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Process Research Methods and Their Application in the Didactics of Text Production and Translation

Shedding Light on the Use of Research Methods in the University Classroom

Abstract

Teaching of translation and writing in the university classroom tends to focus on task knowledge by practicing text production and analyzing and discussing the quality of products. In this article, we will argue that the outcome of teaching may be increased if students are taught to see themselves not only as learners, but also as thinkers and problem solvers. This can be achieved by systematically applying knowledge from process research as this can give insight into mental and physical processes of text production. This article provides an overview of methods commonly used in process research and discusses the pros and cons of their application in teaching of translation and writing at university levels.

1 Introduction

This article gives an overview of the methods currently applied in writing and translation process research and suggests how some of these research methods and the output of research using these methods can be used in university classroom settings.

The focus of this article is learning environments, where writing and translation is taught at BA and MA level (or similar degree courses) to groups of students studying linguistics, language and communication or translation. At these levels, reflection on the individuals' writing tasks to increase writing and translation performance is an integral part of the course outline. We will claim that in such environments methodologically supported approaches to learning are required. While process approaches in experimental research settings date back to the 1980s and have influenced writing and translation process theory to a great extent (cf. Heine 2008: 64f.), process research has still not found its way into the classroom. It seems to be the general case that lecturers still judge processes and pass on process knowledge via product analysis.

We will claim that, if knowledge from process research is applied systematically in teaching, it is possible to help improve process operation and learning strategies[1]. In this article, we take a developmental learning theory as the basis for our didactical approach. According to this theory, learners are thinkers and problem solvers. In

[1] In learning style theory the development of individual learning strategies is seen as a core issue of adult learning.

general, problem solving is agreed to be one of the core features of both translation and writing (cf. Hayes/Flower 1980; Bereiter/Scardamalia 1985; Günther 1993: 28; Molitor-Lübbert 1996: 1006 for writing; Krings 1992, 2005 for translation). Problem solving during a writing or translation task can thus directly be related to the development of learning, where thinking about the task at hand, finding a proper solution to a given problem in the text production situation and reflecting about the process can be seen as methods to pave the way for students' self-regulated learning. This also applies to writing and translation didactics. Given the concept of developmental learning theory, we take for granted that adult learners of university courses are able to process and appropriate information.[2] Student learners can be assumed to possess a degree of awareness of their own meta-cognition.[3] Furthermore, we believe that they are able to self-regulate their learning by using their meta-cognition consciously through a number of strategies that students are more or less aware of in the first place.

The way in which research methods, whether used individually or in mixed form, can be didactically applied in the classroom is based on the concept of self-directed learning theory (Knowles 1975), as roughly sketched above. In this article we will suggest how single and triangulated research data of online and offline studies can be incorporated directly and indirectly into university lecturing.

In section 2 below, we will start out by making an outline of methods employed in research into processes of text production. We suggest that these methods not only shed light on production processes from a theoretical and research-based perspective, but can also be helpful for both students and lecturers when applied in the university classroom. Additionally, we believe that the application of theoretical data and practical application of research methodology can promote students' self-regulated learning. In section 3, we will describe learning in the field of text production, focusing on the targets of classroom lecturing. A distinction can be made between three approaches using process research in the classroom: the researchers' use of results of data analysis gathered in individual studies to improve his or her lecturing, examples taken from studies that employ process research methods and, in addition to that, the practical approach, where the methodology itself is directly applied during lecture hours (section 4). With these three approaches in mind, it is important to note that the research methods described in this section vary in complexity and difficulty. Some, as we will see here, cannot effortlessly be incorporated into everyday classroom practice, whereas others can, with relative ease. But in any case, as we will also see in section 4, the implementation of a methodological apparatus in the classroom offers a number of challenges of which lecturer and students should be aware and which they should be willing to master.

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2 The concepts of processing and appropriating information belong to the information processing theory and socio-cultural theory of learning, respectively.

3 Meta-cognition is knowledge about one's own cognitive processes and the self-awareness that this concept implies. To this concept belongs the ability to efficiently use one's self-awareness to self-regulate the cognitive processes.

2 Research Methods in Text Production Research

The purpose of this section is to give an overview of methods used in research on processes in text production. Methods used for the investigation of processes in text production have in common that they can be used in a cognitive analysis of writing and translation, which makes it possible to obtain an understanding of the operations of the mind between an input (a translation text or any writing task) and an output – a written text.

Research on processes dates back to the last part of the 20th century when electronic equipment allowed for the production of insights into cognitive processes. Until then, such insights were sought by looking at the product of writing and translation. Today an array of methods has been developed, each allowing research into different aspects of writing processes. Such methods can be classified in different ways depending on the criteria applied. Göpferich (2008) describes offline vs. online (for further details see Krings 2005), psycholinguistic vs. neuro-scientific, qualitative vs. quantitative, punctual vs. longitudinal, and laboratory vs. field studies. This article takes its starting point in Krings' (2005) distinction between offline and online methods for data collection processes for the study of translation.

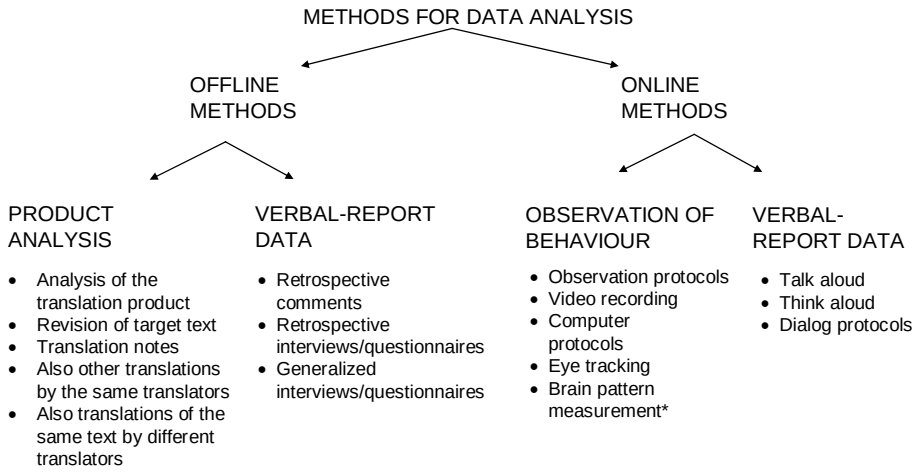

Figure 1: Methods for data analysis (Krings 2005: 348, our translation)

This classification was developed by Krings to establish a systematic overview of research methods in translation. Here, it is used to provide an overview of methods used both in writing and in translation.

In Krings' classification, methods are distinguished according to the time of data collection; whether they coincide with the translation process or whether they are produced after the translation process.

For the following description of methods applied in the study of writing and translation processes, we use partly those methods established by Krings and add further

methods commonly applied in the field of text production. The focus lies on research methodology applicable in didactics.[4]

2.1 Offline methods

Offline methods refer to methods which are used after the writing activity has taken place. They are divided into two types: product analysis and verbal-report data.

2.1.1 Product analysis

Until methods for the investigation of writing and translation processes were developed, researchers strove to shed light on such processes by studying the product. This is also done in recent research, for example by Shlesinger and Malkiel's (2005) comparative analysis of the translation of cognates in written translation and interpreting. The aim of this study is, on the one hand, to provide insights into the differences between the two modalities and, on the other, to provide an understanding of the processes which lead to the product. However, although product analysis can give clues as to how the writing task has been brought about, it may be argued that it has little to say about the process itself. As Krings (2005: 348) points out, it is the method which offers the least reliable data about the process. However, if one includes "sub-products"[5] of the overall process (notes, etc.[6]), this may provide some of the missing points (Krings 2005: 348-349). Furthermore, the method can also be combined with other methods (triangulation) in order to give a more complete picture of writing and translation processes. An example of this is Irena Kovačič's (2000) analysis of subtitling, which uses both think-aloud protocols, interviews and text analysis.[7]

2.1.2 Offline verbal-report data

Where the product in itself forms an inherent part of the object of study, verbal-report data are produced by the writer as an explanation of the process leading to the product. Verbal-report data include data which are produced by an array of different methods characterized by the fact that subjects are asked to verbalize their thoughts, feelings, attitudes, etc. (Krings et al. 2001: 215). Depending on whether these data are produced simultaneously with the writing process or after it, two types may be distinguished: offline and online verbal-report data. This section outlines the former.

In an offline verbal-report protocol, the writer is asked to comment retrospectively on specific aspects of the writing task or e.g. on translation strategies in the case of translation tasks. The most important issues for the validity of data are memory, recognition and retrieval (Hansen 2005: 519). It is therefore these aspects which are the subject of discussion of the method. An aspect often pointed to is that data can be

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4 For a comprehensive description of methods used in process research, see Göpferich (2008).

5 Krings (2005: 348) uses the term *Zwischenprodukte*. Risku calls these instances of processes *Artefakte* (Risku 2004: 114).

6 See section 2.2 on problem and decision reports.

7 As we will see below, other methods can of course be combined and this has indeed been done in an array of studies. See for example Göpferich (2008) for a general overview, Hansen (2005) and Heine (2008).

insufficient due to lack of memory of test persons (Levy et al. 1996: 553, 555 quoted in Miller/Sullivan 2006: 5; Hansen 2005: 518-519; Krings 2005: 349). However, if retrospective data are produced immediately after the writing task, it is possible to minimize the risk of distortion of data (Ericsson/Simon 1993: xvi/19; Krings 2005: 349). Lastly, it should be underlined that retrospective verbal-report data have the advantage that they do not interfere with the translation process. This is often adduced as a problem of other kinds of verbal-report data (as we will see), but can be compensated for by means of this method (Greene/Higgins 1994: 118 quoted in Miller/Sullivan 2006: 4). Heine and Koch (in press) use the following formulation:

> Diese Konfrontation mit dem eigenen Prozess funktioniert auf der gedächtnispsychologisch orientierten Ebene des Wiedererkennens und Bewusstmachens, die aufgrund der zeitlichen Verzögerung nicht mit dem eigentlichen Arbeitsprozess inferiert. (Heine/Koch, in press)

2.2 Integrated Problem and Decision Reporting

Integrated Problem and Decision Reporting (IPDR) is a tool for studying translation processes developed by Daniel Gile (2004: 1). Depending on the way in which they are used, IPDR may be classified as either an online or an offline method. The denomination "integrated" shows that the reporting can, on the one hand, be assigned to the online process – in that a process comment at a process instance is directly written into the report (like, for example, a mental note transferred to paper or to a report file). On the other hand, as indicated by the denomination "decision reporting", the reporting can be assigned to the offline process – in that comments about the process are added to the report after processing instances by way of immediate retrospective comments. IPDR is systematically made during and right after the production process. One key feature of IPDR is that no method-driven questions (called cues) are asked before the writing or translation process is started. Parallel processing of IPDR and the writing or translation task can interfere and the online IPDR reporting can have an impact on the writing or translation task.

> The advantage with IPDR and R+Rp in relation to TA is that the observer does not need to interfere in the process. Bias from observers' effects can be minimized because reminders and cues are unnecessary. A further advantage is that with both methods the different modes of expression *writing* and *talking* are not used simultaneously, so that there is no impact on the translation process from talking. (Hansen 2006: 7)

IPDR was developed as a tool for studying students' decision-making in translation. In the course of translation or text production, students jot down problems and decisions. According to Gile, these notes can reflect thought and provide traces of both long-term and short-term memory, which can, combined with text analysis, enlighten the knowledge about the writing process.

The purpose of IPDR is to improve students', as well as teachers', awareness of the process and heightened efficiency (Gile 2004: 1). It involves three phases (Gile 2004: 3): a reporting phase, in which students account for their translation problems, actions and decisions, – a data-analysis phase, in which the teacher writes comments and synopsis, – and lastly, an instructor's response phase, in which the reports and synopsis are evaluated.

As it appears from the above, IPDR was first and foremost developed with a view to teaching, but it is also supposed to be valuable as a research tool (Gile 2004: 4). According to Göpferich (2008: 36), the method has not as yet been used as such to any great extent. One problem is that students do not give detailed comments although they have been asked to comment on all problems in the translation task (Gile 2004 and Hansen 2006, quoted in Göpferich 2008: 36-37).

2.3 Online Methods

Online data are produced simultaneously with the writing process. According to Krings (2005), online methods can be divided into two types: behavior observation and verbal-report data. As shown in Krings' classification, different online methods for data collection have been developed. In this article, we will not comment on all of them, but merely concentrate on those which can, directly and indirectly, be used in classroom settings (see section 5). In the case of behavior observation, such methods are video recording and eye tracking in Krings' classification. To these methods, we will add key-stroke logging and screen capture. In the case of verbal-report data, the methods are think aloud protocols and dialogue protocols.

2.3.1 Observation of Behavior

Before the advent of the computer and other kinds of technical equipment, researchers in writing processes would simply observe the writer and make notes on his actions:

> Dank Ericsson/Simon (1993 [1994]) stand erstmals ein Instrumentarium zur Verfügung, das sich zur Inangriffnahme der Erforschung von mentalen Translationsprozessen eignete und an Übersetzungsprozessen interessierten Forschern den Mut gab, sich in dieses noch unerforschte Terrain der Translationswissenschaft vorzuwagen, das bis dahin nicht aus mangelndem Interesse, sondern aus methodologischen Gründen brachgelegen hatte. (Vgl. hierzu auch Krings 2005: 343). (Göpferich 2008: 4)

The advent of different kinds of technical equipment has made this method outdated. Today it is possible to make much more precise and detailed observations of writer behavior by the use of technical aids which may provide information about specific parts of the writing process, thus contributing to completing the picture of writer behavior.

Video Recording

One way of observing writers and translators is by means of video recording. By using this method, it is possible to observe writing activities, other activities as well as facial expressions. Depending on the position of the camera, video recording may provide different kinds of data. If the camera is positioned in front of the test person, it may register the writer himself (facial expressions, etc.) and the action of writing. As this perspective misses out on the writing process itself, an additional camera is often supplied; one that is placed behind the test person registering the writing process (Krings et al. 2001: 77).

Video recording has been used in different studies on writing. An example is a study by Jakobs, Lehnen and Schindler (2005) of writers' social environment of work-

places. This study does not explore the very nature of writing, but external factors which may influence the writing process. A study which investigates writing as such is Schindler's workplace study (2003). In her laboratory study, people worked in pairs on a writing task, and their discussion and decision processes were videotaped and analyzed.

Even though video recordings can provide insightful results by showing what is actually going on during a writing session, video recordings can also distract the person observed, because of the presence of cameras and people (observers), and can thus interfere with the process. A further problem is that production studies from real production environments provide a large amount of data which results in a prolonged and complicated evaluation process. Besides the amount of data, the quality of data of such designs can be questionable. If recordings of complex tasks are to represent reality, then many activities of the producers which are not directly related to the object of study (e.g. private phone calls, e-mails, logged pauses and the like) will be recorded. Those instances in the process have to be filtered out – their importance or lack of importance must be evaluated and described in a proper way. If one is willing to gather text production processes as precisely as possible, one should use a mixed methodology.

> Schreibprozesse sind extrem vielschichtig und können mit einer einzigen Methode nicht umfassend erforscht werden. Es ist daher erforderlich, eine Vielzahl von Methoden anzuwenden und Schreibprozesse aus den verschiedensten Blickwinkeln zu betrachten, um die Ergebnisse dann wie Steinchen zu einem Mosaik, das den Schreibprozeß beschreibt, zusammensetzen zu können. (Vgl. Günther 1993: 50, 79) (Göpferich 1998: 254)

Such a mixed methodology approach increases the amount of interpretable data. In addition, the processes recorded via different methods (e.g. logging and video) result in a variety of data formats which in turn need to be synchronized to be understandable and interpretable.

Eye Tracking

A modern eye tracker is a device "with special diodes that reflect light off the pupil and monitor fixations, gaze paths and pupil size as the subject interacts with an object-on-screen" (O'Brien 2006: 185). Eye tracking is a method for examining subjects' eye movement, thus disclosing their visual attention. By studying visual attention, knowledge may be obtained about subjects' centre of attention in the writing process.

Eye tracking has been used as a research method in different disciplines, such as neuroscience and psychology and marketing and computer science (Duchowski 2003). O'Brien is one of the first researchers to use eye tracking as a research method in translation studies. Her 2006 article outlines her research into cognitive effort in the use of translation memory tools. She notes that one advantage of eye tracking is that it allows us to study the relation between cognitive effort and eye movement (O'Brien 2006: 186). However, it also has disadvantages. O'Brien (2006: 186) mentions for example that it requires human resources and its use therefore is restricted due to time, funding etc. Furthermore, eye tracking generates a huge amount of data, the handling of which is time consuming.

Heine (2008) uses eye tracking in combination with think aloud protocols, and keystroke logging to analyze processes of the production of hypertext. In her work, she points to other disadvantages of eye tracking as a research method, for example that test persons may be affected by tiredness or medicine. She also points out that the eye tracker is unable to register all parts of the screen, for example menu bars or scroll bars (Heine 2008: 145f.). Heine concludes that eye tracking as a research method is not fully developed yet:

> Aus Sicht der Schreibprozessforschung steckt die Eye-Tracking-Technologie noch in den Kinderschuhen. Sie ist an die situativen Bedingungen von Textproduktion am Bildschirm – in der Produktionsrealität ähnlichen Situationen – noch nicht angemessen angepasst. Sobald die technische Entwicklung bezüglich der Synchronisierung von Logprogrammen mit Bildschirmaufzeichnungs-Software und Eye-Tracking-Software und die Auswertungsverfahren den anstehenden Qualitätssprung gemacht haben, wird Eye-Tracking zu einem zukunftsweisenden Instrumentarium der Schreibprozessforschung. (Heine 2008: 145f.)

A recent project studying eye-tracking as a research tool is Eye-to-IT conducted at the Copenhagen Business School. The project aims at studying how a combination of eye tracking and keystroke logging can be used to gain new research opportunities in translation processing (Göpferich/Jakobsen/Mees 2008: 2). One of the achievements of the project is the development of the GAZE-to-Word Mapping (GWM) tool which allows the researcher to automatically identify words on the basis of gaze fixation rather than having to carry this out manually (Göpferich/Jakobsen/Mees 2008: 2). In connection with the project, a volume of Copenhagen Studies in Language has been published, focusing on the way in which the human brain controls and coordinates translation processes (Göpferich/Jakobsen/Mees 2008: 2-3).

Keystroke Logging

Keystroke logging was developed in the 1990s as an observational tool for recording writing and translation activities. Miller and Sullivan (2006: 1) mention JEdit, ScriptLog and Inputlog (for logging writing processes) and Translog (for logging translation processes). We will not go into the differences between these tools in this context, but merely comment on keystroke logging in general.

By logging all keystroke actions, such as scrolling, deleting, cursor navigation and deleting, process data are recorded which can give information about, for example, rhythm and speed of translation and text production, as a reflection of the cognitive processes underlying text production (Jakobsen 2006: 96). By recording pauses, it is possible to study "how subjects distribute their time over different linguistic units" (Wengelin 2006: 111).

Unlike what is sometimes argued with respect to methods such as think aloud protocols (as we will see), keystroke logging does not interfere with the writing process (Miller/Sullivan 2006: 5; Wengelin 2006: 10). It can complement methods already applied in process research (Jakobsen 2006: 96). Exemplifying, Alves and Gonçalves (2003) use Translog, in combination with retrospection, to study problem solving and

decision making processes in translation. Moreover, Göpferich (2006a,b)[8] uses Translog combined with think aloud protocols in studies on writing.

Screen Capture

Data can also be obtained by means of screen capture. By this method, all activities on the computer are registered as a digital video. Geisler and Slattery (2007: 186) point out that, as most writing activities today are carried out by means of a computer, methods are needed which can provide insights into digital writing activities. According to Geisler and Slattery (2007: 188), screen capture is a tool which enables the researcher to study digital writing activities. However, relatively little research applying this method has been completed. Recent examples are, however, Degenhardt (2006), which applies CAMTASIA and CATMOVIE to study students' writing processes and Geisler and Slattery's article from 2007, which gives an instructive overview of the possibilities that screen capture offers for the study of writing.

One of the advantages of screen capture is that it does not interfere with the writing process and therefore does not distort data (Geisler/Slattery 2007: 187). This also means that it provides a high degree of ecological validity (Göpferich 2008: 54). As a disadvantage, Göpferich (2008: 54) mentions that screen capture shows only which internet sites have been consulted but does not indicate the part or the exact chunks of texts or pictures on which subjects focus. Göpferich mentions that this problem can be remediated by additional use of eye tracking. Furthermore, Geisler and Slattery (2007: 198-199) mention three potential problems with video capture. First of all, subjects may feel uneasy due to surveillance. Next, there may be a problem with respect to researchers' access to information. Geisler and Slattery (2007: 199) point out that confidentiality with regard to workplace information can hamper the research process and that screening and changing of identifying information may be necessary. The third problem concerns the level of detail. As digital writing involves a myriad of actions (drop-down menus, buttons, and quick key commands), it can be hard to decide the level of actions to be analyzed. Lastly, it should be noted that, as screen capture does not give information about activities which are not carried out on the computer, it may be fruitful to combine it with other methods, such as e.g. eye-tracking or personal observation (Degenhardt 2006: 182).[9]

2.3.2 Online Verbal-report Data

Online verbal-report data are produced by test persons during the writing/translation process. They can be divided into think aloud protocols and dialogue protocols, depending on whether subjects carry out the writing task alone or in pairs.

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[8] Göpferich (2006a) studies comprehensibility of popular science texts and Göpferich (2006b) studies the structure of writing processes

[9] Degenhardt notes this with respect to CAMTASIA, but it must necessarily apply to any screen capture tool.

Think Aloud

One of the first methods to be used in the study of translation processes – and still the most used – is think aloud protocols (TAP). Within TAP studies, a distinction between think aloud and talk aloud protocols is usually made (this also appears from Krings' classification). In this article, however, we will not make this distinction, but provide a general outline which applies to both methods[10].

The TAP method was adapted from the field of psychology on the basis of Ericsson and Simon's seminal work *Protocol Analysis* (1983, second edition 1993). In a TAP experiment, subjects are asked to verbalize their thoughts and actions with respect to the task at hand. Their verbalizations are either audiotaped or videotaped. The verbalizations produced are treated as data which may provide information about mental processes. TAP has been used in a number of different studies, both alone and in triangulation.

As has often been pointed out in the literature on translation studies in general and on translation processes in particular, the use of TAP suffers from shortcomings. The criticism leveled at TAP can be captured under three headings: accessibility, incompleteness and interference. The first has to do with the fact that you cannot get direct access to people's minds. Data obtained by TAP can therefore only be considered indirect data; you cannot know whether verbalizations are in fact a reflection of what goes on in the mind. The second point has to do with incompleteness of data. First of all, it may be argued that it is the test person who decides what to verbalize and what to leave out (Hansen 2005: 516). Furthermore, it is objected that only processes which are actively processed can be verbalized, whereas subconscious processes are not verbalized (Kiraly 1995: 41; Jääskeläinen 2000: 15; Hansen 2005: 513; Kovačič 2000: 98). Lastly, it has been claimed that the very act of producing verbalizations influences the writing activity; that it influences the sequence of thoughts.

In this connection, it has been questioned whether subjects are able to perform two cognitive activities simultaneously. This may, for example, be the case if the translation task requires a lot of attention (Jääskeläinen 2000: 74). Hansen exemplifies this with test persons suffering from stammering (Hansen 2005: 513). She also (2005) mentions a different aspect, viz. that experiences and emotions cannot be kept apart. They will inevitably affect the act of thinking aloud.

With regard to the interference problem, Toury (1995: 235) points out that the fact that written and oral activities involve two different kinds of cognitive processes may interfere with the process. Opponents usually reason in terms of the time frame and argue that TAP takes longer.

In conclusion, it is not quite clear how TAP influences the process, if at all. Ericsson (2006: 228) claims that a large number of studies (presented in Ericcson/Simon 1993) show that verbalization does not affect task performance:

> If the act of verbalizing participants' thought processes does not change the sequence of thoughts, then participants' task performance should not change as a result of thinking

[10] A fairly recent detailed description of studies using TAP is Jääskeläinen (2002).

> aloud. In a comprehensive review of dozens of studies, Ericsson and Simon (1993) found no evidence that the sequence of thoughts (accuracy of performance) changed when individuals thought aloud as they completed the tasks, compared to other individuals who completed the same tasks silently. However, some studies have shown that participants who think aloud take somewhat longer to complete the tasks – presumably due to the additional time required to produce the overt verbalization of the thoughts. (Ericsson 2006: 228)

Other studies, however, show that speed is in fact affected (Jakobsen 2003; Ericsson 2006: 228). As can be seen from the above, the picture of the validity of data obtained by use of TAP is not altogether clear.

Dialogue Reports

In studies using dialogue reports, two subjects are asked to carry out a translation in collaboration. Their dialogue during the execution of the task is either audiotaped and/or videotaped. It can be assumed that verbalizations resulting from work in pairs is more spontaneous and natural compared to an individual report, as dialogue naturally forms an inherent part of this type of work (Krings 2005: 352). It can therefore be argued that it provides a richer pool of data. This is indeed one of the hypotheses put forward by House in her 1988 article.

House's conclusion is two-fold. On the one hand, she concludes that dialogue reports do in fact provide more fruitful data than individual introspections because they secure greater authenticity. On the other hand, she claims that her findings suggest that translation training would benefit if taught in interaction rather than as individual tasks (House 1988: 96). In short, her conclusions are both of a didactic and methodological nature. It is debatable, however, if such different results can be reached on the basis of the same experiment. In this article, we will not go into such methodological questions, but concentrate on dialogue reports as a valid informational source with respect to writing and translation processes. Krings et al. (2001: 97) makes the important point that dialogue translation does not provide a higher degree of validity, as team work does not form a common part of the translator's work praxis. We will agree to a certain degree with Krings (2001: 95-98) in assuming that a higher degree of communicative authenticity does not necessarily provide greater validity. Therefore, it is only if the object of study is dialogue reporting by itself that a higher level of communicative authenticity leads to greater validity.

Having said that, however, we argue that, although translators may not work directly in pairs on translation tasks, they do, in many cases, share knowledge by using joint query lists and sample sentences and use each other as sparring partners both in direct and indirect dialogues. This is not necessarily realized through oral dialogue, although it may very well be so – e.g. in telephone conversations.

2.4 Summing up

In conclusion, all methods have their advantages and disadvantages. It seems to be an indisputable fact that triangulation is necessary to benefit from the advantages of the different methods available. This allows the researcher to compensate for their short-

comings and obtain a rich and more detailed picture of the writing and translation processes at hand. We leave the last word on that issue to Krings:

> Um "die potentiellen Verzerrungseffekte der einzelnen Verfahren" zu reduzieren bzw. zu minimieren, ist es dabei erstrebenswert, auch die gleiche Fragestellung mit unterschiedlichen Methoden zu bearbeiten. Diese Vorgehensweise bezeichnet man als Triangulation. (Krings 1992: 50)

3 Text Production and Learning

A general aim of university courses in the field of writing and translation is to ensure that the students practice text production and acquire the skills and, to a certain degree, also the expertise required in their future work environments. Unfortunately, it seems to be the case that current teaching concepts are mainly based on the provision of task knowledge only. Task knowledge teaching concepts ensure that students recognize the demands of the learning activity, whereas strategic knowledge, the understanding of specific strategies that may be used to accomplish tasks with different requirements (Ireson 2008: 19), is currently almost always taught on product level only. Writing and translation courses fail to incorporate the concept of self-knowledge and thus the individuals' understanding of themselves, as learners, thinkers and problem solvers.

Writing and translation defined as problem solving processes are mental processes which can to some extent be made "visible" and "understandable" by implementing research methods in teaching. The employment of research methods in the classroom, as we suggest in section 4, can lead to better understanding of the mental as well as the physical processes. Reflection and getting to know oneself better by looking at the mental processes and strategies applied to improve this understanding can increase learning. In this line of argument, we suggest that, in addition to a balanced teaching of practice and skill – which can lead to expertise –, a course setup that includes a combination of self-directed learning strategy, which is balanced between learning by observation and learning by doing and the application of research methods is well suited to encourage student learning in the fields of writing and translation.

In the following, we describe how practice and skill are based on the implicit notion of expertise. Based on the concept of self-direction, we will show how awakening and changing students' conceptions and supporting their learning can be promoted by a method-driven self-directed learning concept.

3.1 Expertise

From a lecturer's perspective, expertise is the (ambitious) measure to which students are required to come as close as possible in their performance. Expertise is usually defined according to speed, accuracy and fluency of performance. Unfortunately, though, accuracy (e.g. in writing) does not result in a good written product, and fluency and speed do not ensure a good translation. Still, in the three fields of expertise lies a lesson to be learned for lecturers. Quite contrary to what lecturers do in writing and translation courses – where improving the text or translation products is

the key issue – experts focus on the process. And what is even more important, they chunk the processes down to manageable portions and practice these parts of their profession with what is called deliberate practice[11]. In addition to that, experts watch their own and other experts' performance in their process approaches. Both these ideas can quite easily be transferred into the classroom. But such a transfer requires instruments that allow lecturers and students to examine their processes and chunked sequences of their processes – deliberately.

3.2 Practice and Deliberate Practice

In order to make text production students fit for their profession, teaching focuses on writing and translation tasks by practicing, evaluating, and discussing outcomes produced by oneself and those of others. Teaching focuses on providing the linguistic knowledge necessary to produce a text and to evaluate texts produced by others.

Increased practice is assumed to ensure improvement of performance. Appropriate speed, accuracy and appropriateness of the results are registered as good performance. The reflection on and evaluation of good performance is generally based on the continuum worst to best. Improvements and fallbacks are judged from the text products produced. Learning from practice, nowadays also called learning by doing, can be improved, when practice is no longer taught for the sake of practice, but with deliberation.

The deliberation of practice mentioned above can be applied by the learner by way of reflection of thought, consideration and care. What is important about this is the explicitness with which the learner intends to improve the skill, the explicitness with which the learner tries to reach the objectives and the ambition with which the learner tries to improve performance.

3.3 Skill

Skill can be described as the learned capacity to carry out a task according to the expected and pre-determined results. Carrying out a task involves the quality of doing it well, as well as having control over the technique applied and ensuring that the outcome is as good as expected. Skill can be divided into domain-general and domain-specific. In terms of writing and translation, the ability to write, for example, is a general skill, whereas to write for certain audiences, in a certain environment and in a certain way, is a domain-specific skill. It can be perceived as an ability that needs to be acquired by training and application of certain techniques. Learning is thought to be best carried out via practice over a period of time. Here, it is commonly assumed that the less energy and time used in acquiring skill, the better. The acquisition of skill is not always a natural process that occurs without difficulties. Therefore, it is necessary to practice the skill. The argument for this is threefold.

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[11] The term was coined by Ericsson and the concept described in the famous article "The Role of Deliberate Practice in the Acquisition of Expert Performance" by Ericsson/Krampe/Tesch-Römer (1993).

First, we do not consider skill as an instance that occurs in isolation. In process lectures in particular, the overall task consists of a number of sub-tasks and thus skill components.

> Component process theory proposes that skills are made up of "a number of component processes that perform the various subtasks involved in the skill". (Speelman/Kirsner 2005: 121)

Chunking text production processes down (to writing and translation phases, jumps in the process, back and forward movements in text production, pauses) can help to reduce the skills to be learned to manageable portions. Process research methods can help to work deliberately with these portions.

Second, skills require environmental stimuli and certain situations which help to show the level of skill. Process tools as described above can serve as excellent supporters here, in that they can help reflect on the skills learned in the writing environment and situation in which they occur.

Third, we would like to note that when skill is practiced, there are some instances of difficulty that need to be passed. Once a student gets stuck, practice alone is unlikely to be sufficient to bring the student any further in skill acquisition. Here, the application of a methodologically supported approach that can show expert processes to demonstrate expert performances can serve as an instrument to support skill acquisition.

3.4 Self-directed Learning and the Method Driven Approach

We argue that self-directed learning can be supported by the application of process methods in the classroom. With a student learner we can assume motivation and the willingness to acquire a new skill and to improve or practice tasks or skills already learned as relatively high. The motivation to look at one's own performance and learn from mistakes and from practice is also relatively high with adult learners. Process observation in the form we suggest in this article helps one to become aware of a variety of aspects involved in process tasks and helps judge one's performance.

But, from experience we know that students have problems in judging their own self-efficacy. Self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (Bandura 1986, quoted in Linnenbrink/Pintrich 2003: 120) is a concept that helps students evaluate their competence. In this context, self-efficacy is connected with observable behavior. Here, in combination with motivation, process tools and process methods can help to monitor the students' actions and encourage self-efficacy, also in terms of the students' cognitive engagement and thus in meta-cognition. Meta-cognitively engaged by using the possibilities of the research methods and tools, the students can increase their ability to analyze, reflect on and understand their own writing and translation processes. This kind of understanding, together with self-regulation, where the students control their interest, attitude, effort and problem-solving approach during their writing and translation processes (and adjustment of the latter if appropriate) towards a task or goal set by the lecturer, is the key to self-regulated learning. Ideally, a method-driven approach to learning with focus on

process orientation provides better learner control, both for the learner and the lecturer. It can also provide a high degree of learner autonomy, resulting in the fact that the learner can take the initiative and responsibility for his or her learning by self-monitoring and self-judgment. If, for example, a learner has found out in a writing process session – via application of a process method – about a weakness in proof-reading, he or she can put extra effort and practice to that area during the next sessions. Thereby the student can monitor whether the approach results in improved practice. Such a learning approach helps the learner increase learner autonomy – an ability required of graduates in the field of writing and translation and also an ability required of all learners who continually seek ways to make further improvements.

4 Applicability of Methods in the University Classroom

As mentioned in the introduction, it is possible to make a distinction between research methods in terms of their usability for either experimental research settings or usage of data from experimental settings or classroom settings including the instruments. It is inevitable, given the complexity and difficulty of some of the methods, on the one hand, and the ease with which process research instruments can be incorporated into the everyday classroom practice, on the other, that one will distinguish between the theoretical approach, where the researcher indirectly uses results of the analysis of data gathered in individual studies to improve his or her lecturing, and the practical approach, where the methods themselves are directly applied during lecture hours. In the following, we will first discuss why the online methods of eye tracking, screen capture, online verbal reports, video recording and observations are best used in experimental studies. Next, we will discuss why product analysis, some kinds of offline verbal reports and IPDR can be easily applied in the classroom and how methods like logging, some forms of reporting and some forms of report analysis can serve as empirical material, as reference material for lecture hours and for both purposes. Reasoning for these assumptions will be given, which will in turn lead to aspects of learning theory that relate to the application of methods in classroom settings.

4.1 Applicability of Methods

In section 2, the process methods were described with respect to their applicability in research. In this section, we will discuss their didactic applicability. Online methods include eye tracking, screen capture, video, verbal reports, logging and observation. Here, we will discuss their usefulness in the classroom and in connection with a matching learning concept. Observational research, such as eye tracking studies, screen capture, and verbal-report settings, is carried out to gather online mental process data. These methods are best suited for research proper and rather impractical to carry out with student groups. Even though all online observation data (besides verbal data) can be gathered discreetly in the background while the test person is working on the computer;[12] and even though ecological validity can be assured by way

[12] It has to be noted here that verbal reports can only be taken discreetly when, for example, a translation and interpretation lab is used as classroom setting.

of research settings, observational settings of this kind are not ideally suited to general classroom application. Even if applied in a computer room or lab with given ecological validity, there are still a number of problems that hinder direct application of these methods in lecturing.

The eye tracking systems available today are expensive, rather difficult to handle and not self-explanatory. The systems are neither compatible with each other nor do they provide software functions for triangulation. Eye tracking studies in particular exclude whole groups of students – namely those with eye problems, people wearing glasses, some people who are wearing contact lenses and all those who have different visual acuity.

Screen capture software is less difficult to apply and gives interesting insights into the processes. Screen capture, however, is, to the best of our knowledge, only worthwhile for insights into the process if it is backed up with some kind of immediate retrospection. Here, the length of the production task plays an important role. If the resulting videos of single screen capture sessions exceed the time frame of 15 to 20 minutes, it will be very hard for the students to remember instances of the process (e.g. process stages and breaks) from the replay. On the other hand, we consider a 15 to 20 minute writing process session insufficiently revealing. Screen capture videos, like eye tracking, provide qualitative data – a kind of data that is difficult to interpret for an inexperienced student. Furthermore, screen capture and screen logging systems used at the same time can corrupt each other's data – most often because they are not compatible. In addition to that, neither eye tracking nor screen capture alone can provide full insight into a production process.

Unfortunately, the observation software currently available on the market is not tailor-made for cross-usage and there are hardly any systems to be found that can provide combinable data. Combinable and trianguable data "at a click" would be desirable in both classroom settings and research proper – since very often one method used and evaluated alone cannot give insightful results. Today, however, triangulation is still a hands-on rather than an automatized job.

Staying on this practical front, evaluation of most of the online methods is a time-consuming and tedious task that involves engagement, commitment and a keen interest for either the processes or certain aspects of the process of individuals' (e. g. participants in research settings) text production. Self-evaluation of observation protocols, video recordings, computer protocols or eye tracking involves a significant amount of effort when carried out by the students themselves. The learning effect to be gained with such a tedious exercise would not justify the effort. Therefore, eye tracking and screen capture tools can best be used to exemplify processes and to make the students aware of the complexity of mental and physical processes during their production – but cannot be expected to be tools suited for general use with students, especially not on a regular basis and in classroom settings.

This is also particularly true for the verbal report data which are almost only useful for the classroom lecture when they are available as transcripts – where in turn transcription is also a prolonged task which should rather be carried out by an experienced researcher than by an inexperienced student.

Videos of production process sessions and participant observation of a production process session, which belong to the group of online methods, are also not particularly suitable for use with lecture groups. Individual laboratory-type studies or studies, where production processes of student teams are observed (e.g. where the focus is on the dialogues of the participants rather than the production process as such) are very revealing and a good source of information for the researcher. They can be an attention-grabbing source for lecture material – but would require too many resources when applied during lecture hours.

Having mentioned the shortcomings of the applicability of using this group of online methods during lectures, we would like to point out that particular sets of results of experiments or studies with online data or chunks of a production process can very well be used for presentation purposes in the classroom.

Text production and translation processes of either student group members or expert writers/translators can be used for analysis in the group and are a very effective and useful instrument for teaching.

4.2 Learning by Observation

In a case study carried out by Heine and Koch, learning by observation with method application was tested in a course on text production. In that study, monitoring[13] (of both the behavior of other people and one's own) proved to be appealing to students (Heine/Koch 2008). Typically, students are very interested in their own actions and benefit from observing and retracing performances. Such retracing and comprehension of other people's actions is an integral part of adult self-learning. Here, learning by observation lies in adopting the good and rejecting the bad of the observed performances – be it process features, process elements, process strategies or whatever didactic message the lecturer wants to get across. In process lectures, watching videos and replays and evaluating what is perceived can help to direct the students' attention to certain process phenomena which would have otherwise escaped their notice. This is particularly true when students monitor and reflect upon good examples, typical strategies, expert performance strategies and mastery models of processes; chunked down and served in manageable didactic portions by the lecturer. The chunking principle can help foster gradual learning. In that way, learning by observation approaches makes it possible to concentrate on certain aspects or features of the process approaches and theories to be taught. This is a very relevant element in teaching writing and translation processes, where the subject is very complex. The learning concept introduced here is that of building strategic knowledge. Learning to write (in a broader adult learning sense) and learning to translate are fostered through observing particular events in monitored processes. Here, consciousness-raising and reflection ideally result in improved further practice of the text production task. This

[13] Monitoring in the Hayes sense of observing, evaluative and reflective activities (Hayes 1996). Self-monitoring implies that one perceives one's own activities during task execution and self-reflection implies also that the output of monitoring is processed by evaluation, abstraction and attribution (cf. Couzijn/Rijlaarsdam 2005: 242).

implies the ability to abstract, generalize and transfer – resulting in the development of skills for lifelong learning.

Without idealizing the "learning by observation" idea, we would like to point out the crucial role that self-monitoring, reflection and monitoring of others plays in adult learning. We argue, along with Couzijn and Rijlaarsdam (2005), that learning by observation has a status alongside learning by doing (which we will discuss below in relation to the application of offline research methods). Couzijn and Rijlaarsdam argue that:

> Apparently effective skill acquisition is induced by more factors than practice alone. The development of effective instructional methods requires insight into these additional factors that modify the effect of practice on skill acquisition. […] Particularly in more complex task domains, [such as writing and translation, our addition], the expertise to be acquired is made up of more than only of knowledge proceduralized by practice. (Couzijn/Rijlaarsdam 2005: 242)

On this basis, we suggest the use of online methods of translation and writing process research to support this type of learning. Even though the research methods discussed and argued above are not ideally suited for direct use in the classroom, we suppose that the students' learning benefits will make up for the work of preparing research material (data from online studies) for classroom application.

4.3 Learning by Doing

We pointed out above that most of the online methods are not particularly suited to direct use in the classroom and we showed at the same time that replays and videos can be used in didactic concepts that built on learning by observation. Now we would like to point out how transcripts (e.g. triangulated transcripts, partitures of triangulated data and the like) can be applied in a learning by doing didactic concept. We will also describe logging as the online method that can best be used in classroom settings.

Transcription from think-aloud, dialogue reports and all other online methods can be used to make processes in writing and translation transparent to students of the field. They can serve as insightful and informative material for the learning process. Even more so if the transcription is carried out by the students themselves (e.g. as partial transcripts of their own or somebody else's processes). Transcription tasks can, if used with care and in small portions, ideally support the students' first steps in writing or translation process theory. Here, the features, characteristics and numerous aspects of the process task at hand which shine through the transcripts, can serve as an instrument to raise students' conscious awareness and can help increase students responsiveness to process issues. But we would like to stress that we are only suggesting use of a transcription task as a warm-up and a means to make the students conscious of and prepared for working with processes.

Within the range of usable online methods, logging appears to be most appropriate for writing and translation courses. The way in which logfiles and statistics are produced while the student is working with the tool, without the tool interfering with the mental processes, makes the method ideally suitable for lecture practice.

The students can log their processes at any time, save the writing or translation product, the replay video and the linear representation (as in Translog) and the program provides a statistical analysis of the students' performance. Furthermore, the documents can be shared with each other. This approach is particularly interesting for courses, where discussion of aspects of the processes belong to the learning concept. The type of learning involved here is learning by doing in a rather cyclic process. Here, the direct experience of a writing or translation task carried out leads to observation of the data produced by the log program and to reflection about the statistical data and the replay. This reflection in turn leads to abstraction, which can be used as guidance for concrete future action.

Let us look into this cycle in further detail. The learning process begins with the students' own experience. In the case of logging applied during writing and translation courses, the experience lies in the fact that the process is observed by a software program – an aspect that initially alerts the students, but which is forgotten as soon as they concentrate on the production task. The experience phase continues during observation of their own process in the replay – where they can follow their own processes (or those of others) along the replay. The students are encouraged to compare their earlier writing and translation experience in the light of observation and reflection. This can at first be hindered due to a lack of words for describing the experience. Once the words are found to describe the processes, students will be able to comment on their writing and translation task and evaluate them. The lecturer can provide process theory to support this phase to help the students with formulating their findings on their own processes. In the classroom, comments can be used as a shared experience in the student group, where not only individuals comment on their own processes, but also other people's observations and findings about the process, process phases etc. are subject to further insight. These reflections, especially if backed up with a didactic concept provided by the lecturer, can lead to a deeper understanding of the processes involved. If the writing and translation behavior can be retained in that way, a considerable insight into the current state is gained. On this basis, learners' abstractions can be carried further into generalizations or theories.

Almost all parts of the text production process can be looked at when using the linear representations and the replay facilities of logging programs. Statistics (linear representations) give interesting insights into the general countable process elements, such as e.g. pauses, which visually can help the students to understand both process phases and the overall process structure better. The logs can give insights into a wide array of aspects of the writing process, as the following few examples will show: the way in which text is produced (typed, erased, wrongly spelt, corrected, moved around on the screen) and evaluated can be observed when the replay is watched. The replay serves as a trigger to make the student aware of the known and also of the unknown cognitive processes of the process. Instances of the replay will make the students remember production situations, e.g. a pause will remind them of their information gathering (e.g. checking a word in a dictionary), while deletions and re-typed words will remind them of their problem solution phases. When being asked about the

processes by the lecturer, the students will be able to remember which kind of internal or external knowledge and which sources they have used.

Logfiles are very often a suitable instrument to discover a writer's or translator's strategies or habits. With the following example of a strategy or habit discovered, we will try to show how lecturers can integrate the students' findings from logging sessions into the didactic approach: if a strategy or a habit proves to be good and useful, it will be perceived by the students as a concept or approach that they will try again. Here, applying a learning-by-doing approach can be used to ensure that good habits or strategies are subject to repeated practice. In this context, the lecturer is required to ensure that good habits or strategies will – with much practice – become automatic and will, after a while, be performed rapidly and without effort. It is therefore the lecturers' task to ensure that the individual learner does not only practice for the sake of practice.

As in all approaches on the way to expertise, here too, deliberate practice is the key to success. In a complex process like that of text production, it is a core requirement for the lecturer to find individual weaknesses and strengths in the process performance and to assure that the student practices according to them. Process logging and checking the resulting process logs can help the lecturer to "trace her students' learning process and gain cognitive, affective and contextual insights into the students' otherwise inaccessible 'black box', and to revise or modify her instruction accordingly" (Segev/Miller 2005: 544). Working with the learning-by-observation concept and integrating practice to improve students' knowledge about strategies is just one we have picked out of the numerous instances of production processes to illustrate the usefulness of applying the logging method in the text production classroom.

Lastly, it should be pointed out that a prerequisite of this method application is that the lecturer is able to read, understand and process the knowledge that lies within the logs, which means that the lecturer has to be qualified within the field of research methods and logging – and on top of that, the lecturer must be able to explain and to implement logging as common practice within coursework.

4.4 Other Methods

Another group of methods well suited to application in the classroom are reports. IPDR can help the students to comment on their process tasks as they proceed. The students can write down, either on paper as suggested by Gile or in a computer document (which we would suggest here as a more modern approach to text production), what they consider important, questionable or otherwise significant for their work. The IPDR can be used during lecture hours to reflect upon the students' processes. It can serve as an instrument to explain writing and translation concepts and strategies. Process logs of other work, e.g. dialogue reports of group work, can be used in the same way.

One particular advantage of this kind of report is that it can be used for home assignments, class application and in a more sophisticated form of lecturing. Reports are also particularly suitable for e-learning environments and for distance learning.

Having mentioned the latter two, we would like to point out that there has as yet been no research into the socio-cultural approach that lies within a given "at home setting".

5 Conclusion

This article suggests how process methods can be applied in university courses in order to improve students' ability to carry out writing and translation tasks. Where teaching usually tends to concentrate on task knowledge, we propose methods to increase students' understanding of themselves, as learners, thinkers and problem solvers. In this article, it is argued that a balanced interplay between learning by doing and learning by observation can provide a stable concept of learning in text production didactics:

> […] once a basic cognitive level of knowledge and skill has been acquired, the need to proceduaralize and flexibilize arises (Salomon & Perkins, 1989, Anderson, 1990). This calls again for "learning by doing" activities. These activities can now profit from the observation experience because criteria for self-evaluation [among others, our addition] have become more explicit". (Couzijn/Rijlaarsdam 2005: 258)

On this basis, we suggest that, in writing and translation, courses should be designed in such a way as to combine the qualities of these two approaches and to use research methods of the theoretical field in the classroom.

Moreover, we argued that process methods can be used in the classroom to improve self-directed learning. In section 2, the most well known research methods were described. In section 3 and 4, we showed that some of these are inappropriate as a teaching tool, whereas others can be employed in the classroom to improve students' writing and translation processes. It is a common feature of such methods that they are readily available and do not require a complicated introduction for the students to use. Lastly, it should be mentioned that the use of combined methods has the advantage that they can contribute different perspectives on the working process, thus giving a more complete picture.

We would like to point out that we consider the methods described here in combination with learning concepts a field that deserves to be studied further. In terms of applicability, logging is, to the best of our knowledge, a very suitable method for home assignments and coursework during lecture hours. Likewise, IPDR can be used in both settings. It will be interesting to investigate how these two can be used in connection with each other and how their implementation in the classroom can be further combined with e.g. screen capture. An important issue to study is the way in which learners' text production strategies bear resemblance to or match problem solving strategies known from learning research. This will enable us to carry out such studies in the future, in order to ensure that our students benefit from the research undertaken in the overlapping fields of writing and translation process research and learning styles theory.

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trans-kom **ISSN 1867-4844**

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