review feedback that the manuscript is about to be accepted and b) is able to put the criticism into a broader context and more clearly see how criticism can be transformed to a positive resource of improving the manuscript. If you are publishing alone or with another doctoral student, it is a good idea to ask a senior researcher experienced in international publication, to go over your review statements with you and your buddies. Some research groups organize seminar sessions in which doctoral students under strong guidance of senior researchers go through an article manuscript and review statements and collectively determine the best line of action for making corrections (Hakkarainen et al., 2014a). Suggesting such seminars for your supervisor or teacher may be a good idea.

Categories used in peer review vary somewhat from one journal to another. In what follows, I will explain the categories used in my own journal. I will present them in order of assumed likelihood, relying on my own interpretation of their meaning.

- **Rejection**; this is probably the most common result of evaluation; the more demanding journal you target, the more like your manuscript is to get rejected. A piece may be rejected because it does not fit into the scope of targeted journal. Editors of journals go beforehand through manuscripts submitted and reject a significant proportion of them before peer review, if they do not have a possibility of succeeding because of misfit in orientation or methodology. A manuscript may also be rejected because of its weaknesses, such as a description of school project without any conceptual or analytic rigor. In some journals, editors evaluate manuscripts being rejected and produce 1-2 page statement concerning how the manuscript should be improved, if it is to be realistically resubmitted to the same journal. From this perspective, it is already an achievement that your submission is subjected to peer review; it indicates that you may have succeeded in making a correct choice of the journal. Smart investigators seeking to get published do not become depressed because of

rejection but quickly resubmit their manuscript to another journal and make the required changes in the focus and style.

- **Revise and Resubmit** is rather typical result of evaluation. Your manuscript has so many strengths so that it is not completely rejected; you are expected to make essential corrections before resubmitting it to evaluation. The author is requested to make substantial changes in the manuscript, for instance, in rewriting, restructuring, reanalyzing results or sharpening interpretations. You should expect several review and correction cycles before reaching your destination.
- **Major Revision** is rather typical result of peer evaluation. The reviewers see many strengths in the manuscript and would like to see it, in principle, be published after major corrections. Major corrections should be taken as an encouraging signal that it is possible for the manuscript, after resilient (intensive and extensive) corrections, to be published in the target journal. Some research groups actually congratulate a researcher for receiving this kind of feedback (Hakkarainen et al., 2014a). Simultaneously, success is dependent on taking the criticism seriously and putting a major effort into improving the manuscript to the requested level in the areas or aspects specified, e.g., conceptually, analytically or interpretatively.
- **Minor Revision.** Small mistakes and weaknesses are requested to be corrected from a manuscript that is likely to have been edited through multiple cycles. In a high-quality journal, this is hardly ever the first stage but reached only after making 2-3 cycles of corrections. If your manuscript gets such feedback immediately, I would not "jump for joy" but seriously consider if I have submitted my manuscript to a journal of high-enough quality. One might consider that it's a fine manuscript receiving due recognition.
- **Accepted.** In a good journal this never happens immediately but after making many cycles of corrections at earlier cycles of reviews.

A maxim of Gruber, Sinatra, and Säljö (2012) is that: "Don't panic! Expect rejection". People who submit many manuscripts for evaluation also have to go through repeated rejections. On the other hand, if you would have submitted your manuscript to a weak journal, and it was immediately accepted, you could have seriously under-achieved as a scientific author of publications. As a consequence, respected researchers would never cite your study appearing in an untrustworthy forum. The better the journal you are targeting, the longer and more demanding the evaluation and correction process will be. This has to be taken into consideration when selecting forums for dissertation articles. Articles appearing in the best journals may not have been exceptionally good when they were first submitted for publication but were transformed to diamonds through a sustained evaluation, rewriting, reanalyzing, and remodifying process across numerous cycles of peer review.

In many cases, authors of a promising manuscript are given an opportunity to use review statements for deeply reconsidering their investigation and testing how far its ideas, methods, and analyses can be stretched. If the authors only change a word here and there and make only minimal local changes to cope with reviewers' criticism, perhaps they did not understand the challenge of taking their investigation to a new level for advancing scientific discourse by capitalizing on the intelligence and creativity of an expanded network, which includes the reviewers. The best journals require authors to profoundly reframe their investigation, search for new literature, carry out novel analyses of data, and come up with new innovative perspectives of interpretation.

Successful completion of such demanding processes of transforming the manuscript may require personal and intensive participation of senior researchers for construction of a student's manuscript (Hakkarainen et al., 2014a). Sometimes it happens that a manuscript submitted to a high quality journal becomes rejected after several cycles of correction; in that case it is likely to be so much improved that it can be quickly accepted to another journal.

Appendix B presents hypothetical review comments regarding an article as well as parallel explanation of hypothetical changes that the authors may suggest. Weak manuscripts appear to have similar kinds of weaknesses. Manuscripts are rejected because they poorly fit into the discussion going on in the target journal and/or represent different scientific genre and methodology. Weak manuscripts are not adequately anchored on the discussion going on in the target journal so as to help it advance. Such manuscripts have weaknesses also in theoretical framing. Instead of making a rigorous literature search for showing a gap of knowledge and developing a new and innovative perspective on examining the topic, such studies involve weakly integrated listing or earlier studies without an identifiable red line. Research question are too fuzzy and do not sufficiently structure analyses or results. Methods are described in a very unspecific way so that it is hard for an outsider to understand what kind of data was collected and how it was analyzed. Results may be excessively long with too many tables and figures. Results are weakly structured and main results not highlighted. The manuscript is weakly structured so that it is hard to follow the ideas mentioned. Discussion involved mainly lower level synthesis of results rather than rising above and connecting back to the big questions and theoretical issues in the background of the investigation. Sometimes such manuscripts are weakly written so that ideas are hard to follow; there is not a clear red line and there are many grammatical mistakes and mistakes due to sloppiness. Simultaneously with acknowledging such too-common patterns of weakness, it is important to take into consideration that quite good submissions also become rejected because so many investigators are seeking to publish in the best journals.

I appreciate **Roger Säljö's communication-theoretic perspective on scientific evaluation. Scientific publication should be seen as participation in a scientific discourse.** Although the reviewers represent expertise of the field, they come from different contexts. Because of that, they may not have prior understanding that comprehending your manuscript and embedded knowledge claims would require. They make the evaluation according to meanings embedded on the manuscript text that does not open as easily to outsiders as to your supervisors and peers who are more familiar with our study and its background. A long and detailed critical feedback should be taken as a sign that an academic expert coming from another context appreciates, in principle, your study; but your manuscript, in its current stage, does not communicate your intended meaning to outsiders with sufficient clarity. If meanings of your manuscript are not understandable to experts, it is likely that also other people would have similar problems of making sense of it.

Peer review relies of interpreting ideas that have been externalized, crystallized, and materialized in your manuscript. People are always bound to their own perspective, and we cannot truly know without object-mediated interaction, such as peer reviews, which of our ideas communicate and which do not. From this perspective it is possible to understand the epistemic value of peer review. In a sense, peer review institutionalizes an object-mediated process of interaction that allows borrowing an external experts' eyes and perspectives diverging from our own; thus we learn to know how our manuscript should be developed so as to communicate our ideas to readers more clearly and comprehensively. It is very important to read review statements carefully and repeatedly to learn to understand why our ideas did not get across as intended. From such a communicative

perspective, peer review could transform from threatening criticism to a central instrument of academic advancement. Consideration of this communicative aspect is missing from traditional practices of creating documents for demonstrating learning or clarifying our own thoughts. Only manuscripts that have gone through peer review and associated processes of modification communicate their purposes in transparent and comprehensive way to readers coming from other contexts. In a sense, **peer review of a process of interactively or socially validating knowledge created by a researcher, validating that relies on an extended network of intelligence and creativity of reviewers**, and thereby has characteristics going beyond individual possibilities.

An experienced scientific publisher turns peer review upside down from a hit that sinks a researcher's self-confidence to scaffolding for improving the manuscript, and thus, indirectly the reputation of the author. Review criticism can usually be pretty straightforwardly transformed to suggestions concerning how the manuscript can be improved so as to overcome weaknesses and more effectively communicate with readers (**see, for instance, Appendix B**). It is essential to learn to transform critical feedback to positive resources for development that force and kick you to do deeper inquiries. It is a good practice to take the review comments and well as editorial meta review and partition them into separate critical points, cluster these points according to different themes across all evaluation documents. In many cases, comments may be meta comments concerning the whole manuscript; in other cases they target specific subsections of a manuscript (title, abstract, introduction, method, results, discussion, references). My habit is to take such partitioned critical points of reviewers as track changes comments to the associated part of the manuscript (with general comments on the first page). The comments assist in considering, alone or together with other authors, how each section of the manuscript should be modified and improved. Sometimes it is possible to overcome major weaknesses with relatively small changes (changing the title; taking a slightly different perspective). In some other situations, you may need to do new literature searches, new analyses, and substantial reframing of the overall manuscript. Concrete comments on linguistic expressions can be directly inserted in the text ("We define X to be ...").

Secondly, it is useful to make the kind of table presented at Appendix B so that the first column involves comments of the reviewers clustered according to theme and structure of the manuscript, and the second column explaining to reviewers how the authors corrected the manuscript on the basis of the comments. Because the criticism emerges from a communication problem between the manuscript and the reviewers, there is no reason to question or object the criticism but to orient toward improving the manuscript in a way that eliminates the criticism (Gruber, Sinatra, & Säljö, 2012). It is essential to do everything you can do to take the reviewers' critical comments into consideration because the fate of your publication is at their hands. You may resist some of the reviewers' suggestions for justified reasons. Taking a new perspective on data analysis could, for instance, lead to the manuscript become longer than dictated. You can say that it can be done if so desired and only if other constraints of the journal are softened. A space of negotiation is also provided by reviewers making conflicting demands that could take the manuscript into different directions. When balancing between them, you are likely to have many opportunities to take the manuscript in a direction of your own desire. If you feel that you and your manuscript have been mistreated, unfairly assessed or if you have to wait your manuscript excessively long period of time, contact the editor and express your worries. In many cases, this solves the problem, hastens the process and affects the way your manuscript is managed.

After making the corrections, the manuscript is sent to a new peer review. Together with the cover letter, the corrections table communicated both to the editors and reviewers how the requested corrections have been implemented in the manuscript. In some cases, the cover letter and corrections documentation may be larger than the original manuscript (Gruber, Sinatra, & Säljö, 2012).

During the subsequent editing cycles, you are likely to be asked to make new corrections. Usually those are, however, smaller. The overall publication process is likely to involve several correction cycles before the manuscript is accepted to be published. Make sure that the last version corresponds to the publication standards and style of the journal. Send the last version and carefully check proofs that the journal is likely to send to you for corrections; those often have to be returned in 24 to 48 hours or so. Be careful because proofs may contain many mistakes that were not in the original manuscript.

Principles and practices of coauthoring

Because learning to do scientific publication is so challenging, **practices of co-authoring play a critical role in socializing and enculturating a new generation to academic knowledge creation across natural and social sciences** (Hakkarainen et al., 2014a, Hirschmann & Gruber, undated); Hytönen et al., 2012). As mentioned above, academic writing is parallel working for production of text and shaping one's identity (Kamler 2008, Kamler & Thomson, 2007). Beginners feel themselves very small in front of infinitely many present and future critics in a way that a) prevents improvisational development of ideas and b) easily leads to writing to a drawer instead of daring to subject oneself to peer review. Also many senior researchers without extensive peer review experience are afraid of showing their writings even to close colleagues, not to say anything about scientific reviewers. Yet, young researchers with peer review experience may learn to expand their intelligence and creativity in the way described above. Solo-publishing social scientists are reported to seek "safe havens of publication" (Kamler, 2008), i.e., journals with low criteria of peer review. At the same time, the collective co-authoring practices of natural sciences support doctoral students in early socialization to write like scientists (Florence & Yore, 2004) and pursue, together with senior researchers, publication even in the most highly regarded journals. This is a truly significant intellectual, creative, and socio-emotional achievement anchored on co-authoring. The socio-emotional value of co-authoring is that senior researchers may carry a part of the socio-emotional burden that identity work related to international publication involves. When you have an opportunity to practice international publication with support of a senior researcher, you may rather safely try out your academic wings with less risk to your identity.

Simultaneously, the academic world is still dominated by very individualist notions of academic talent and creativity. Such conceptions appear to be especially strongly rooted on individual practices of many social sciences, which play an important role in writing theses at different levels of education (Hakkarainen et al., in press). Students are guided to make monograph studies concerning personally meaningful themes that often have very little to do with the interests or research projects of their supervisors. More or less explicitly, it is assumed that "talented" students rise from among the others; some older professors are reported to have said that students should *not* be too much guided and supervised because it would make identification to true "talents" harder. From such a perspective, academic research may be seen as an effort to reach a top of a mountain in difficult conditions (Holmes, 2004). A participant is expected to rely on distant model examples provided by research literature and the supervisor as well as personal creativity and local experiences. In the best cases, one may reach very high mountain tops by relying on such personal experience, but usually not the highest ones. Although the monograph thesis has for a long time functioned as a relatively good basis of scientific training in many areas of social science, it does not appear to provide sufficient support for transmitting skills and practices of international publication to new generations.

As I see it, professional scientific publication is collaborative authoring in nature, and associated practices appear to represent "the collective zone of proximal development" (Engeström, 1987) in

many areas of social science. For those who are oriented toward a career as professional researchers, there do not appear to be any other adequate alternative, even in social sciences, than pursuing so called article-based dissertation. Such dissertations consist of 3-4 internationally refereed articles published with supervisor and other colleagues and well as a one's own summary of the research synthesizing theoretical foundations, methods, results and significance of the studies (Dudley-Evans, 1999, Green & Powell, 2005; Hakkarainen et al., in press; Kwan, 2013). The best way of pursuing an article-based thesis is to go to a research community and senior researcher oriented toward supervising such theses. Pursuing an article-based thesis may be compared to participating in guided mountain hike under guidance of those who have already examined and marked the most difficult aspects of the routes. With strong community support, it may be possible to reach even the highest mountain tops by relying on concepts, theories, methods and instruments cultivated by a research community (Hakkarainen et al., 2013b). Although pursuit of international journal articles involves challenges as mentioned, it is worthwhile because students who had gone such a process have learned to publish internationally. As mentioned above, publication of dissertation results is the best predictor of the future productivity of an academic researcher (Kamler, 2008). An article-based dissertation, with already peer-reviewed publications, is also a much firmer foundation for defending your thesis than a monograph acceptance of which may be uncertain until the last meter; it is also a better foundation for achieving the future publications on which your career depends. Simultaneously, however, doing a monograph may make more sense to a student who has a large set of ethnographic data on a national language. Experienced professionals seeking to write a dissertation for reflecting on their life work, may also better succeed in completion of a monograph.

Together with a research assistant, I selected 2-3 journals with highest impact from six disciplines and asked him to categorize 36,000 articles published from the beginning 1900s according to whether they were co-authored or not (Hakkarainen et al., 2013a, 2014a; Figure 2, below). The examination revealed that collectivization of academic research is a collective trend from natural to social sciences. Social scientific research is becoming more and more complex so that an individual researcher cannot master the main theoretical and methodological paradigms in a way that used to be possible several decades ago (Hakkarainen et al., in press). With this background, it is critical to develop collaborative and collective practices of sharing investigative efforts within a research community or network. Professional academic research takes place in communities that are developing theoretical and methodological competence and cultivating associated knowledge practices--guiding and channeling the participants' academic activities. My research community's process of learning to do international publication represented such collective learning. In the background of a successful academic study is usually a whole network of people regardless whether their contributions have been acknowledged in authorship

The purpose of co-authoring is to socialize students to academic knowledge practices that productive participation in the international scientific community requires. According to my experience, it is important already at master's level to orient toward collaborative writing of a joint article because it enables early socialization to mastering demanding academic practices under support of a senior researcher. Co-authoring means that senior students use a part of their time to guide and support students' investigations, in the spirit of academic payback ethics. Collaborative culture entails senior researchers giving relational support to students similar to what they have themselves received when starting their career (Edwards, 2005). A supervisor's support should be tailored according to a student's developing skills and competencies so that the degree of support is reduced when moving to a more demanding level of performance. In the beginning, it is essential to support a student in formatting a manuscript according to disciplinary genre. One research leader characterized her role as an invisible hand that assists in transforming a student's good (though

roughly shaped) contribution through framing and shaping of argumentation to one that its actually publishable in a target journal (Hakkarainen et al., 2014a). My habit is to support doctoral students fairly strongly in preparing the first article but require them latter on to make a stronger contribution. I have noticed that most student having received a great deal of initial support, developed to make a stronger contribution later on. If we raise the standards and aim especially at highly regarded journals, a strong senior researchers' support may be needed in the later as in the earlier articles (Hakkarainen et al., 2014a; in press).

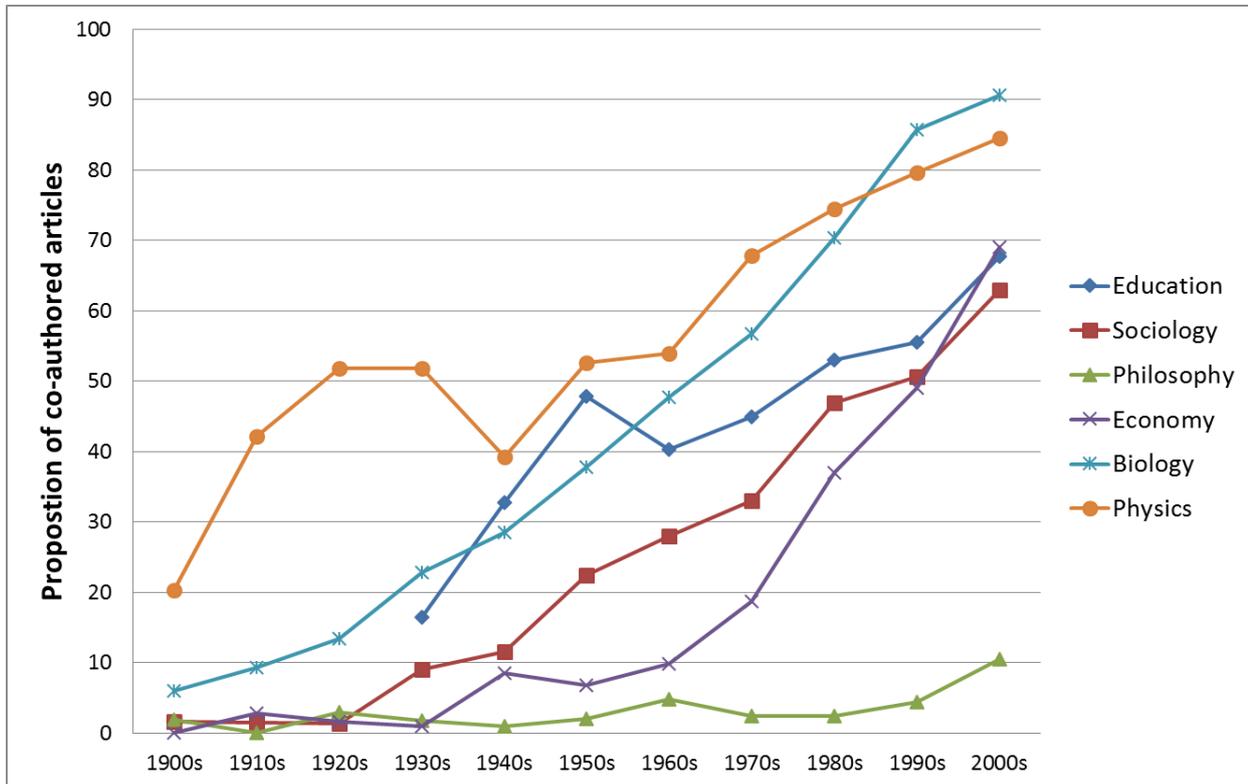


Figure 2. Collectivization of academic research assessed according to the proportion of co-authored journal articles in high-impact journals (Hakkarainen et al., 2013b; 2014a; Hytönen et al., 2012). This figure is based on 36,000 articles that appeared in 2-3 best journals across six disciplines from the beginning of 1900s to the present.

The purpose of co-authoring is to socialize students to academic knowledge practices that productive participation in the international scientific community requires. According to my experience, it is important already at master's level to orient toward collaborative writing of a joint article because it enables early socialization to mastering demanding academic practices under support of a senior researcher. Co-authoring means that senior students use a part of their time to guide and support students' investigations, in the spirit of academic payback ethics. Collaborative culture entails senior researchers giving relational support to students similar to what they have themselves received when starting their career (Edwards, 2005). A supervisor's support should be tailored according to a student's developing skills and competencies so that the degree of support is reduced when moving to a more demanding level of performance. In the beginning, it is essential to support a student in formatting a manuscript according to disciplinary genre. One research leader characterized her role as an invisible hand that assists in transforming a student's good (though roughly shaped) contribution through framing and shaping of argumentation to one that its actually publishable in a target journal (Hakkarainen et al., 2014a). My habit is to support doctoral students

fairly strongly in preparing the first article but require them latter on to make a stronger contribution. I have noticed that most student having received a great deal of initial support, developed to make a stronger contribution later on. If we raise the standards and aim especially at highly regarded journals, a strong senior researchers' support may be needed in the later as in the earlier articles (Hakkarainen et al., 2014a; in press).

A close collaboration with a supervisor requires that there emerge of a shared research object with the supervisor. In social sciences, such an object may sometimes emerge when elaborating, jointly, a student's ideas. The student' development is best supported, however, if there emerges a possibility, through the supervisor or otherwise, of joining the "long march" (Holmes, 2006) of academic research, i.e., taking part in an existing research tradition and an associated sustained line of research. If newcomers have an early possibility for peripheral participation (Lave & Wenger, 1991) in a research community that has for years developed and accumulated concepts, methods, and practices of investigating a complex phenomenon, they may have a "flying start" for the development of their academic competence. Taking part in such academic, relay race facilitates their development tremendously as compared with trying to start from a resting point, relying on personal experiences. As far as I know, this is the only known relative short-cut to excellence. It appears evident that such collective giftedness facilitates development more than any level of individual talent would (Hakkarainen et al., 2013b). Simultaneously, one needs to take into consideration that a research group is not only directly affecting a student's thesis work but the latter's personal knowledge and competence, experiences and produced creative tensions that may affect the direction and success of future investigations.

In co-authoring, each author should have a distinguishable contribution to the investigation or manuscript in preparation; free riders are not needed. Professional research takes place under a certain division of cognitive labor, and actual writing of the article is only one creative contribution among others. Especially in social sciences, it is essential to learn to appreciate various contributions to creation of a publication, such as developing a research idea; framing the investigation, developing methods and instruments, collecting data, analyzing and modelling results, visualizing results, interpreting results, showing the significance of results, and assisting in embodying all these in a coherently written manuscript (cf., Kulmala, 2009). Through co-authoring, we acknowledge to role of participants without which the investigation could not have been completed in the way it was done. My view is that collectively collected data should always be collectively published in a way that a) acknowledges the hard effort of people who collected the data and b) supports the fragile authorship of junior researchers. From the perspective of co-authoring, it is essential at an early stage to agree that a joint publication is about to be published, to agree who will take part in production of the manuscript and how, as well as to inform relevant stakeholders who might want to become involved, about such collective intention (Hakkarainen et al., 2014a). In order to allow senior researchers to actually make an important contribution to the manuscript in preparation, they need to have given sufficient time for participating. If you ask for comments a couple days before a deadline, the busy professor may not be able to change priorities and timetables in a way that makes intensive participation possible (Kulmala, 2009). It is also important to agree who will assume responsibility for developing the manuscript and how related work is going to be distributed—e.g., framing, structuring, and presenting results, and synthesizing them. It is useful to keep everybody in an email loop so that they can follow the progress of the process. It is crucial that every author accept the final version of the manuscript.

The rationale of co-authoring is to socialize newcomers to academic knowledge practices related to international publication. This can only take place as far as junior and senior researchers are working in parallel as well as successively with a shared epistemic artifact: the joint manuscript.

It would be in conflict with such collaborative practice merely to add a senior researcher's name to an already completed article manuscript. In many research communities, there is agreement on principles and practices of co-authoring. Both junior and senior researchers may be asked to sign an agreement defining ownership, use, and publication of the data collected. In each article, it is described what each author contributes (Contributions by All Authors); it is especially important to document junior researchers' contribution who may use articles as a part of their theses. **Co-authoring is a smart collaborative strategy through which the participants grow up to reach ambitious academic objectives by putting themselves under constructive criticism and learn to capitalize on the distributed creativity of the reviewers.** If an inexperienced researcher does not make more than one publication per year, he is able through co-authoring participate in making several of them (Kulmala, 2009). Yet, coauthoring is not only critical for socializing newcomers to academic knowledge practices but also a smart strategy of collective activity. Publications are collective creations and make the research group or community known. The publications bring recognition of merit to the whole community and make collective efforts visible.

Collaborative mechanisms of surpassing oneself

Here at the end of this document, I will address some of the interrelations between investigations, identity, selfhood, and academic knowledge creation. My own academic experience, research data, and research literature regarding the topic indicate that academic development of junior researchers in social sciences is constrained by the fact that our academic identity does not sufficiently support international publication. In many domains of social sciences there are only a few internationally publishing researchers and professional organized research groups. As a consequence, many researchers are one-time academic orphans who have not given an opportunity to learn to overcome intellectual as well as socio-emotional obstacles of international publication under the wing of an experienced senior. Participation in doctoral training is an uncertain solution for a doctoral student who does not have any relative with a doctoral dissertation. It appears to me, further, that the identity of young people pursuing a monograph is, to a significant extent based on an extension of an earlier individual identity as a student; such participants have a great deal of self-efficacy in relation to academic studying. This has enabled them to successfully overcome challenges and negotiate one's way to post-graduate and doctoral studies. It is natural to orient toward extending practices developed through earlier studies to pursue a monograph in a particular way. When pursuing his or her monograph at the edge of one's performance, such doctoral student do not easily start imagining him- or herself writing articles to fine journals that international researchers would willingly cite. The student just focuses on getting his or her degree adequately completed instead of dreaming about uncertain external epistemic objectives.

I have often wondered why the academically most promising youth appear to set up modest epistemic aims and objectives, when so many doors appear to be open to them. Is it truly the case that only those students who come from academic families have such a self-confidence that they may orient toward an academic career and imagine themselves as prospective creators and builders of knowledge, in other words as authors of often-cited publications. Because of constraining cultural myths of intelligence and creativity, those who come from socio-economically or culturally disadvantaged homes appear to be until the last meters of their journey extremely unsure to what extent they can stretch their abilities and talents (Hakkarainen, Lonka, Lipponen, 2004). Are we losing, because of constraining cultural beliefs, young people who could grow up to a Leena Palotie (a highly regarded Finnish academic who passed away couple years ago)? Because of these kinds of issues, it appears that issues related to academic self-confidence play a critical role in selection of an academic career and growing up to be an international researcher-publisher in particular.

Because of these kinds of considerations, I have started to think that the biggest challenges of adopting knowledge creation practices are related the identity and self. You need to have extremely strong academic self-confidence and epistemic “poker face” so as to start think yourself as a knowledge creator rather than as a mere student. Holland and her colleagues (1998) addressed how human beings may go through dramatic developmental processes through improvisational processes of transforming their identities and “authoring their selves” in a way that change their future perspectives. In such a process, a participant may start seeing him- or herself gradually as an agent able to produce knowledge valued by a community. Human activity takes place through “figured worlds” (Holland et al., 1998) of possibilities regulated by their enacted social practices. While traditional academic practices prevailing in many fields of social sciences often do not change the figured world of an advanced student, pursuit of article-based dissertation and associated co-authoring experiences, enculturate the participants into a completely new world of collaborative knowledge creation. A participant’s way of seeing him- or herself is likely to change through overcoming obstacles involved in the publication process. Within a collaborative community, he or she learns to see him- or herself, in principle, as a similar creator and builder to authors of articles he or she is appreciatively reviewing. Nevertheless, it may require that the participant have courage to dive into the water before he or she has learned to swim. When struggling to stay on the surface and survive, the student is likely to have great deal of existential anxiety concerning whether he or she is able to grow up to meet the challenges initially completely beyond competence (Delamont wt al., 2000).

A challenge of social science students is that only a few junior researchers have a possibility (in the present system) of deep socialization to collaborative research communities that growing up to become a scientific publisher appears to call for. Simultaneously, the process is socio-emotionally extremely challenging also for those students who are growing up in professionally organized collaborative research communities (Pyhältö, Stubb, & Lonka, 2009). We have never encountered any data that would have been as emotionally laden as those from interviews of doctoral students working at highly regarded research groups of medicine and physics (Hakkarainen et al., 2013c). Many of these young people were wondering whether they are in the correct place and capable of overcoming knowledge-creation challenges encountered. Their experiments involved meeting repeated and seemingly uncontrollable failures in a way typical for natural sciences; this appeared to remind the participants concretely that they were, basically, only ordinary human beings in front of a challenge bigger than themselves: How did I get into this situation? Has there been a mistake? What happens when the community realizes that I am not so exceptional? **If students representing the absolute elite of academic students are so vulnerable in the face of intellectual challenge, how might those students feel, who are getting their first experiences of academic research and international publication.**

The interviews revealed, however, three complementary types of knowledge-creating agency that played crucial role in negotiating insurmountable challenges.

1. **Personal agency** supported by cultivated academic expertise, self-efficacy, and character strengths. These individual capabilities were important but covered only 32% of interview talk;
2. **Distributed agency** supported by community-mediated experiences of collective efficacy (as a part of this great group I can reach something that otherwise would be beyond by capabilities), sharing of expertise at a community (I do not have to know everything but can trust the competencies of the others), and socio-emotional support of peers (it was considered absolutely crucial). Addressing such distributed agency was the focus of about 47% of interview talk;

3. **Objective agency** that involved a gradual academic growth through the knowledge-creation process (21% of interview talk). Although a mountain wall appears too steep ever to be scaled (you cannot imagine yourself to the shoes a student defending her thesis), you may step-by-step grow up to meet the challenge while struggling to meet academic milestones, such as getting dissertation articles published one by one.

The participants exceeded themselves through the process and became capable of overcoming challenges that were initially completely beyond their abilities and competencies. An important role is played by social recognition that the participants get throughout the process from the supervisors, peers, and external experts. A human being's sense of his or her intellectual and creative capabilities emerges interactively in terms of seeing reflections of his or her potentials in the eyes of participants of the community or network in question. Good supervisors are able to give a **"gift of confidence"** (Mahn & John-Steiner, 2002) to their students that fosters the stronger self-confidence that they would otherwise be able to muster. It also creates a kind of safety zone in which you can try out your wings without being discouraged by repeated failures or hard criticisms you are likely to encounter. As repeatedly emphasized, the significance of collaborative working is in senior researchers carrying a part of the intellectual and psycho-social burden that the first pursuit of a challenging academic activity entails (Kamler & Thomson, 2007). Human strengths emphasized by positive psychology play a crucial role in the successful overcoming of insurmountable challenges. There are strengths that anybody may cultivate, such as passionate pursuit of learning and research, commitment to high standards of academic accomplishment, assuming a collective cognitive responsibility for an object larger than yourself, and orientation toward sharing your knowledge and competence. It is critical to cultivate collaborative research practices so as to provide young researchers with socially distributed intellectual, creative, and socio-emotional resources. Growing up to become a scientific publisher is possible when you have collaborative support and facilitation that encourages you to raise your eyes to the stars and put your butt on the line for submitting your manuscripts to publication in highly regarded journals.

Concluding comments

Based on the above considerations, I strongly recommend orientation toward international publication. Getting your studies internationally published provides a much bigger impact than mere national publication. Simultaneously, it is also essential to have your publications available to a national audience; it is an important aspect of societal influence. The main question is not to publish in foreign languages but learning to make, through rigorous peer reviews, contributions that become a durable part of global cultural knowledge. Pursuit of article science forces the young researcher to considerably raise standards and, thereby, improves the quality of social scientific research. International publications may not only significantly contribute to advancement of scientific discourse but also make a permanent and cumulative impact on scientific credibility. Scientific articles are read, cited, and reused even after many decades. From the perspective of a beginner, refereed international publications are critical because without them it may be hard to get stable funding or manage in academic competition. International publication opens the door to scientific and university positions. Getting an academic position is getting harder and harder across of disciplines and requires more and more recognized merit. Pursuit of international publications may also provide access to competitively distributed "good" academic money that allows focusing on research activity.

In many social scientific departments, quantity rather than quality appears to be valued. Many nationally publishing researchers do not have a clear understanding of the challenges encountered when getting an article published in a high impact journal. Getting articles to highly regarded

journals require systematic efforts of improving the quality of your research in terms of theoretical and methodological rigor and using complementary methods of addressing longitudinal and developmental processes. Success is possible only through systematically working at the edge of competence exploring boundaries, trying to reach farther, and learning from failures. Try to follow the present guidelines for working step by step toward producing successively more ambitious manuscripts from conference abstracts to extended abstracts, full conference papers, book chapters to journal articles. It is critical to invest systemic efforts in raising standards and levels of publications. Create your own waves of publication from cemetery publications to who-you-know publication, and journal articles. Even if you start from less highly regarded forums, you can gradually try to move toward publications with higher impact and initiate a fourth wave of publishing in cutting-edge forums!

Journal science has been criticized for bringing formerly unknown marketing mechanisms to universities and subjecting master's and doctoral education to increased and reifying academic competition; this may violate the fundamental humanist values of universities (Guttorm et al., 2014; Slaughter & Rhoades, 2004). A student's development may be hindered if their thesis are reduced to external publication requirements. Journal science has well-known limitations. Publication pressure may encourage investigators to repeat the same studies with small variations. People could, for tactical reasons, start putting their names to each other's articles. In natural sciences and perhaps also in some social scientific groups, a student's investigation is a small part of a larger whole, and he or she may not experience it as personally significant. If orientation toward international publication would reduce a student's possibilities of deciding the direction and nature of his or her own investigations, it could have some negative consequences. I do not want to ignore the limitations and constraints of journal science but I think that the advantages outweigh the limitations in these respects: a) the quality of investigations rises by using an extended expert community (including also the reviewers) and making appropriation of even the most challenging academic knowledge practices possible to students; b) after learning to publish internationally the participants have a freedom to orient their investigations in any way they would like to.

Publication is its own game and the purpose of this guide is to reveal some of its rules and principles. I do not, however, consider that academic game to be an end in itself; the starting point has to be that you and your community have something worthwhile to say. Investigative projects that you create have to be significant from the perspective of the scientific community, society and ultimately humankind. It is more and more often emphasized, when struggling with atmospheric change, sustainability of Earth or radical inequality (Facer, xxxx; Homer-Dixon, xxxx), that you cannot reach excellence by focusing on cultivating mere narrow skills and personal expertise. Excellence can be reached when cultivation of higher-level cognitive competencies is integrated with deliberate practice of an ethic of responsibility for the wellbeing of future generations (Gardner, Csikszentmihalyi, & Damon, 2001). Only when you have some deeper reason than your own personal interests to become sparked and inflamed by your studies, will creation of a publication culture have broader significance.

My contention is that it is both important and enjoyable to orient toward collaborative publication whenever it is possible. Working with a manuscript together with your peers and supervisors is often pretty inspiring. I would suggest transforming publication projects to processes of collaborative knowledge building by asking others to join your investigation. If you are skillful writer, it is important to learn to appreciate also other contributions that may be required to construct a strong manuscript submission arising from a complex investigation. You do not need have a professorship to start to collect a group people collaboratively investigating and writing, a group that may gradually become known through its publications. Be willing to create partnerships with all

participants from whom you can learn and who can learn from you, and pursue collaboration with them.

A list of things that a maker of an article manuscript needs to remember:

1. Select an interesting investigation that, in terms of multi-level data and analysis, represents at least a good quality master's thesis (e.g., an interesting perspective, a little bit broader than usual data; complementary bodies of data, rigorous analysis, interesting results – at least some of these characteristics).
2. If you plan a co-authored publication, agree with the others about the process of making the article as well as about the division of labor;
3. Go through publication forums which are the outlets for the academic community whose discussions you would like to contribute. Go through journal webpages and familiarize yourself with the theoretical and methodological focus of journals and select one of them as the target.
4. Make sure that the targeted journal is categorized as high quality (use webpages of Finnish Societies of Learned Societies, if needed (finding a journal is sometimes easiest by using ISBN number); check also the journal impact from the webpages or the Internet.
5. If you are unsure whether the journal is suitable, consult your supervisor. You may also send your abstract to an editor and ask his or her opinion.
6. Go through articles published in the journal across the last two-three years and familiarize yourself with their nature and style. Read carefully articles closely related to your own so as to have a sense of discourse and useful citations.
7. If you are working with a master's thesis, transform it to a manuscript with required size and shape (Table 1) across successive editing cycles until the desired – compact and coherent – document has been created.
8. Submit your manuscript to (native) English-language editing and make sure that the manuscript is very carefully prepared, that there are no grammatical mistakes or weaknesses due to sloppiness; such limitations could lead to negative review results. Be aware of which variety of English is used and required in the journal.
9. Familiarize yourself very well with Instructions for Authors and prepare the manuscript carefully according to instructions (structure, textual formatting, references, formats of text, table and figure files).
10. Construct a cover letter explaining authors, affiliations, length, number of tables and figures as well as description of research context.
11. Make sure that all authors accept the final version of the manuscript.
12. Submit the manuscript to evaluation through an online submission portal and fill in, carefully, all text boxes.
13. Wait for review statements; journal pages or instructions for authors often inform investigators how long it typically takes. It is likely to take several months (some journals are committed to a quick review process). If evaluation statements are excessively delayed, contact the editor of the journal; usually this speeds the process up.
14. When review statements return, immediately distribute them to all authors and go through them as soon as possible with your supervisor or another senior researcher; read them through many times so as to understand where and why your investigation did not communicate to the reviewers as expected.
15. Partition review statements to separate critical points across reviewers and organize them thematically. Take critical remarks as comments to the corresponding places in your

manuscript to assist in revisions. Create a table or a list of thematically organized corrections and explain to reviewers in the context of each critical point how their comments were taken into consideration.

16. Make simple and technical corrections directly to the text and implement deeper changes agreed with your supervisors one by one. Take the critical comments seriously and make the deep changes that adequate responding requires. In many cases, it means substantial rewriting, finding of new literature, reanalyzing results, and so on. Simultaneously, it is important to keep your efforts manageable so that you change only as much as needed and no more.
17. Read your revised manuscript carefully through several times and improve it until it again constitutes a coherent and well-elaborated whole.
18. Resubmit your corrected manuscript to the next review cycle with a cover letter detailing the corrections with a table or list.
19. If the manuscript is rejected, return to the beginning, find a new publication forum, tailor the manuscript accordingly, and submit it again for evaluation.
20. If you get new review statements, implement requested corrections, which are likely to be somewhat smaller, in the above described way.
21. When the manuscript is accepted, read the proofs carefully to ensure that there are not new mistakes and provide the requested missing information (usually details of “in press” publications at references)
22. When the article is accepted, it may be useful to put the last draft version (Word file converted to pdf format) to a website to make sure that interested investigators across the globe will find it.

Acknowledgements. I would like to thank the Academy of Finland for funding the Collective Intelligence project (127019) as well as the University of Helsinki for funding the Tohtis project (2106008); the present investigations were carried out in the frames of these projects. I would like to thank participants of these projects, most notably Kirsti Lonka, Kirsi Pyhältä, Kaisa Hytönen, Juho Makkonen, Jenni Stubb, and Jenna Vekkaile for inspiring discussions regarding many ideas presented in this guide. Corresponding warmest thanks belong also to research leaders and doctoral students that my colleagues and I have interviewed. Whatever I have learned about these issues has always meant co-learning with my students, colleagues, and supervisors. I am grateful to Hal White who assumed responsibility for the English-language editing of this document. Production of this document has been supported by SEDUCE doctoral program (Faculty of Behavioral Sciences, University of Helsinki).

References

(all of my articles mentioned below are in draft form available at my academia.edu site [www.http://helsinki.academia.edu/KaiHakkarainen](http://helsinki.academia.edu/KaiHakkarainen))

- Bakhtin, M. (1981). *The dialogic imagination: Four essays*. Edited by Michael Holquist. Austin, TX: University of Texas Press.
- Bakhtin, M. (1986). *Speech genres and other late essays*. Austin, TX: University of Texas Press.
- Bazerman, C. (1988). *Shaping written knowledge: The genre and activity of the experimental article in science*. Madison, WI: University of Wisconsin Press.
- Bazerman, C. (2004a). Intertextuality: How texts rely on other texts. In C. Bazerman & P. Prior (Eds.), *What writing does and how it does it: An introduction to analyzing text and textual practices* (pp. 83-122). Mahwah, NJ: LEA.
- Bereiter, C. (2002). *Education and mind in the knowledge age*. Hillsdale, NJ: Erlbaum.
- Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, NJ: Erlbaum.
- Boice, R. (1993) Writing blocks and tacit knowledge. *Journal of Higher Education*, 64, 19-54.
- Collins, A., Joseph, D., & Bielaczyc, K. (2004). Design research: Theoretical and methodological issues. *The Journal of the Learning Sciences*, 13, 15-42.
- Delamont, S., Atkinson, P., & Odette, P. (2000). *The doctoral experience*. London, UK: Falmer.
- Donald, M. (1991). *Origins of the modern mind: Three stages in the evolution of culture and cognition*. Cambridge, MA: Harvard University Press.
- Donald, M. (2001). *A mind so rare: The evolution of human consciousness*. New York: Norton.
- Dudley-Evans, T. (1999). The Dissertation: A Case of Neglect? In P. Thompson (Ed.) *Issues in EAP Writing Research and Instruction* (pp.28–36). Reading: Reading University, Centre of Applied Language Studies.
- Dysthe, O. (2002). Professors as mediators of academic text cultures. *Written Communication*, 19, 493-544.
- Edwards, A. (2005). Relational agency: Learning to be a resourceful practitioner. *International Journal of Educational Research*, 43, 168-182.
- Engeström, Y. (1987). *Learning by expanding*. Helsinki: Orienta-Konsultit.
- Facer, K. (2011). *Learning futures: Education, technology, and social change*. London: Routledge.
- Fleck, L. (1979, originally published in 1935). *Genesis and development of a scientific fact*. Chicago: The University of Chicago Press.
- 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.
- Gardner, H., Csikszentmilyai, M. & Damon, W. (2001). *Good work: When excellence and ethics meet*. New York: Basic Books.
- Geisler, C. (1994). *Academic literacy and the nature of expertise*. Hillsdale, NJ: Erlbaum.
- Gleick, J. (1992) *Genius: The life and science of Richard Feynman*. New York: Vintage Books.
- Green, H., and S. Powell. (2005). *Doctoral Study in Contemporary Higher Education*. London: Open University Press.
- Guttorm, H., Arvola-Orlander, A., Niemi, A.-M., Vaahtera, E., Mertanen, K., Tammi, T., Mononen-Basista, S., Brunila, K., Kouhia, A., Paakkari, A., Kainulainen, V., Ikävalko, E. (2014). Akateeminen

kapitalismi ja kollektiivisuuden paradoksaalisuudet tohtorikoulutuksessa. *Aikuiskasvatus*, 33, 121-128.

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

Gruber, H., Sinatra, G. M., & Säljö, R. Publishing in scientific journals. A presentation for doctoral students. EARLI Executive Committee and University of Regensburg, Germany.

Hakkarainen, K. (2003). Can cognitive explanations be eliminated? *Science & Education*, 12, 671-689.

Hakkarainen, K. (2009). A knowledge-practice perspective on technology-mediated learning. *International Journal of Computer Supported Collaborative Learning*, 4, 213-231.

Hakkarainen, K. (2014). About the structure and content of academic research proposal: Instructions of making an academic research proposal available at: https://www.academia.edu/1746739/Kai_Hakkarainen_2014_The_structure_and_content_of_an_academic_research_proposal

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. (2013a). Kollektiivista mallia voidaan soveltaa kasvatustieteiden tohtorikoulutuksessa. *Aikuiskasvatus*, 33, 278-289.

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._Hytönen_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. (2013b). Inter-agency, 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.

Hirschmann, M. & Gruber, H. (undated). How young researchers spread their wings. a study on doctoral students' enculturation into the scientific community. A manuscript submitted for publication. CHECK

Hirsjärvi, S., Remes, P., & Sajavaara, P. (1997). *Tutki ja kirjoita*. Helsinki: Tammi.

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.

Homer-Dixon, T. (2001). *The ingenuity gap: How can we solve the problems of the future*. London, UK: Vintage.

Honneth, A. (1995). *The struggle for recognition: The moral grammar of social conflict*. Cambridge, UK: Polity Press.

Hyland, K. (2004). *Disciplinary discourses: Social interactions in academic writing*. Ann Arbor: The University of Michigan Press.

- Hytönen K., Makkonen, J. & Hakkarainen, K. (2012). Yhteisjulkaiseminen: Jaettu akateeminen tietokäytäntö. In T. Soini & K Pyhäلتö (Eds.). *Akateeminen ohjaus tohtorikoulutuksessa* (Pp. 218-233). Tampere: Tampere University Press.
- Johns, A. M. & Swales, J. M. (2002). Literacy and disciplinary practices. *English for Academic Purposes*, 1, 13-28.
- 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.
- Kulmala, M. (2009). How to write publications /proposals. Presentation at Stockholm 11.12.2009.
- Kwan, B. S. C. (2013). Facilitating Novice Researchers in Project Publishing during the Doctoral Years and Beyond: A Hong Kong-based Study. *Studies in Higher Education* 38 (2): 207–225.
- Lave, J., & Wenger, E. (1991). *Situated Learning: Legitimate Peripheral Participation*. Cambridge, UK: Cambridge University Press.
- Lonka, K (2003). Helping doctoral students to finish their theses. In L. Björk, G. Bräuer, L. Rienecker, G. Ruhmann, & P. Stray Jørgensen, (Eds.) *Teaching academic writing across Europe*. Kluwer Academy Press.
- Lonka, K., Chow, A., Keskinen, J., Hakkarainen, K., Sandström, N., & Pyhäلتö, K. (2014). How to measure PhD students' conceptions of academic writing – and are they related to wellbeing? *Journal of Writing Research*, 5, 249-269.
- Lonka, K., Hakkarainen, K., Ferchen, M., & Lautso, A. (2005). *Psykologia!. 1. kurssi*. Helsinki: WSOY.
- Mahn, H. & John-Steiner, V. (2002). The gift of confidence: A Vygotskian view of emotions. In G. Wells & G. Claxton (Eds.), *Learning for life in the 21st Century. Sociocultural perspectives on the future of education* (Pp. 47-58). Cambridge, MA: Blackwell.
- 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 Publishing
- Novotny, H. (2003). Dilemma of expertise: Democratising expertise and socially robust knowledge. *Science and Public Policy*, 30 (3), 151-156.
- Olson, D. R. (1994). *The world on paper: The conceptual and cognitive implications of writing and reading*. Cambridge; Cambridge University Press.
- Ong, W. (1982). *Orality and literacy: The technologizing of the word*. Methuen, London.
- Paavola, S., Lipponen, L., & Hakkarainen, K. (2004). Modeling innovative knowledge communities: A knowledge-creation approach to learning. *Review of Educational Research*, 74, 557-576.
- Paavola S. & Hakkarainen, K. (2014). Trialogical approach for knowledge creation. In Tan S-C., Jo, H.-J., & Yoe, J. (Eds.), *Knowledge creation in education* (53-72). Education Innovation Series by Springer.
- Pare, A. & McAlpine, L. (forthcoming). Entering the text: Learning doctoral rhetoric in education. In D. Starke-Meyerring et al., (Eds.), *Writing in the knowledge society*. Toronto: Canadian Association of Teachers of Technical Writing.
- Prior, P. A. (1998). *Writing/disciplinarity: A sociohistoric account of literate activity in the academy*. Mahwah, NJ: Erlbaum.

- Prior, Paul, & Shipka, Jody. (2003). Chronotopic lamination: Tracing the contours of literate activity. In Charles Bazerman & David Russell (Eds.), *Writing selves, writing societies* (Pp. 180-238). Fort Collins: The WAC Clearinghouse.
- Pyhältö, K., Stubb, J., & Lonka, K. (2009). Developing scholarly communities as learning environments for doctoral students. *International Journal for Academic Development*, 14, 221-232.
- Ritella, G. & Hakkarainen, K. (2012). Instrument genesis in technology mediated learning: From double stimulation to expansive knowledge practices. *International Journal of Computer-Supported Collaborative Learning*, 7, 239-258.
- 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.
- Schank, R. (1999) *Dynamic memory revisited*. Cambridge, MA: Cambridge University Press.
- Scardamalia, M. (2002). Collective cognitive responsibility for the advancement of knowledge. Teoksessa B. Smith (toim.), *Liberal Education in a Knowledge Society* (s. 67-98). Chicago: Open Court.
- Slaughter, S & Rhoades, G. (2004). *Academic capitalism and the new economy: Market, state, and higher education*. Baltimore, Maryland: The John Hopkins University Press.
- Yin, R. K. (2009). *Case study research. Design and methods*. Applied Social Research Methods Series, Volume 5. Los Angeles, CA: Sage.
- 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.
- .

Appendix A. A description of the structure and content of empirical research article

In what follows, I explain the structure and content of various subsections of an empirical research article. I am using a similar structure to guide my students' structuring of Master's theses as well. In the context of a Master's thesis, I would like to emphasize that is not only a recommendation to an actual structure on which you need to anchor your manuscript. When necessary, this structure model can be adapted to the nature of your own questions, methods, data and analysis. All sub headings do not need to be used (and you can use more expressive headings), but it is important that corresponding issues be addressed in the manuscript. Instructions for Author may involve some further structural guidelines that you need to familiarize yourself with. When constructing this appendix, I partially relied on text included in my instructions concerning structure and content of academic research proposal (Hakkarainen, 2014), although the text has been somewhat edited for the present context.

My instructions for Master's students and article writers is to begin creating, at the very beginning, a document structured according to this appendix; in that way you can create a kind of a skeleton of the targeted epistemic artifact that your start filling in step by step. If you are too tired to do creative writing, perhaps you are well enough to edit your tables or complete references.

Title: Memorable and striking as well as expressive. It is worthwhile to put effort into considering it because it crystallizes the core of your investigation and sparks readers' interest.

Authors. Give authors' names with (letters of first names), institutional affiliations, and contact information. As mentioned in the main text, the authors are in the following order of importance in relation to their contribution 1. author, 2. author, last author (usually supervisor or research leader) and the other authors. One authors is nominated as corresponding author for keeping contact with the journal ("correspondence concerning the present manuscript should be sent to P. P.").

Abstract

The abstract crystallizes the background, methods, results of your study, and their significance. Writing the abstract is a truly essential aspect of your study because readers often decide on the basis of abstract whether they read your article. Writing the abstract forces you to clarify and crystallize to yourself as well as to readers what is the core point of your investigation. The abstract should be written so an outsider clearly understands what your study is all about. 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. 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 main results and their significance). An abstract is usually 150-300 words long. It is written after everything else has been completed.

Keywords: Create a compact list of key concepts concerning your study and use the same concepts systematically to refer to a target phenomenon (even if there is a danger of repeating).

1. Introduction

This section introduces readers to 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 ‘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 parts of the study, such as research goals, method, expected results, and discussion of significance of the study because the reader needs to be reminded several times of 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 hypotheses 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 economical 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).

The introduction needs to be tailored and customized according to the publication forum and anchored on scientific discourse going on in that journal. The point of scientific research is not to make knowledge from scratch but expand, deepen, and advanced investigative lines that other researchers have also been working on. When you are preparing the introduction, you need to do focused literature review from the perspective that you ended up when framing your study. The introduction has to be very compact (usually no more than 20% of the manuscript); hence it could be challenging to write the introduction in a way that assists an outsider to understand and appreciate a potentially complex research domain. Different journals vary in the extent to which theoretical discourse is emphasized; the *Journal of the Learning Sciences* tends to presuppose that manuscripts also advance theoretical discourse through providing new perspectives, beyond reporting highly interesting and significant findings. If your study 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’s or master’s studies; in such case, it may be relevant to explain an earlier study and how its results guided the present investigation. Your study becomes more convincing if you can show that you have already investigated the theme by carrying out pilots and former studies.

The purpose of the introduction is to integrate themes addressed in a way that communicates to readers a coherent story with a clear red line so that the text flows naturally from one theme to another, without giving a list-like and unfinished impression. Do not copy sentences from one place to another (abstract to text and vice versa) but invest efforts for saying things in exact, expressive and fresh ways. In a good manuscript concepts and theories are adapted to the purposes of the manuscript through the authors’ own interpretations rather than taken as ready-made entities out there. Do not just describe what references say something, but anchor all ideas to the

frames of your own study. Blend paragraphs together by writing connecting sentences that integrate earlier issues and anticipate subsequent ones. Sometimes you need tables or figures to illustrate and model concepts and their relations. In many cases, the introduction is completed only after the other parts of the manuscript have taken their shape. From the perspective of coherence, it is critical that all concepts and themes addressed in later parts (in relation to variables analyzed) have been defined and anticipated in the introduction. Because of that the introduction needs to be refined, even reworked, when completing manuscript, so as to reach sufficient coherence. At the end of introduction, you may need meta discourse explaining your structure and how your article will proceed to address various issues.

Research aims

At the end of introduction you should present your overall research goals, as well as more specific objectives that may be numbered as separate research questions to be answered in the study. Although defining hypotheses 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 pre-specify definitive hypotheses. Educational phenomena are seldom understood so well that you need to explicitly test hypotheses in the way characteristic of experimental studies; at least this is not the way I am used to frame my studies.

Usually there are several goals, as well as specific objectives or questions to be addressed. Although it could be instructive to crystallize research questions to single sentences, it is often useful to explain and specify content, meaning, and interpretation of 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 one starts from whatever results are in hand and infers 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 to (there is reciprocal influence between your plan that guides result analysis and the nature of data and results that reshape the questions). 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 have changed your original perspectives and orientations. When writing an article, internal coherence is the most important this; you should ask—that is, present-- only questions that your data truly provides answers for.

2. Method

This is the second main section of an article, which mediates the relation between theory and data. This absolutely core section explains how the investigation was carried out; thus the methods of data acquisition and analysis provide information that allowed answering research questions embedded in the theoretical framework. The Method section explains the operationalization of the research concepts, i.e., how the investigation were transformed to a coherent and meaningful research process having all elements and aspects of supporting one another. Methods should

be described in a way detailed enough so that anyone could, in principle, replicate your study. Even if shortening of other elements of the manuscript may be necessary because of length limitations, it is not usually wise to compress the method sections too much because assessing the overall feasibility of the study relies on adequately detailed presentation of methodology. Focus on concretely describing how your study was carried out without extensive philosophical discussion of methods. Completed investigations are usually reported in past tense.

2.1 Participants (and setting)

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 which 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 a large number of cases. If the 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 study. When you have a small number of participants, it is useful to have a table to present a summary of them, their backgrounds and the size and shape of data collected from them (e.g., length of interviews in minutes or words).

2.2 Data acquisition

In this section, you describe and justify methods used in your study 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, but you may state the main ones on which you draw. 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.

Describe, in the Method section, the operationalization of your investigation; how the target phenomenon was measured through categories created and utilized. 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. When commenting on manuscripts of my 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 article, in the perfecting of which you need to invest great deal of time.

2.3 Data analyses

The methods 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 have used 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.

Report results analyses in a detailed way so as to provide a concrete and convincing view of your investigation. How data analysis is emphasized depends on the nature of investigation. If you have engaged in advanced statistical modelling of developmental processes, explaining details of data analysis is more important than in the context of an explorative qualitative study.

It is a good practice to use transparent ways of describing your methods. One way of doing it, is to provide readers a table like Table 2 that in parallel introduces your analytic categories, their explanation (explicating your own interpretation of them), and corresponding excerpts of your data. This kind of table allows readers themselves assess how plausible your categories are and whether the analytic choices make sense to them and appear trustworthy.

Table 2. Classification categories and data excerpts

Category name	Explanation	Data excerpt
Name of category A	Explanation of category A	Data excerpts regarding category A
Name of category B	Explanation of category B	Data excerpts regarding category B
Name of category C	Explanation of category C	Data excerpts regarding category C
Name of category D	Explanation of category D	Data excerpts regarding category D

Notice: From each category you could present several excerpts, if necessary. Use this kind of notes to explain the table to readers so that they can understand it without reading the text.

3. Results

In this core section you present detailed analysis of your results. It is natural to structure results analysis thematically according to the research questions. Use tables and figures to crystallize your research results. Because the Results section tends to be long you need to assist readers in navigating through it. Toward that end, you need immediately in the beginning of Results, meta texts explaining how it is going to be structured and how you plan to proceed.

3.1 Results analysis in relation to the first research question

In this section, we analyze results in relation to the first research question. When necessary, research questions have to be reframed so that the most interesting results are their answers. Remember that tables and figures have to explain themselves without reading the main text (use informative enough captions and notes, remarks at the bottom of table or figure). Make sure that the text flows fluently from one paragraph to another, even if occasionally interrupted by tables and figures. When necessary, create integrative sentences and paragraphs between sections that conclude what was said before and what will be addressed subsequently.

3.2 Results analysis in relation to the second research question

In this section, you will function in a similar way. Overall, in the results section you should focus on a pretty plain description of results without new references to literature or extensive interpretations; making interpretations and going back to theory and other studies belong to the discussion. Of course, in this regard different disciplines have varying practices that you should reflect on during literature searches. In social scientific studies it is important to present abstract (e.g., statistical) analyses in parallel with your actual data. Rather than masking your data with abstract statistical (e.g., frequency tables) comparisons, it is a good idea to let your data to talk through interview quotations or other transcriptions of data collected.

3.3 Results analysis in relation to the third research question

Structure results analysis among the most important findings and structure according to research questions. Make sure that the result analysis is progressing logically and comprehensively (keep up the red line). In many cases, weaknesses of the presentation of the results ruin otherwise ade-

quate investigations. When necessary you may summarize results locally at the each of each section or as a separate last section; integrate two or three separate analyses together. Focus, however, mainly merely on describing (setting out) results. Relating results to other studies or bigger conceptual issues will take place in the discussion section.

4. Discussion

4.1 Reliability and validity

You need to address reliability and validity either in methods or in discussion. I used to do it in the beginning of discussion but many people return to these issues only at the end of the discussion. 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 in parallel columns (so that the reader can assess the convincingness 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 to yourself about how to justify the validity of your investigation; on what grounds do you argue that different instruments developed in the study assist in assessing the target and that they have, in fact, the same target.

There are no perfect studies and all social scientific ones have their limitations. By bringing methodological challenges to the front, yourself, you indicate a sophisticated understanding of challenges and constraints of your own study. Usually this works to your advantage, if you are not overdoing it.

4.2 Synthesizing results

This section gives an overview and synthesizes your research in relation to the research questions; how did you manage to answer them? While the results section might have involved local integration of results, here you have to do it, in Discussion, on a higher level in relation to the research questions.

4.3 Significance of findings

In Discussion, you need to go back to conceptual and theoretical themes and associated "big ideas" and relate your study with parallel investigative efforts. Discussions that merely summarize results are not inspiring and lead to poor reviews; it is a major, if not fatal, defect of many proposed Discussion sections. You need to rise above the investigation pursued at connect it to a

broader context. When addressing the significance of the study, the reader is reminded of theoretical perspectives addressed in the introduction. Explain what your results mean by putting them into context of other studies. How does your study advance investigations? What new perspectives emerge? The discussion may end up envisioning themes that appear promising avenues of advancing the line of inquiry in question.

In social scientific studies, it is important also to reflect on the societal impact of results. 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 starting to give way 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 plays a more and more important role in academic investigations. Therefore, it is a good idea to include a couple paragraphs or a few sentences regarding involvement of your participants in shaping your study, collecting and interpreting the data and giving feedback. This is crucial, for instance, is those educational design experiments which aim at improving pedagogic practices prevailing at school and subsequently further developed in collaboration between students, teachers, and researchers.

Contribution by all authors). Describe each participant’s role in the investigation and writing of the manuscript. This is critical from the perspective of junior researchers who may use the manuscript as a part of their thesis. If your study was funded or supported by external stakeholders, you may thank them here, mentioning an associate project number. It is customary also to thank collaborators as well as participants of your study who contributed its success but were not included as authors.

References

Include in references only those sources that you actually refer in the text. Present carefully selected references that anchor your study to the targeted scientific discourse. International publication should not rely mainly on national references; you may refer to original national studies but put extra effort into finding relevant international references. In the article context, you will have truly limited space so that only the most important references can be included. Because readers are using your references in their own detective work, it is a good idea to refer to earlier studies of you and your colleagues; this will guide interested readers to relevant sources.

Take extra care of taking care and formatting your references. In order to give a good overall impression, each detail is essential! Follow systematically some style of presenting references, such as that of American Psychological Association (APA). From the Internet you can find example reference lists formatted by various publication standards³; references of this guide were also formatted according to APA. If you have time, learn to use a reference management system, such as

³ https://owl.english.purdue.edu/media/pdf/20090212013008_560.pdf

Reforworks, and use it systematically from the beginning to the end. You should deal with references carefully in your text and make sure that each period or comma is in its correct place. All references should be within sentences, rather than as text fragments after paragraphs (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 write on deep topics that contribute to the development of content.

I ask 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 in your list are mentioned in text, and that you have not mentioned references in the text 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).

Check and recheck for exact agreement (text -> reference; reference -> text) of references listed in the text and in the reference list, according to APA guidelines: Make sure that the reference list includes all sources mentioned in text, and your reference list does not include references that were, perhaps, deleted in the text.

Appendixes

Put large, one- or two-page tables or figures as appendixes.

Appendixes may contain large samples of your data or analyses.

Nowadays it is rather common to have a part of your study published as an appendix that can be downloaded from the internet. There could be a whole research instrument (self-report questionnaire; interview framework) anonymized data (e.g., sample interviews) or dynamic visualizations (e.g., 3D network graphs). Having such extra material available, which does not fit in your main article text, might make your study more convincing than otherwise would be the case.

If you are publishing your study in an online journal that allows using various colors and sometimes also 3D visualization (at least to have links to them), remember to ensure that such entities will also function in conventional grey-scale printing..

Appendix B. Authors' responses to reviewers' criticisms. An example of a hypothetical authors' hypothetical responses to reviewers' critical comments (although this table serves only illustrative purposes, this is a rather typical case of peer reviewing a social scientific manuscript. Notice how critical comments are, simultaneously, like instructions for improving the target manuscript!)

Typical review comments	Possible responses and corrections by authors
<p>General comments -An overall weakness of your article appears to be that you do not sufficiently separate normative and descriptive issues from one another (Reviewer 1).</p>	<p>-We have worked through the text and tried to separate normative and descriptive issues; describing more neutrally how the participants functioned and explicitly indicated when normative evaluation was considered necessary</p>
<p>Abstract I had to read the whole article before truly understanding the abstract (Reviewer 3)</p>	<p>-The abstract was rewritten so as to more comprehensively communicate purpose, methods, findings, and their significance</p>
<p>Introduction -The introduction appears only to list earlier literature without a clear red line leading to research questions (Reviewer 2). - The introduction does not involve references regarding one of the key concept included in research questions and methods (Reviewer 1) -The introduction does not include references to gender issues playing important role in the result analysis (Reviewer 3) - You conceptualize learning only at a superficial level in the introduction; such weakness appears to affect your methods and results (Reviewer 2) -You do not sufficiently assist readers to in achieving an integrated view of the issues addressed (reviewer 3)</p>	<p>-We have rewritten the introduction so as to improve coherence of the text and adequate flow of ideas -We have defined the key concept mentioned and addressed with references associated body of literature -We have added references to earlier studies regarding gender effects so as to anticipate the results -We have deepened our way of addressing learning related issues and have included an improved definition and coverage of relevant issues -We have used new literature reviewed to frame our investigation as providing a new perspective on the issues being investigated. This appears to improve coherence of the text.</p>
<p>Research aims -Research questions are too general and weakly aligned with other aspects of the study (methods and results). -Results indicate significant gender differences that were not addressed in your research questions</p>	<p>We have completely revised the questions and now have more elaborated and specific ones that structure methods and results. -We have added a question regarding gender</p>
<p>Method -Method section is weakly structure and hard to follow. It is hard to understand what methods is used to answer what research questions (Reviewer 1 & 2) You do not appear able to analytically capture learning processes; you address learning only in terms of personal experiences (Reviewer 2) -Qualitative methods are explained so fuzzily that it is hard to understand analytic procedures employed (Reviewer 3) -Please add information about quality assurance of the qualitative analyses. (Reviewer 2)</p>	<p>-We have restructured the method section according to research questions, explained each method more comprehensively, and improved overall flow of the text -We have redefined learning and reanalysed a part of the data so as to be able to account for a broader spectrum of learning processes. Our research design does not, however, allow going beyond self-reported learning outcomes. We address associated methodological limitations in the discussion -We have expanded explanation regarding qualitative methods, provided better explanations of categories employed and added an analytic table detailing categories, their explanation, and data excerpts -We have better explained our methods of trying to ensure inter-coder reliability of the data analysis. We read the data jointly many times, tried out several alternative ways of describing it, ended up with a shared framework and ensured throughout the process that our interpretations cohered.</p>

<p>Results</p> <ul style="list-style-type: none"> - Results do not have a comprehensive structure and there is not sufficient advanced organizers helping readers to follow ideas (Reviewer 1) -Results are organized according to different methods rather than research questions (Reviewer 2 & 3) -Results address gender differences that were not at all addressed in introduction or questions (Reviewer 1) -There are too many tables and figures; their function is not always clear (Reviewer 3) 	<ul style="list-style-type: none"> -We have restructured the results and added meta text that explains how we proceed with result analysis We have structured the results according to research questions instead of methods. It appears to us that the results are now much easier to understand We have added references to gender – in the introduction as well as reframed one research question so that also gender is included. -We have eliminated redundant tables and one figure; the resulting ones communicate better the main findings of the present investigation
<p>Discussion</p> <ul style="list-style-type: none"> -Discussion does not provide clear information regarding to what extent you succeed in answering each questions (Reviewer 1 & 3) -Discussion is very short and merely summarized results rather than getting back to big issues addressed in the beginning (Reviewer 2) -Discussion involved new concepts that were not introduced in the beginning of the manuscript (Reviewer 3) -The discussion should address methodological limitations regarding objective standards for measuring learning (Reviewer 2) 	<ul style="list-style-type: none"> -We have restructured discussion a bit and addressed more explicitly how the research questions were answered -We have rewritten the discussion and now come back to be big ideas addressed in the beginning of our investigation. This has, however, increased the length of the manuscript somewhat so that it exceeds the space limitation by a few hundreds of words. Let us know if this is not acceptable. - We have improved coherence of the manuscript by ensuring that all key concepts were introduced in the beginning of the manuscript -We have expanded methodological limitations section, acknowledge lack of objective standards and added a few sentences justifying the methodological approach adopted
<p>References</p> <ul style="list-style-type: none"> -Your investigation is only weakly anchored on earlier discussion appearing in the present and related journals. Many relevant references were missing, such as X and Y. -Your references do not systematically rely on APA and some of the references were missing 	<ul style="list-style-type: none"> -We have gone more carefully through earlier discussion in the field, expanded our references, and added the requested references X and Y. -We have checked the references and formatted them systematically according to APA
<p>Overall focus</p> <ul style="list-style-type: none"> -Your manuscript does not address central concepts and constructs of the present field. Because of that it might more centrally fit in and contribute to discourses of other academic communities. 	<ul style="list-style-type: none"> -We have invested great deal of efforts for profoundly reframing our investigation (including changes in question, methods, and result analysis) for making our study better contribute to the community of the present journal. We considered also submitting this manuscript to another journal but think that your perspective would nicely complement (such and such) discourses going on in the present journal.
<p>Technical comments</p> <ul style="list-style-type: none"> -Manuscript needs spelling checking. There were many minor grammatical mistakes (reviewer 1) -Here and there are sign of poor mastery of English: the manuscripts have to be English language edited (Reviewer 2) 	<ul style="list-style-type: none"> We have corrected all mistakes and grammatical errors pointed out by Reviewer 1 -We have asked a professional English language editor to go through the manuscript once again!