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**Promotion of Reading Skills – Challenges in the
Vocational Field of Construction Engineering**

Herausgeber

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Journal of Technical Education (JOTED)

ISSN 2198-0306

Online unter: <http://www.journal-of-technical-education.de>

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Promotion of Reading Skills – Challenges in the Vocational Field of Construction Engineering

Abstract

Up-to-date efforts to promote reading skills in vocational education have had little effect. The motivational attitude of apprentices towards reading is proving to be a challenge. It is clear that a lot of apprentices remain unaware of the importance of reading competence to their professional lives. Accordingly the consequences for effective training concepts to promote reading skills result from a systematic analysis of the professional (training) reality in the vocational field of construction engineering. In such training concepts the discrepancy between pedagogical objectives and the low value ascribed to reading skills by the trainees seems to be the key didactical challenge. Another important conclusion is the conceptual design of recipient- and domain-specific promotion of reading skills.

Keywords: Vocational Education, industrial and technical professions, Vocational Field of Construction Engineering, reading skills, promotion of reading skills

Förderung von Lesekompetenz – Herausforderungen im Berufsfeld Bautechnik

Zusammenfassung

Zur Wirksamkeit von Lesekompetenzförderung im berufsbildenden Kontext liegen bisher eher negative Befunde vor. Als bedeutungsvoll zeigt sich vor allem die problematische motivationale Einstellung zum Lesen. Offensichtlich wird die berufliche Relevanz von Lesekompetenz vielen Auszubildenden nicht deutlich. Auf Basis einer Untersuchung der betrieblichen (Ausbildungs-)Realität im Berufsfeld Bautechnik werden Konsequenzen für eine effektive Lesekompetenzförderung formuliert. Dabei erscheint insbesondere die Diskrepanz zwischen pädagogischer Intention und geringer Relevanzzuschreibung als zentrale didaktische Herausforderung. Darüber hinaus zeigt sich die Bedeutung einer adressaten- und domänenspezifischen Förderung von Lesekompetenz.

Schlüsselwörter: Berufliche Bildung, gewerblich-technische Berufe, Berufsfeld Bautechnik, Lesekompetenz, Förderung von Lesekompetenz

1 Initial Point

For industrial and technical occupations the importance of reading skills and basic competencies in general should be reflected from various points:

1. with reference to the development of vocational competencies (see Nickolaus et al. 2008),
2. with reference to theories on vocational education (see e.g. Heid 1999; Pätzold 2010) as well as
3. the perspective on labor market policies (DIHK 2011).

Considering the deficits in reading comprehension (overview in Rexing et al. 2013) the promotion of such skills is an important aspect of vocational education.

Few reliable findings exist with regard to the efficacy of training programmes to enhance reading skills in the context of vocational training (overview in Keimes & Rexing 2011a; Gschwendtner 2012). They indicate a rather low effect of such programmes on the development of reading skills. For those findings several explanations seem plausible: (1) heterogeneous and unfavourable learning prerequisites among the students, (2) difficulties in achieving a high level of quality in training approaches, (3) conceptual deficits of training approaches, (4) diagnostic deficits (Gschwendtner 2012; Norwig et al. 2013; Ziegler and Gschwendtner 2010).

Apart from the fundamental lack of development in reading skills, current results show that the motivation of vocational students stagnates or even decreases during training procedures (Ziegler and Gschwendtner 2010). A likely cause is the misjudgement of students concerning the importance of reading skills for their everyday working and training reality. For example, apprentices in agricultural machinery mechanics view reading as an unnecessary skill for coping with job requirements (Keimes et al. 2011). However, the success of learning processes depends on the perceived importance of the learning content (Knöll et al. 2007). The trainees' motivation is also influenced by the epistemological beliefs of supervisors about the value of study materials (e.g. Urhahne 2006; see also Zinn 2012). In connection with further studies about the promotion of reading skills (Ziegler & Gschwendtner 2010; Norwig et al. 2013; Gschwendtner 2012) results indicate that training approaches that were actually developed for other learning environments cannot simply be transferred to vocational training (see also Norwig et al. 2013). The promotion of reading skills needs to be recipient- and domain-specific (Keimes 2014). If a form of training "that refers to a vocational operating context in a more systematic way leads to measurable effects" has to be assessed empirically (Nickolaus 2013; see also Ziegler & Gschwendtner 2010; Norwig et al. 2013). First, however, it seems essential to systematically examine working and training reality and especially the text-based language requirements within each vocational context.

The present article reports key findings of an explorative empirical study for selected industrial and technical apprenticeship trades in the vocational field of construction engineering from a multi-perspective view. First, the status of research will be presented and the study design will be outlined. The focus of the present article is a summary of critical

points and their interpretation with regard to consequences for the promotion of reading skills. The presentation of results of the different sub-studies will be limited to aspects which, either directly or implicitly, are part of the conclusions about an effective training of reading skills in the vocational field of construction engineering. Sources containing further findings and a more detailed presentation of the methodological approach of the relevant studies will be referred to.

Based on these analyses, conditions which might lead to a larger efficacy of training programs to enhance reading skills in the context of vocational training will be outlined. In a next step, it will be necessary to evaluate this in an approach involving intervention. This was not a goal of the studies presented here, and is consequently not included in this article.

2 Status of research

Initial studies on language requirements in working contexts are available (Efing 2010; Janich 2007; Pätzold 2009); not so, domain-specific studies. This necessity of domain-specific approaches for linguistic support has been already pointed out by Efing and Janich (2006). It is also determined in several guidelines and curricula. For example, in the national educational standards for German classes in secondary school the promotion of language and methodological competencies is postulated as necessary for vocational training (KMK 2005). Similarly, the syllabus for German communication courses in subject classes of the “dual system” states that the job-specific demands (in construction engineering a.o.) form the cornerstone of the level of language competencies to be achieved (MSW NRW 2007). However, up to now, we have known little about linguistic and communicative demands in the context of apprenticeship (Efing 2013; Janich 2007; Pätzold 2009; Settlemeyer et al. 2013).

The present studies examine linguistic-communicative requirements (receptive/productive written and oral language skills respectively) for adult employees and focus especially on second- and foreign-language activities in workplaces (e.g. DIE 2010; overview in Efing 2013). Further studies analyse linguistic-communicative requirements in technical literature (Niederhaus 2010; with reference to apprentices with low competencies see also Eckardt-Hinz et al. 2013) and accordingly evaluate requirements listed in curricula for vocational education analytically (Efing 2013; Grundmann 2007; Kaiser 2012).

Moreover, some initial overarching studies on the communicative requirements within the context of vocational education are available. These studies show the existence of serious differences in requirements within the diverse settings of vocational training and scholastic education as well as insufficient preparation of youths for demands in their future professional lives (Efing 2010; Efing & Häußler 2011; Knapp et al. 2008; Radspieler 2014; Baumann & Siemon 2013). The study results reported in this paper focus on the vocational field of construction engineering.

3 Research Questions and Methodology

Using a multi-perspective view the empirical examination tries to answer the following research questions:

1. What importance do reading skills have in the (vocational training) reality of industrial and technical apprenticeship programs?
2. What level of motivational prerequisites do apprentices in industrial and technical training programs have concerning reading activities?
3. What level of cognitive demand do the identified occasions for reading/texts pose for apprentices (and skilled workers)?

We conducted the study with selected professions of the vocational field of construction engineering (bricklayers, road builders). Specifically in those professions a large number of apprentices show serious weaknesses in reading comprehension (Grotlüschen & Riekman 2012; Eckhardt-Hinz et al. 2013; Norwig et al. 2010). Further studies have to show to what extent the findings of this study can be transferred to other industrial and technical professions.

Research question	Methodological approach
importance of reading skills	Analysis of documents (training regulations) Expert interviews (supervisors)
Level of motivation	Questionnaires (Apprentices)
Cognitive demands	Linguistic analysis of work-related texts (in accordance with Niederhaus 2010; Efung 2010, 2012) Cognitive-theoretic analysis of work-related texts/operational situations in accordance with the model of functional reading skills (Ziegler et al. 2012)

Tab. 1: Research questions and methodological approach

The methodological approach (Table 1) is explorative and uses the triangulation method in order to give a detailed picture of what has been a largely unexplored field of interest. To describe the training reality we used several, primarily work analysis procedures (e.g. Spöttl 2008).

In a first step, the current status or normative frame was analysed through *document analyses* of training regulations for the vocational occupations of *brick layer* and *road builder* as well as, by way of example, the corresponding curricula of the federal state of North Rhine Westphalia (see also Keimes et al. 2011).

As a further approach, guided expert interviews with company supervisors were used to determine the current state of the in-company (training) reality. With reference to our research interest, the subjects interviewed seemed a suitable choice as experts from two perspectives. (1) Training supervisors who work in companies operating in the professions analysed are extremely thoughtful and competent representatives of the practical field; (2) as the trainee's mentors they are responsible for the quality of job training within the companies. Therefore they are familiar with the realities of job training and interacting with trainees (for more detailed information see Keimes 2014). Fourteen actors were interviewed. Rather quickly a saturation effect was noticeable. Therefore we abstained from conducting additional interviews. The interview material was assessed using a method of qualitative content analysis developed by Mayring (e.g. 2010). Intercoder reliability (analysis was done by two coders) reached values between .81 and 1.0, good to very good results (Keimes 2014).

Because little is known about the level of reading motivation in this field of research (Schneider et al. 2013), our survey primarily serves the purposes of exploration and description. The questionnaire used contains a total of 30 items and is divided into three parts. Data analysis was implemented using SPSS. Constructs were operationalized through a limited number of items or sometimes even single items in order to fit the length of the questionnaire to characteristics of the target group. Considering our research interests the volume seemed fitting, though. Part 1 contains five items concerning personal and socio-demographic information. Part 2 contains items measuring a person's *habitual reading motivation* (e.g. Pekrun 1993). Habitual reading motivation refers to the recurrence of intentions to read over an extended period of time (e.g. Möller & Schiefele 2004; for further differentiation Artelt et al. 2007). Further items are supposed to specifically reflect habitual reading motivation in the context of vocational schools (*reading motivation in a scholastic context resp. ascription of importance*). Also *interests* in specific types of literature is being surveyed, since that aspect is a predictor of reading motivation (Artelt et al. 2007). Part 3 of the questionnaire focuses explicitly on the *vocational ascription of importance* towards reading and reading competencies in the context of an in-company (training) reality as an important predictor for habitual and current (esp. intrinsic) reading motivation (Artelt et al. 2007; Schneider et al. 2013).

In the following section, we present a summary of the results of completed and evaluated sub-studies. They are in detail:

1. An exemplified analysis of documents of core curricula and training plans (for more details see Keimes et al. 2011).
2. Guided expert interviews with company supervisors (N=14) (for more details see Keimes 2014).
3. Questionnaires completed by apprentices (N= 188). (Convenient sampling. For more details see Rexing et al. 2015).

4 Results

The structure of the presentation of study results will be based on research questions 1 to 3, integrating the results of the sub-studies described.

4.1 The perceived importance of reading skills within the real conditions of apprenticeship of selected professions in the vocational field of construction engineering

Starting with central outcomes of the analysis of relevant training curricula and training regulations. Based on the surface text the different curricula show little importance of reading. For example, within core curricula (e.g. basic vocational training) (MSW NRW 2008) one can identify only three *explicit occasions for reading* (e.g. “How to read reinforcement plans”). Though an analytic approach leads to a significant number (18) of *implicit occasions for reading* (e.g. “Specifying the composition of concrete through tables”). Occasions for reading are made explicit by naming the document material (here: “tables”). Furthermore, numerous *integrated occasions for reading* (26) can be identified (e.g. “Planning the manufacturing of reinforced concrete elements”) through a specialist analysis of the formulation of goals within curricula. The analysis of training plans depicts similar results (Keimes et al. 2011).

In contrast to that, the content evaluation of the conducted guided expert interviews with company supervisors (N=14) paints a different picture, at least globally. The experts interviewed describe teaching/learning processes with respect to the demands of reception of texts within the workplace as poor (Keimes 2014). Hence reading is not a skill that is required to master challenging professional situations within the training company. A differentiated analysis shows an increasing importance of readings skills to professional work, the higher a person’s hierarchy level and responsibility within a company (Table 2).

Since their range of responsibility includes planning, administrative and organisational duties, only skilled workers with completed training and (more often) personnel in leadership positions are given tasks that require reading. Apprentices are rarely asked to handle written documents. Therefore, within the context of training, apprentices are rarely exposed to the demands of reception of text.

Nonetheless, it is generally accepted that reading is of importance for apprentices. All company supervisors acknowledge the importance of reading skills. The importance of reading is undisputed amongst company supervisors. But that doesn’t show up in training processes. This study documents an area of tension: On the one hand reading skills are stressed as being fundamental, on the other hand in-company training does not require apprentices to deal with written documents. (For an extensive discussion see Keimes 2014).

Level of hierarchy Documents	Apprentices	Journeymen (skilled workers)	Personnel in leadership
(Installation) drawings	✓	✓	✓
Operating instructions for appliances	✓	✓	✓
Product, operating and processing information	✓	✓	✓
Safety precautions and regulations	✓	✓	✓
List of services	✓	✓	✓
Tables	✓	✓	✓
Work assignments and instructions	-	✓	✓
Delivery notes	-	✓	✓
List of materials	-	✓	✓
Check lists	-	✓	✓
Legal requirements	-	✓	✓
Trade journals	-	✓	✓
Norms	-	✓	✓
Soil reports	-	✓	✓
Statics	-	✓	✓
Daily reports	-	✓	✓
Staff schedules	-	-	✓
Emails/correspondence	-	-	✓
Authorisations	-	-	✓
Calculations	-	-	✓

Tab. 2: Overview of relevant documents within in-company (training) reality (Keimes 2014)

4.2 Motivational prerequisites of apprentices in selected professions in the vocational field of construction engineering

The questionnaire was implemented with a total of 188 apprentices of the apprenticeship trades of brick layer and road builder at the intercompany vocational training sites of the Chamber of Trade Aachen as well as the Chamber of Industry and Commerce Cologne. The sample (N = 188) is all male. The average age of the sample is 19, with an age span from 16 to 30 years ($s_d = 2.36$). With reference to the level of education, the mode points to secondary modern school (years 5 to 9), at 53.6% (99). The further distribution of degrees is: 21.1% (39) secondary school (vocational extension certificate); 16.2% (30) advanced technical college entrance qualification; 3.8% (7) A levels. Of our sample, 2.7% (5) dropped out of school prematurely. Road builders, with 57.4% (108), make up the largest proportion of the sample; 42,6% (80) were training to become brick layers. More than half of the sample (52.7%) were at the basic level of training; more than a third (35.5%) were in their first year and 11.8% in their second year of advanced training in building construction and civil engineering.

Based upon the *written questionnaires* completed by apprentices of the occupations examined (N= 188), we were able to deduce some of their attitudes towards reading and the importance they ascribe to reading (for a detailed description see Rexing et al. 2015). The *habitual reading motivation*, defined as the recurrent intention to read over an extended period of time (e.g. Schiefele 1996) is, as expected, low. Amongst the professions analysed, habitual reading motivation is independent of a person's level of education. This means that not just trainees with only basic school education but also trainees with higher degrees show a rather low level of reading motivation. A possible explanation is that students with a low level of reading motivation tend to pick industrial and technical professions.

Besides the general habitual reading motivation, the *school-specific reading motivation* (as a context-related facet of habitual reading motivation) seems highly important to the institutions where such competencies are promoted – especially since those institutions are (or have been) primarily schools. Results show mid-level, but highly significant dependencies ($r_s = 0.35$; $p \leq .01$) between school-specific and habitual reading motivation. As expected, the willingness to participate in occasions for reading in a school context is rather low amongst apprentices who also show a low level of general habitual reading motivation. Further dependences exist with reference to the ascribed importance of reading skills for vocational training in companies ($r_s = 0.19$; $p \leq .05$) as well as for vocational development after training has been completed ($r_s = 0.33$; $p \leq .01$). The more importance people ascribe to reading skills in the workplace, the more favourable is their attitude towards reading in school. Trainees who ascribe greater importance to reading skills for professional development after the completion of training also ascribe greater importance to German/communication classes ($r_s = 0.27$; $p \leq .01$). These correlations are further supported by the trainees' *preferences for certain types of text*. With their primary interest in texts from reference books (61.7% / 116), factual texts of professional importance (46.3% / 87), and technical data manuals (39.4% / 74), trainees prefer text materials which are explicitly job related (for detailed information see Rexing et al. 2015). As indicated above, the idea that ascribing a high level of importance to job-related textual material is a basis for the acceptance of a further training in reading skills is apparently another correlation confirmed by these findings (Ziegler & Gschwendtner 2010; Keimes et al. 2011).

The *importance of reading* for (training) reality in companies on the other hand is perceived as being very low amongst trainees. Several indicators support this statement. Asked about competencies that are important for a successful apprenticeship, the participants in this survey ascribe great importance to secondary virtues and motor skills. E.g. punctuality and reliability (88.3% / 166), handcraft skills (75.0% / 141) and teamwork (64.9% / 122). On the other hand, "Being able to read well" is rarely viewed as an important skill. This finding corresponds with the expert opinions (company supervisors) about the professions we reported above (Keimes 2014).

Those assessments apparently correspond with the perceived training reality. In answer to a question about the options work assignments are communicated within companies (as an indicator of the reality of reading practice) 97.3% (177) of the surveyed apprentices said that work assignments are primarily given orally. Among the same apprentices, 74.1% (137) also

said that in order to implement given tasks at construction sites they do not have to [be able to] read.

The challenge that the promotion of reading skills poses within the context of vocational training is obvious when we consider that a supervisor's subjective theories and epistemological beliefs are highly important for the design of teaching/learning processes (e.g. Schommer-Aikens et al. 2003). If teachers (here: supervisors) ascribe a low level of importance to reading skills, their epistemological beliefs influence the trainees' level of motivation (e.g. Urhahne 2006) as well as their learning performance (Trautwein & Lüdtke 2004).

4.3 What level of cognitive requirements do the identified occasions for reading/texts have on apprentices (and skilled workers)?

Based on the *content analysis of the expert interviews conducted* (with company supervisors) 11 fields of actions (in accordance with DIE 2010), which describe job-specific reading demands within in-company training and in-company operational practice, were derived (Keimes 2014). With reference to the concept of learning field-orientated curricula "fields of action" describe "complete vocational tasks a person should be enabled to cope with" (Bader & Schäfer 1998, S. 229). They document demands of reception of text, which are put on persons working in the field of construction engineering. They are oriented generally toward structures of vocational work processes (Table 3).

For example, Field of action no. 1 (*work planning and organisation*) includes planning and organising tasks that are part of construction work as well as pre-construction assessment. Drawings (e.g. installation, detail and design drawings) are part of the relevant text material. They are the foundation of construction work and include detailed information about the production of components, staff schedules with information about construction sites, working hours and construction schedules. The latter document the individual working stages and their sequence (Keimes 2014).

With the objective of a targeted promotion of competencies, besides the systematisation of skills required for the reception of text, it seems highly important to identify the inherent demands of a reading situation on a person's reading skills. To some extent, *analysing domain-specific reading requirements* is a fundamental necessity to promote trainees' reading skills in a demand-oriented and recipient-specified manner. One can analyse domain-specific reading requirements using the model of *functional reading skills* (Ziegler et al. 2012). The model focuses on vocational reading situations that are bound to an immediate requirement for action.

The model of functional reading skills classifies texts depending on their *mode of representation*. A distinction can be made between *descriptive* (e.g. journal articles), *mixed* (e.g. forms) and *depicted* (e.g. graphics) *text formats*. The model of functional reading skills assigns reading requirements to one of three *levels of demand*. With reference to Kirsch (1999) a distinction is made between several areas of demand (1) *identifying*, respectively

localising, (2) *integrating* and (3) *generating* (ibid.). The demand levels increase with respect to the required level of cognitive information processing.

Fields of action requiring reception of text	Label	Text material
Foa 1	Work planning and organisation	<ul style="list-style-type: none"> • (Installation) drawings • Staff schedules • Construction schedules
Foa 2	Material procurement and receipt	<ul style="list-style-type: none"> • Delivery notes • List of materials
Foa 3	Execution and construction of components	<ul style="list-style-type: none"> • List of services • Product, operating and processing information
Foa 4	Working with machines and electric appliances	<ul style="list-style-type: none"> • Operating instructions for appliances
Foa 5	Ensuring safety	<ul style="list-style-type: none"> • Safety precautions and regulations • Legal requirements
Foa 6	Response to construction	<ul style="list-style-type: none"> • Soil reports • Statics • Norms • Tables
Foa 7	Quality control and assurance	<ul style="list-style-type: none"> • Check lists
Foa 8	Monitoring of economic efficiency	<ul style="list-style-type: none"> • Calculations
Foa 9	Communication with internal actors	<ul style="list-style-type: none"> • Work assignments and instructions
Foa 10	Communication with external actors	<ul style="list-style-type: none"> • Emails/correspondence • Authorisations
Foa 11	Teaching-/learning processes in the context of training and retraining	<ul style="list-style-type: none"> • Daily reports • Trade journals

Tab. 3: Fields of action requiring reception of text within in-company (training) reality (Keimes 2014)

The *identifying* demand level requires that readers locate a single text or image information. To master a reading task at this level it is usually sufficient to construe a superficial representation of the text read or image viewed.

The *integrating* demand field by contrast requires forming at least a propositional representation of continuous texts, that is, it requires the integrative processing of multiple bits of text information, or the development of a local mental model in the case of discontinuous texts. Integration can also imply a coupling of image and text information, which is a combination of both formats.

Reading tasks within the *generating* demand field require the construction of a mental model that involves mode switching. That means the transfer of descriptive representations into external visualisations and the verbalisation of depicted representations (ibid., see also Balkenhol 2015).

The level of difficulty of reading tasks can vary in each of the three fields of requirement depending on how strong the connections are between the specific bits of information, the density of information and the amount of information.

The analysis of the reading skills needed to practice the examined professions shows that work-relevant texts (Table 4 presents an exemplary selection) are mainly documents containing depicted and mixed formats of representation. When it comes to reading skills, they require mainly skills in the fields integrating and generating (for further information see Keimes 2014). Therefore it is frequently necessary to construct a mental model. With reference to cognitive processing that means a high level of demand (ibid., see also Balkenhol 2015). Reading construction drawings, e.g., requires the reader to develop a mental model in the context of global knowledge. To do so readers have to perform a mode switch, by verbalising a fact depicted in the form of an iconic representation.

mode of represent. levels of requirements	<i>Descriptive</i>	<i>Depicted</i>	<i>Mixed</i>
<i>Identifying</i>		Safety guidelines	Personnel scheduling
<i>Integrating</i>	Accident prevention regulation		Delivery notes
<i>Generating</i>		Graphics	Construction schedules

Tab. 4: Vocational text materials/reading requirements in the model of functional reading skills (in accordance with Ziegler et al. 2012)

The expert interviews, conducting information about the in-company (training) reality, confirm expectations about the domain-specificity of cognitive demands on reading skills (Ziegler et al. 2012). Also, the assumption that, in an in-company context, reading is practiced mainly when there is an explicit intention to act, is further confirmed (see also Balkenhol and Ziegler 2014).

5 Consequences for the recipient- and domain-specific promotion of reading skills in selected professions of the vocational field of construction engineering

Based upon these findings, a series of consequences can be derived, which systematically consider the framework for a recipient- and domain-specific promotion of reading skills within industrial and technical training courses (or at least the examined sample).

In view of the recipient specification, motivational orientation of apprentices is probably a didactical challenge with regard to the value and educational needs of reading skills. Sensitising supervisors about the importance of reading skills and their promotion within each individual seems highly important. Insofar as they have the opportunity to convey the importance of reading skills in every learning facility, all parties can make a contribution.

With regard to in-company training it seems necessary for supervisors to promote a positive culture of reading and stress the importance of reading for a successful vocational and educational career by giving authentic examples of situations that demand such competencies (Keimes 2014). The responsibility supervisors carry is the result of the great significance that trainees, especially those in the industrial and technical professions, attribute to companies as learning facilities and to the knowledge of their experienced and well-respected staff members (Zinn 2012). Occasions for reading are without a doubt also part of professions that have a seemingly reduced theoretical part, like the ones examined in this paper (Keimes 2014). Tasks that require reading have in the past typically been performed mainly by skilled workers or personnel in leadership. To further enhance trainees' reading skills, companies should enable or, ideally, systematically integrate the apprentices in tasks that require reading within the context of in-company training. Tying the different learning facilities conceptually and organisationally (also via a systematic inclusion of inter-company training) seems highly important since training experiences within the area of tension of in-company (inter-company) and educational learning facilities affect the development of epistemological beliefs among apprentices (Zinn 2012).

The structurally defined fields of action (Keimes 2014) could work as a conceptual base for the promotion of reading skills, integrated into workplace learning processes or a professional context of action. During the didactic/methodological implementation a combination of direct and indirect promotion could be productive (Artelt & Moschner 2005; Norwig et al. 2010; Ziegler & Gschwendtner 2010). Recurring in those fields of action, a strong connection with actual structures of workplaces is achieved. And they seem, at least from a motivational perspective, just as important as the inclusion of work-specific text materials.

To not just point out the importance of reading skills, but also increase the level of acceptance towards initiatives to promote such competencies within the school-part of vocational training in the dual system it is important to turn the promotion of reading skills into a part of vocational classes – if applicable, in combination with the general contents like German language, politics and business education (see also Ziegler & Gschwendtner 2010).

Recipient specificity becomes apparent when different levels of cognitive capability have been taken into account (e.g. Norwig et al. 2013; Grotlüschen & Riekmann 2012). Especially

the consideration of the connection between the selection of a strategy, workplace-specific reading requirements and cognitive dispositions of learners is important. In doing so, specific analogue reading strategies (e.g. visualising) seem more adequate for clients in the field of vocational training than other strategies, e.g. verbal-symbolic strategies (like summarising), which are commonly used in mainstream schools (see also Leopold 2009; Ziegler & Gschwendtner 2010).

To achieve that, it might be necessary to further one's understanding of reading strategies, since at this point it is mainly focused on reading within the context of studying (e.g. Artelt et al. 2010). From the perspective of cognition theory, one has to declare a desideratum referring to the so-called "mixed formats" (diagrams, tables, forms) (Ziegler et al. 2012; Balkenhol 2015), that are distinctive for the examined professions. For example, how to successfully teach a person to use strategies that promote an integrated comprehension of images and diagrams (depicted and mixed formats of representation) remains largely unsettled.

For the examined vocational field it might be relevant to include evidence from training programmes for disadvantaged persons (individual diagnosis, individual educational plans) (e.g. Matthes 2009) because it poses a challenge to individually promote the cognitive competencies that are crucial for reading skills (Grotlüschen & Riekmann 2012; Eckhardt-Hinz et al. 2013).

Based on specific implications it seems sensible to integrate the promotion of reading skills of the target group, "apprentices", into a greater support plan that addresses the development of epistemological beliefs. To do so, one needs empirical results about the prerequisites of trainees (as well as of supervisors and teachers in various learning facilities) in industrial and technical vocational fields. This data is still pending (Zinn 2012).

Concerning a domain-specific promotion of reading skills the analysis shows specific demands, with respect to the text material as well as references to challenging situations, that are specific to reading that occurs in workplaces. The accentuation of domain specificity and a focus on authentic challenges within a profession, especially functional reading skills (Ziegler et al. 2012), the intention is not to marginalise other goals of vocational education. The adoption of this approach intends simply to increase trainees' willingness to accept the importance of reading skills not only as an important part of vocational learning processes, but also as an essential basic competence involving thoughtful reflection.

Based on the presented information the conceptualisation and implementation of the promotion of reading skills within industrial and technical vocational fields should be an interdisciplinary, specialist didactical task. Functional reading skills (Ziegler et al. 2012), for example, can be identified through field- and work-process-related analyses alone. In this context it is interesting that specialist didactics in vocational training have as yet discussed those relationships only in passing (Niederhaus 2010).

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Rexing, V., Keimes, C. & Ziegler, B. (2015): Promotion of Reading Skills – Challenges in the Vocational Field of Construction Engineering. Journal of Technical Education (JOTED), Jg. 3 (Heft 1), S. 56-74.