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Academic Literacies – Discourse and Epistemology in a Swedish University

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Academic Literacies; Discourse and Epistemology in a Swedish University

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Abstract

This article explores the perceptions of active senior researchers from different scientific and scholarly areas about scientific and scholarly writing, specifically that associated with research. The study comprises interviews with 12 researchers in four different faculties at a Swedish university: Arts, Social Sciences, Science and Technology, and Medicine. The article draws on Biglan's (1973) and Becher's (1994) four intellectual clusters, i.e. (1) *hard pure (natural) science*; (2) *soft pure (arts and social) sciences*; (3) *hard applied (engineering) sciences*; and (4) *soft applied (education) sciences* and connects them with Graue's (2006) four identified writing traditions in academia, of: *reporting, interpreting, constituting and praxis*. The findings suggest that researchers in the applied sciences see writing as having a mediating and creative function for research while, for pure scientists, writing is based on epistemology that does not attribute a mediating function to language (Wertsch, 1998). The study also indicates that researchers who are active in applied science, e.g. professional education of various kinds, are positioned at the interface between the discipline and individuals as social beings, and that they operate as epistemological boundary crossers for the faculties.

Keywords: scientific writing, pure science, applied science

Introduction

Writing has for a long time constituted the primary artefact in scientific research. For example, the new technology of printing enabled theses to be printed in the 14th century. Scientific journals first appeared in *Philosophical Transactions of the Royal Society* in London and *Journal des Sçavans* in Paris in 1665 and since then original articles have appeared in scientific journals. This implies co-operation and exchange between researchers and opportunities for researchers to communicate their writings more quickly and in greater detail than was previously possible (Kruse, 2006).

Wilhelm von Humboldt (1767-1835) laid the foundations of the first research university, Humboldt-Universität in Berlin, in 1810. It marked a change from medieval teaching practice, chiefly about communicating knowledge *orally*, to our present-day understanding of universities as places primarily for the written production of knowledge (Kruse, 2006). Writing has since then tended to unite members of the research community. At the same time, different writing discourses have emerged, associated with different scientific paradigms, epistemologies and status in academia.

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Traditional academic writing is currently being challenged in different ways. Over the last 50-60 years, a number of “crises” or “turns” have occurred in Humanities and Social Science scientific writing, e.g. the linguistic turn (Rorty, 1967), and the crisis of representation (Marcus & Fisher, 1986; Lincoln & Denzin, 1994). Such linguistic turns imply a break with the notion of language as something solely cerebral; instead, it is argued that language is a shared phenomenon. Such turns are also associated with ideas that we cannot position ourselves outside language, that language is necessary for our thinking, and that reality is linguistically constructed. The crisis of representation implies a challenge to the authority of, for example, the scientifically-educated and writing researcher. What is thus required is developed reflexivity which recognises and takes this challenge into consideration.

As a long-term consequence, such crises have resulted in what has been termed a post-modern attitude or a “post-modern turn” of language in relation to the world and science (Hassan, 1987) and, more so, in the Arts and Social Sciences (Marcus & Fischer, 1986). The core of post-modernism is the inability of any method, theory, discourse or genre to make a claim to being an incontestable form of reliable knowledge (Richardson & Adams St. Pierre, 2005).

The present study concerns how active researchers from different scientific and scholarly areas perceive scientific writing and, specifically, the writing and forms of publication associated with research. The study is based on interviews with 12 researchers in four different faculties. It explores questions concerning: (1) the function of writing in a scientific context; and (2) the epistemologies or knowledge theories, i.e. what is possible to know in what form. The writing traditions that emerge in the study thus draw on various scientific and scholarly contexts.

Area orientation

Disciplines are the lifeblood of higher education and the basis of its organisation (Becher, 1994). Becher argues that universities are composed of different (disciplinary) tribes that only in some senses share a culture. Each tribe has its own name and its territory, a distinct language or at least a distinct “dialect”, and a unique set of symbolic ways of demonstrating its difference from the rest. Sullivan (1996) refers to the internal rhetoric or scientific “bardic voice” (223) that scientists use when communicating with each other within a subject or discipline. Different “tribes” have different positions in a hierarchical system, which is apparent in the established names that are used in each fields, as is illustrated below.

Students rapidly assimilate the literacy practice that is predominant in their chosen discipline (North, 2005). As regards written production, arts disciplines value most highly the narrative dimension and demonstrate an interest in concrete events and participants, unlike the more abstract prose of Technology and Engineering (Biber, 1988). Thus, writing for Arts students is a lengthy process involving many drafts and revisions, and described as a struggle to make the text run smoothly. Knowledge is

relative insofar as oppositional views are also considered worthy of note. Further, knowledge is seen as perspective-dependent, constructed and disputed. According to Biber (1988), Science students are less likely to regard textual structure as problematic and have a different relation to writing, often resulting in one revision only. The Science text is generally organised into sections, arranged in points, is brief and aims to avoid “waffle”, i.e. irrelevance.

Arts students often refer to having difficulty in shortening texts, whereas Science students mention having to “pad out” in order to achieve the required text length. From a Natural Science perspective, writing is about facts and getting the “right answers”. Natural Science disciplines are thus characterised by disciplinary consensus with students more likely to believe in absolute knowledge than their Social science and Arts counterparts. The latter tend to emphasise critical thinking, oral and written examination, and analysis and synthesis of course content (Paulsen & Wells, 1998). Natural Science students stress the need to understand facts and figures and to describe experiments, all of which require relatively modest writing skills (Neuman, 2001). Science and Economics students are more inclined to use superficial strategies. In contrast, both History and English students are more likely to punish a reproductive orientation (Lea & Street, 1998). However, Palmer & Marra (2004) point out that, whatever their discipline, experienced researchers not only possess more knowledge of their subject areas than their more inexperienced colleagues but also have a more complex perception of scientific problems; that is, they are more sophisticated problem-solvers and reflect a more complex epistemology.

Theoretical points of departure

Drawing on Biglan (1973) and others, Becher (1994) distinguishes four principal intellectual “clusters” in academia, each of which has its unique epistemological and ontological point of departure and tradition. The *first* cluster consists of “hard” pure (Natural) Science, e.g. Physics, and according to Becher (1994) is cumulative, atomistic, and universal, quantitatively oriented and accounts for results in the form of discoveries and explanations. The cluster is competitive, its members live in flocks, it is politically well-organised, has high publication figures and is task-oriented. The *second* cluster consists of the so-called “soft” pure Arts disciplines (such as History) and pure Social Science disciplines (such as Anthropology). The cluster takes an interest in the holistic, particularity, and in qualities and complexity. The cluster is individualistic, pluralistic, loosely constructed and has lower publication rates. The *third* cluster consists of “hard” applied science (technologies such as Mechanical Engineering) and is pragmatic and practical. Know-how is especially valued and the cluster is occupied with mastering the physical environment, and by profession evaluations. Finally, the *fourth* cluster consists of the “soft” applied sciences such as Education. It is functional, power-oriented and occupied with levels of performance of (semi)-professions. Resultant activities include the accumulation of techniques (rather

than knowledge) and uncertainty about status. The cluster is extrovert in character and dominated by intellectual fashions. Its level of publications is relatively limited.

Texts and genres are mediating tools, that is, resources used for participating in social, in this case academic, practices and practice communities. Mediating tools are formed over certain periods and within certain groups and are hence associated with the values of the group and era. They are included together with other tools and practice in the means by which researchers generate knowledge together with others in, for example, a discipline. As time passes, practice becomes more automatic and subconscious (Wertsch 1998:147). At the same time, the scope of action widens. Just as physical tools make us stronger, our actions and thinking become restricted and controlled (Wertsch, 1998: 38 ff). Different academic areas and disciplines adopt different mediating tools, texts and genres, and hence represent different academic literacies or discourses.

The ways in which science defines problems, designs experiments, constructs meaning and so on is therefore culturally determined. Put differently, there is no value-free or pure science that can be separated from the science as a social practice. Following Harding (1986), epistemologies are based on the relationship between knowing and being. This means that epistemologies constitute a function of social class, gender, ethnicity etc. and there is thus no value-free description of experience to which knowledge can be reduced (Van Orman Quine, 1953).

Different scientific practices thus produce different types of packaged reports, based on specific traditions, norms and epistemologies. Graue (2006) identifies four writing traditions in academia. First, *writing as reporting* draws on the idea that the world is observable and understandable with writing viewed as a by-product of scientific activities. The second writing tradition, *writing as interpreting*, involves a semiotic representation of a process of understanding and is viewed as an integral part of the research activities themselves. The third writing tradition, *writing as constituting*, may be characterised as a specific view of the world with specific literary and rhetorical structures, which uses narrative conventions such as chronology, metaphors and various other rhetorical devices for producing meaning. The fourth tradition, *writing as praxis*, is less of a self-contained phenomenon but rather a combination of the other three. Accordingly, academic writing exists within the framework of specific action.

Method

This study is based on interviews with 12 researchers from four different faculties. The selection of the researchers was dictated by the four intellectual “clusters” in academia identified by Becher (1994). The participants come from the Faculties of Arts, Social Sciences, Science and Technology, and Medicine, respectively. Two researchers were chosen from each faculty to represent so-called pure sciences [ps] and one researcher was chosen to represent applied research [as]. All have been given fictitious names, with the first letter corresponding to the first letter of the faculty area.

Pure sciences

The “pure” sciences here are from the Faculty of Science and Technology represented by senior lecturer *Tore* [ps] (born in 1969), specialising in so-called Population Genetics; senior lecturer *Turid* [ps] (born in 1970), who has a doctorate in Plant Biotechnology; the Faculty of Medicine is represented by *Malte* [ps] (born in 1942) a male professor, specialising in Immunochemistry; *Malin* [ps] (born in 1966), a female Microbiologist or Molecular Biologist specialising in gastric ulcer bacteria; the Faculty of Social Sciences is represented by *Sven* [ps] (born in 1964), a male senior lecturer in Business Administration who describes himself as a pure qualitative researcher; *Siv* [ps] (born in 1957), a female professor of Psychology, with a professional nursing background who undertakes experimental research in laboratory situations and describes her research as both basic and applied research; finally, the Faculty of Arts is represented by a male professor of History, called *Aron* [ps] (born in 1961) and *Ann*[ps] (born in 1964), a senior lecturer in Comparative Literature specialising in theatre science and practical artistic processes.

Applied sciences

The applied sciences from the Faculty of Science and Technology are represented here by *Torsten* [as] (born in 1952) with a doctorate in Physics, but who has more recently focused on Energy Technology and applied research within the faculty and is a teacher in one of the engineering programmes; the Faculty of Medicine by *Mikael* [as] (born in 1957) who is a professor and Pulmonary specialist, representing applied research; the Faculty of Social Sciences by *Sandra* [as] (born in 1949) who represents applied research and has a background as an upper secondary school language teacher, a doctorate in Education, and specialises in basic social values; finally the Faculty of Arts by *Andre* [as] (born in 1949), a reader with experience as a primary, lower and upper secondary school teacher and in teacher education. In a table format the participants could be placed in the following boxes (Table 1).

	Pure	Applied
Hard science	Tore, Turid, Malte, Malin	Torsten, Mikael
Soft science	Aron, Ann, Sven, Siv	Andre, Sandra

Table 1: Researchers and intellectual cluster

The interviews were semi-structured and used an interview guide which focused on certain themes and included some suggestions for questions. The interviews thus aimed first to gain an insight into how the researchers think and reason about their writing. However, it is understood that interview statements are rhetorical in the sense they cannot be used to confirm practice. The interviews were conducted individually, took about 40 minutes, were recorded and then transformed (interpreted) at different stages (Wolcott, 1994; Elmfeldt, 1997; Ewald, 2007).

In processing the interviews on which this study is based, two distinct groups emerged: the researchers representing the so-called pure sciences and the researchers representing applied research (Biglan, 1973; Becher, 1994). The study draws on Graue's (2006) four identified writing traditions in academia, of: *reporting*, *interpreting*, *constituting* and *praxis*.

The study

When asked about how they look upon their research colleagues and the research tradition they represent in other faculty areas than their own, the scientists in this study have strongly rooted opinions that differences exist between the orientations and methods in research conducted in different faculties, and also with regard to the value of this research; expressing in statements a highly explicit "us and them" referring to this tribe or another (Becher, 1994; 1989/1993).

Pure scientists

The historian Aron [ps] states that people in the Arts have created working methods and expressions that differ from the others, i.e. they are more likely to publish in Swedish, for example, and more likely to publish their work in monographs. In his opinion, when it comes affirming a truth or a reality, some people in Medicine and Technology may have it easier as they do not need to take as many alternative truths into account as do those in the Humanities. Similarly, Ann [ps] observes that other faculties and disciplines may have a more "unproblematic" way of approaching material. It can "simmer" in test tubes or under microscopes. As Humanities researchers, she argues, we write texts and argue from the very beginning. On the other hand, we are not so isolated; we can have a dialogue and everybody knows what it is all about. She speculates that this is not the same for those in e.g. Chemistry. The Natural Scientists have a more positivistic view, which is unacceptable in the Humanities and considered too simplistic in the discipline she represents, i.e. Comparative Literature. In contrast, Ann argues, the Faculty of Social Sciences depends on tables and quantity.

For Sven [ps] and from a Social Sciences perspective, both Medicine and Natural Science are more quantitatively-oriented fields. Like Ann [ps], he thinks that academics from Medicine and Natural Science are more locked in the system in which they had their education as doctoral students. It is a more controlled apprenticeship process. At the same time, the model adopted is seen as "educational" since students do complete their degrees there. If, on the other hand, they had been allowed to design their doctoral journey themselves, they would have tried to become more "reflective and mature" researchers. Sven [ps] observes that his own discipline has become more "streamlined", with a turn towards more quantitative work. In Psychology, Siv [ps] says, who is a medical researcher in Biological Neuropsychology, we "sit on the fence", by which she means on one hand taking a biologically-based view of genetics, and of heredity and the importance of values and upbringing on the other. Historically,

Philosophy has held a high status within Social Science as a discipline, but Psychology is now approaching the high status of Medicine and Natural Science, argues Siv.

Tore [ps] maintains from a Science and Technology perspective that Humanities researchers are scientific, but in a different way, and that the nature of science is defined differently in the different areas. Tore [ps] states, moreover, that these are “preconceived views”, i.e. that Humanities researchers are less stringent as analysts. Turid [ps] suggests that, while many things remain similar between Medical and Humanities researchers, Comparative Literature uses different tools for laboratory work. Everything is defined by the discipline. Interpreting a text is different from an experiment, and therefore requires more subjective material in the interpretation. In line with this, Malte [ps], who is a preclinical medical researcher, maintains that to be termed science, a discovery must be original, i.e. newly discovered. As regards clinical research such as that on treatment methods, it is important to work in an “investigative way”. For Malte [ps], the nature of an investigation marks it out as scientific. Arts researchers are unable to construct challenges in the same way, so the research must be different, in Malte’s view. Malin [ps] also claims that there are great differences between research fields, and also prejudices due to ignorance. She also claims to be among the least prejudiced groups of researchers in her context and declines to state how people think in her area. It is “embarrassing”, she says.

Applied scientists

The applied researchers, however, display more caution when they try to imagine what their colleagues in other faculties do, referring to different “paradigms”, “tool boxes” and “techniques”, at the same time as problematising their own methodologies which they regard as complementary to other approaches. As an applied researcher, for Sandra [as] it is largely a matter of different paradigms and types of result. She maintains that it should be possible to “take another person’s perspective and understand why things may be seen in that way”. Meanwhile, Torsten [as] suggests that researchers use different “tool boxes”: “We have completely different preconditions. In the Social Sciences and Humanities it is a matter of studying behaviours and problematising.” Mikael [as] refers to the “different techniques” used in research, ranging from more descriptive to harder data. His general point is that different research methodologies are complementary. For Mikael, making discoveries is not the only criterion of science:

In health issues, which I deal with, I also encounter Humanistic and Social Science aspects. They are important complementary techniques quite simply for describing reality, society, mechanisms, functions, how people feel. So there is no single technique that tells the whole story.

Writing, text, researcher and reality

Pure scientists

The informants believe academic writing is associated with conflicting feelings. Aron [ps] is mainly positive as regards writing, suggesting that it is easy for him and that academic writing provides an opportunity to use language otherwise not often used. He says that he holds the trump card in the sense that academic language is close to his everyday language. In contrast, Both Ann [ps] and Siv [ps] find writing both difficult and demanding, yet also pleasurable. Sven [ps], however, does not find writing easy because it does not “flow” easily. One reason for this difficulty is that he generally writes in English because he is expected to do so professionally. However, he admits that once he gets started, it can also be fun. Turid [ps] is also “ambivalent” about writing, but understands that writing is possibly the most important part of her work. Tore [ps] sees writing as a “necessary evil” because he finds writing difficult so that before each writing assignment he needs a spare week for preparation. In the meantime, Malte [ps] reports that at the beginning of his career he thought that writing was principally about conveying facts or results from the lab. Now he suggests that this was naïve; rather, it is more about producing a “coherent story”. In other words, the order in which things appear in a text is as important as the content. Texts need to be interesting and worth reading. Tore’s [ps] ambition is to make writing ordinary (rather than academic) Swedish acceptable. Malin [ps] also considers that academic writing can be both difficult and fun, and that it is important. In her opinion, doing research in isolation without communicating the results is of no use to anybody

Applied scientists

As an applied researcher, Sandra [as] expresses more interest in “the writing process”, having attended several writing courses in order to develop her narrative writing concerning e.g. how texts are constructed with a plot, tension and turning points:

... then I also assimilated the idea that it is a matter of developing your thoughts through writing instead of the other way round ... you might say that it is a reciprocal act, both in thinking and writing, so I write quite a lot.

Another applied researcher, Torsten [as], also emphasises the connection between thinking and writing for research:

In research it is an important process for producing new thoughts and structures. You see red threads. When you start writing, it may turn in a different direction from what you had in mind when you started writing. So it is an important process. But it is not always so easy.

Likewise, Mikael [as] emphasises the relationship between language and writing. Writing, he suggests, is an important tool – “a weapon”.

I have a kind of writer's empathy and try to understand how people think. It's also part of a doctor's job to some extent. We also deal with complicated things and when we see patients every day, it is about communicating in a way that they can understand.

Writing and research

Pure scientists

All the informants in this study regard writing as an important aspect of research activity. For example, Sven [ps] claims to have no problems combining the two activities, while for Siv [ps], the main question concerns the ethics with which researchers are confronted when presenting their results. Ethics are important in the opportunities available to manipulate words, she argues; thus what has been printed cannot be taken back. For Tore [ps], writing is an integral part of a scientist's activities, whereas Turid [ps] considers that the more proficient one is with language, the more highly one is valued as a researcher. Turid suggests that researchers' command of language has become increasingly important in recent years, a view confirmed by Malte [ps]:

I can sit pondering on the design of articles for days without writing anything. You can't head straight for details – they must be put in a context.

Similarly, Malin [ps] emphasises the ability to “convey” the results.

You might have produced terribly good discoveries, but if you can't convey them either to the scientific community or to the general public, then the discovery does not amount to much. That's the consequence of it.

As a Literature scholar, Ann [ps] finds it helpful to read fiction when trying to identify words and convey nuances.

... but I think it's difficult to find a living language, to find the words and the nuances sometimes and I think it helps me very much to read a lot of fiction, which is a very good tool.

As a Historian, Aron's [ps] ambition is to write as well as possible. While part of the task is to make accessible abstraction, it is also important to be able to describe reality. Aron argues that a core exists that needs describing but there are also many “variables”, and that one assumes that we can both discuss the world around us and share “observations”. It is easiest not to stir that “ant-hill”. Then it may be more or less easy to capture or describe the world in written words. Aron [ps] argues that historians like him face a positive challenge in recreating a world and a reality that no longer exists. This means that imagination has a greater scope, but also an increased level of consciousness about the reality one is describing.

For Ann [ps], language is sometimes insufficient, and then complementarity may be of value. She thus regards artistic research as a way of approaching the worlds she

seeks to understand (Springgay, Irwin & Wilson Kind, 2005), involving a process of creating art and writing.

Siv [ps] takes a middle position by admitting there are always problems involved in studying the world, on one hand, and describing it, on the other. She contends there is insufficient space to describe the “whole reality”; rather, it is enough to describe parts and to build up “the whole”, as in when building walls. Sven [ps] is convinced that, as a researcher and writer, he influences the picture he creates through his texts. Accordingly, he regards language as a “creative tool” by which the world is shaped.

Applied scientists

In the applied areas, Torsten [as] aims to be primarily a scientist and “partly a writer in some way”, where being a writer implies working with text structures and trying to make it flow. Andre [as] finds it self-evident that a researcher is also a writer in the sense that a researcher observes, reflects and writes. Torsten [as] does not regard the two activities as separate processes. Mikael [as] also considers writing as central to his research activity but, at the same time, that in developing into a researcher, science and data are paramount. It is only after the science has occurred and the data have been collected that one learns to write the whole thing down.

Writing the world

Pure scientists

Tore [ps] understands the relationship between writing and the world as relatively unproblematic. Similarly, Turid [ps] assumes that:

If you have data that is good enough, writing is no problem. But then of course not everybody deals with the little bit that I do, so how you present your data and how you write are terribly important and decisive for whether you are published or not.

In his capacity as a medical scientist, Malte [ps] has some difficulty in “getting the hang of” the question of the relationship of language to reality since, as he says, “he fiddles with molecules and how molecules react to one another”. In that sense, he finds the world observable and possible to describe by means of language. Malin [ps] is also able to describe in linguistic terms what has been discovered. Her problem is more (like Siv [ps]) that she writes in English which is always challenging since she is not able to “dress it up”. It has become increasingly important for Malin to write “in a marketable way”.

Applied scientists

As an applied researcher, Andre [as] emphasises that his resources as a researcher and writer consist of concepts. For him, the world is “real” but to some extent constructed. It is this human, world, life- or cultural world that we continually describe

and interpret. Science thus constitutes a meta-perspective on knowledge, according to Andre [as]. Sandra [as] believes writing is about experiences, which cannot be seen, are not observable but perhaps are intuited. An ethical research dilemma arises for Sandra since, as a researcher and writer, she has power over language and can select the picture she wants to show. Torsten [as] argues that formulae offer a better description than language when it comes to the picture he wants to communicate:

Language is not static, so I can imagine that it is possible to interpret it differently in different Anglophone countries. ... Formulae give a clearer description. You can see what approximations you are making.

Presence in the text

Pure scientists

All the informants state (although with somewhat different emphases) that the researcher is always present in the texts he or she creates. Yet, according to Aron [ps], one could to some extent withdraw from the context although he realises that philosophically no one can disengage absolutely. The answer for him is that, in the long run, it is how much one “shines through in the text” that is important. By contrast, Ann [ps] contends it is “inevitable” that the author is present in the text and, as a researcher of stage management, it also concerns the processes she studies. One is enormously present, argues Siv [ps]; thus, even though one may try to be objective, one cannot free oneself from subjectivity:

You try of course to be objective in your way of writing, but I think that freeing yourself completely from subjectivity would be almost inhuman.

Sven [ps] regards the issue of writing as being more about technique:

... the technical aspect makes visible what attitude you have to your own written text. Rewriting myself as the author really indicates that I wish to distance myself, that I want to pretend that my text is completely neutral vis-à-vis myself if I write as the author in the third person, which I think is an artificial method.

Tore [ps] admits that we “should not have any subjective opinion”. But, at the same time, self-interest and preconceived ideas predominate when it comes to presenting how the world functions, he adds. It is therefore inevitable that we present ourselves and our results in ways that support our images of the world. For Turid [ps], this starts with her choice of subject or discipline. She says that we come to make such choices in different ways and make interpretations on the basis of our backgrounds. On the other hand, Tore [ps] suggests that able and experienced writers can hide themselves in their texts. Thus, when Malte [ps] reads texts written 10 years ago, he recognises the language and way of thinking on a purely scientific basis. However, he

observes that his younger self was striving towards clarity and exactitude that cannot be linked to him as a person right now. Malin [ps] states that the models she uses in her research are self-created and “reflected” in a particular section of the text, i.e. the discussion. One cannot hide oneself in a text, she argues, if one has set the questions.

Applied scientists

As mentioned above, Andre [as], an applied researcher associates science and scientific writing with the “concepts” available in the scientific culture to which he belongs. Andre argues that social consensus creates reality or, more precisely, reality is socially created. The point of departure is the notion that no one can directly confront an object. Rather, knowledge is attained through the mediation of symbols (Croasmun & Cherwitz, 1982). Sandra [as] thus finds it “ridiculous” to conceive of the author of a scientific text as absent from the text. “I select the picture I want to bring out. I choose the angle and main focus, so I am not neutral”. For this reason, it is important for Sandra [as] to take care to accept responsibility. Torsten [as] likewise maintains that the writer is always present in the text in the sense that the first selection concerns areas of interest and issues of particular focus. This is followed by individually shaped forms of expression. Mikael [as] states that the text is “naturally” connected to him, but that a great deal of what he has written is filtered through various individuals and institutions. This makes the end product a kind of collective language document that implicitly gives expression to the voice of a scientific area than that of an individual researcher.

Discussion

The so-called post-modern attitude or turn of language in relation to the world has profoundly affected the Arts and Social Sciences. In this study and in connection to language and writing issues, however, attention has been called to dividing lines that run along the borders between pure scientists on one side and applied scientists on the other.

There is a strongly rooted opinion among the informants that differences exist concerning not only the orientations and methods of the research that are carried out in different faculties, but also differences in the perceived value of the research itself. We have found an explicit “us and them” and “that tribe” and “our tribe”, to echo Becher’s (1994) words. The participants confirm researchers’ self-images and images of others regarding similarities and differences between faculties. Pure scientists express themselves more categorically about colleagues on the other side of the faculty borders, while applied researchers in that sense are more hesitant and use words and concepts filled with caution.

The linguistic tool appears to be easy or difficult for different reasons, depending on whether they are a pure or applied scientist. For the pure scientists, writing seems to be problematic for chiefly technical (non-academic) reasons, such as finding the right

concepts, which are assumed to exist but may be hard to find at a particular moment, or because of their commitment to writing in a foreign language – English. Malte [ps], an author of many articles, also links pain and pleasure together in language. Writing for him is a struggle which takes time and is associated with pain. But once these hardships are overcome, a well-composed article emerges. He also mentions how to construct texts in the best possible way so that they will be effective rhetorically and reach their intended audience.

All the informants in the study regard writing as an important aspect of scientific work and as important in communicating the results of research, albeit with somewhat differing emphases. A new aspect, however, seems to have entered for the pure scientist in the academic writing of Malin [ps], Turid [ps] and Malte [ps], namely an explicit demand that texts should be more than just a factual report of scientific results. How reports or articles are structured and designed has become increasingly important. This means that rhetoric becomes more important connected to the question of whether knowledge and truth exist outside discourse, i.e. the old controversy on the distinction between fiction, rhetoric and subjectivity on one hand, and facts, pure language and objectivity on the other (Pierre, 2005).

The applied researchers believe writing involves more than technical issues. For Andre [as], it is evident that the researcher must also be a writer – and that it is one and the same process. This relates to Sandra's [as] claim that thinking and writing about research are reciprocal processes, and to Torsten's [as] supposition that a scientist is "partly" a writer. The applied researchers in the study thus place greater emphasis on the relationship between language and thought. Sandra [as], for example, calls this relationship a "reciprocal act", i.e. a form of mutuality, where one thing leads to another and back again. This is close to Torsten's view of "process" and "new thoughts and new structures" in connection with writing. Writing may be difficult and demanding, but it is an integral part of researchers' work.

As a result, we can see that different positions crystallise as regards researchers' views of language and its possibilities to capture reality. For pure scientists, the world is describable and language is hence more an unproblematic tool for them as researchers in terms of language philosophy rather than in a practical technical sense. Applied scientists instead emphasise language and writing as creative and mediating tools and, simultaneously, as more fundamentally problematic to research.

Nearly all the informants agree that the author cannot be concealed in the text, but for different reasons. Aron [ps], for example, expresses awareness of the philosophical side of writing and of the impossibility of "disengagement" from a text, but chooses not to allow this to affect his daily writing to any great extent. Turid [ps] argues that experienced writers are more able to hide themselves in the text. Turid [ps] and Malin [ps] take yet another more technical position. Malin [ps] refers to the discussion section of any academic text as the place where the author appears most clearly, implying that the writer is less visible in other places. For applied scientists,

for example for both Andre [as] and Sandra [as], the issue leads more to the assumption of explicit philosophical standpoints that have consequences for their everyday (and academic) writing.

Conclusion

As regards the answer to the first research question, “what function does writing have in a scientific context”, a pattern appears implying that the linguistic tool may be difficult or easy to handle for different reasons; for example, either in technical terms or for reasons to do with the problematising of the relationship of language to reality and writing as part of the cognitive processes of research. Different positions are also evident concerning language and its possibilities to describe reality. Language, or language *and* writing, are conceived of as fundamentally problematic in research contexts. At the same time, writing is unanimously considered as integral to the researcher’s work and as important for communicating results, but with different emphases. If two extremes are imagined, at one end lies the notion, mostly among hard pure scientists, that language is primarily a means of writing down or accounting for facts. The writing task is completed when the facts have been established and recorded. At the other extreme and among applied scientists, especially stressed by the soft applied scientists, but also visibly by hard applied scientists, lies the notion that writing is a lengthy process intimately connected with thinking, and as a reciprocal act. This position includes the perception that it is difficult or impossible for the author to be concealed in the text since they are aware philosophically of the impossibility of “disengaging oneself” from a text. Such a view holds consequences for everyday academic writing. Conversely, pure scientists regard writing more in terms of technique, for example by referring to the discussion section of a text as the place where the author appears most clearly.

As regards the second research question, *i.e.* the epistemologies or knowledge theories, *i.e.* what is possible to know in what form, the pure scientists are more likely to support the belief in absolute knowledge. From this point of view, text structures are not a fundamental problem. Writing is to a great extent mainly about text revision (Biber, 1988). Texts need to be sectioned, set up as points and written in draft form briefly and with minimum waffle. We carry out experiments, says Malin [ps], which “require that you are stringent, that is, you shouldn’t ‘adorn the language’, and there is no room for any ‘frippery’”. This may be interpreted as if the writing task is finished when the facts have been determined and recorded. Knowledge is equated with facts and results are described in the form of discoveries and explanations (Becher, 1994). In this way, academic writing requires both intellectual capacity and technical ability (Antoniou & Moriaty, 2008). According to Graue (2006), *writing as reporting* is thus based on the notion that the world is observable and possible to understand and that the researcher’s task is to describe phenomena that have been carefully measured or arrived at through specialist procedures. Writing becomes technique, controlled by stylistic

manuscript conventions, e.g. the *Publication Manual of the American Psychological Association* (APA, 2001). The researcher's explicit, though not implicit, presence in the text is regarded as marginal and reports are becoming more standardised as regards both text and form. The whole phenomenon is seen rather as an equal relationship between a researcher's representation and an externally located reality. And limits are placed on any requirement for authorial reflexivity and responsibility.

The applied researchers take up positions derived from other epistemologies, more explicit among the soft applied scientists, and more implicit among the hard applied scientists. In different ways they take a stance in relation to the different "crises" or "turns" that have confronted scientists and scientific writing such as "the linguistic turn" (Rorty, 1967) and the "crisis of representation" (Marcus, G.E. & Fisher, M.M., 1986; Lincoln & Denzin, 1994). This is manifested, among other things, in a more critical attitude to all-embracing paradigms, total visions or general paradigmatic styles in research, which means that researchers are more likely to produce essays and fragmented descriptions than great theories and large works. Thus some researchers value in particular narrative approaches in research. Academic writing is also described as a lengthy process including drafts and revisions (Biber, 1988) and in accordance with the writing tradition that Graue (2006) calls *writing as interpreting*, in which writing is a semiotic representation of a process of understanding and an integral part of the research activity itself. The interpretative process can only partially represent a complex social world. Text conventions bring not only technical and methodological issues to the fore, but also ethical consequences. A researcher's knowledge is intimately connected with how much s/he knows this. There is recognition of the interpreter's role as regards, for example, the construction of the narrative. The author offers a rich account of her/his fieldwork: which decisions have been taken, how s/he is involved in the project, dilemmas concerning how involved s/he is etc., reflection and awareness of subjectivity.

One of the applied researchers in the study, Sandra [as] strives in their statements for the third writing tradition, *writing as constituting*, where through literary and rhetorical structures writing creates a specific view of the world by using narrative conventions such as chronology, metaphors and various rhetorical devices in order to produce meaning. The applied researchers regard writing as something that creates realities. Their writing is thus empirical, literary, political and ethical. They imagine using different genres and strategies for representation: ethnographic fiction, poetry, self-narrative and drama. In her views on marginalised groups, Sandra [as] in particular also expresses conceptions close to the fourth tradition of *writing as praxis*, where writing exists within the framework of action, and where research and writing aim at social justice, especially for marginalised people. As mentioned above, Sandra [as] emphasises that as a researcher and writer she exerts power over the text in being able to choose the picture she wants to be shown. Writing here thus becomes a "political act".

The applied sciences, both soft and hard, applying to different professional educations, are based on the precondition that contact is made with society. Applied science researchers generally demonstrate greater openness vis-à-vis different kinds of problematisation. Andre [as], for example, points to language and writing as fundamentally problematic in research contexts. Sandra [as] also clearly states that ethical research problems exist and that writers have power. Torsten [as] also emphasises the behavioural variables, for example, present in his work on construction energy use. He shows how he is forced to use stereotyped values, which he calls “fictitious values”. He also emphasises different selection phases leading up to an article and writing more as a process of creating thoughts and structures rather than merely just reporting. Mikael [as] is less categorical about the characteristics of research than his colleague Malte [ps] in the sense that he considers the different ways of conducting research as being complementary and that “discoveries” are but one criterion of science. This creates more explicit openness vis-à-vis alternative ways of regarding things and a more relativistic view of research and knowledge, i.e. in this context a kind of epistemological boundary crossing.

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