

Sense of Workplace Learning

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Workplace Learning, an integral element of vocational, occupational and professional education and training, is oriented towards gainful employment and professionalism (Blankertz 1977; Billett 2008), but can also be related to non-remunerated work (e.g. charity or community work and similar post-employment activities) (Sonntag and Stegmaier 2007; Tynjälä 2008). The corresponding learning and developmental processes take place in workplace settings—especially for purposes of gainful employment for unskilled workers as well as those aspiring to advance their careers. Workplace learning occurs at various loci and in multiple modi: For structuring and specifying these different types of workplace learning, literature differentiates between “labor-integrated learning” which is part of the labor processes themselves and which occur while conducting the work tasks and solving problems (like the development of expertise in skills on “comprehending medical visualizations” such as X-rays and ultrasounds. See the contribution of *Gegenfurtner, Lehtinen and Saljö*, this issue); and “labor-related learning” which explicitly results from educational or training interventions aside to the value creation processes such as during meetings at the shop floor—like in a Change Laboratory used within the studies of *Rantavuori, Engeström and Kerosuo* and *Täras and Lasonen* in this issue; and training courses, counseling sessions, vocational schools, continuing education programs, virtual learning communities etc.—as informal or formal learning (Sonntag and Stegmaier 2007; Stenström and Tynjälä 2010; Malloch et al. 2011). Depending on historical traditions workplace learning—especially for gainful employment—is shaped in a more structured way and has to deal with different tensions of diverse stakeholders (employees’ and employers’ unions, governments etc.) like within the dual system of vocational education in Germany (Achtenhagen and Grubb 2001; Achtenhagen and Thäng 2002) each with a different set of goals.

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Goals of workplace learning are complex and multilayered for individuals, organizations, and governments. In an extensive discourse on the preparation of an international large-scale assessment for vocational education and training, an international expert group from 18 countries across three continents agreed on the following broad overarching goals for workplace learning: (a) the development of individual occupational adjustment from an individual user's point of view, taking self-regulation and autonomy into consideration; (b) the safeguarding of human resources in a society, and (c) the warranty of social share and equal opportunities (Baethge et al. 2006). Vocational achievement is not only related to fulfilling the goals of the particular workplace, but also to support personal (e.g. emotional stability) and organizational goals (e.g. creating a positive working climate, proposing meliorations, generating additional resources (e.g. by social networking) (Sonntag and Stegmaier 2007). Regardless of the goals, there are several important considerations when organizing workplace learning.

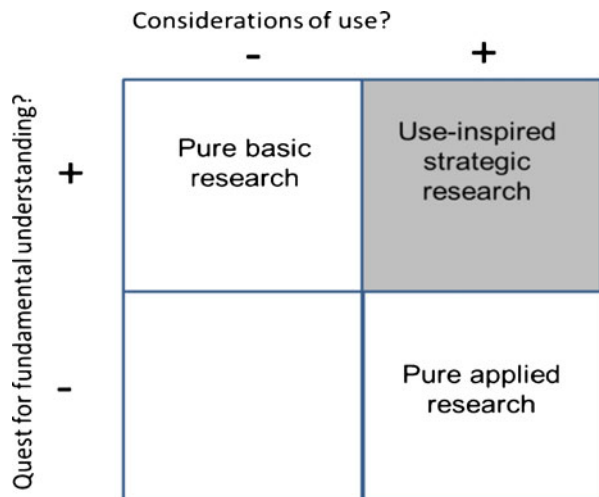
Central research questions of workplace learning relate to learning/working as well as to teaching/training processes to consider when designing these to suit individual learner's/employee's preconditions and institutional conditions and the impact of these designs on labor-integrated and labor-related learning (for a broad overview cf. Malloch et al. 2011; Scott and Reynolds 2010) as well as the 3-P-Model of Workplace Learning by *Tynjälä* (in this issue). For describing, analyzing and explaining relevant aspects of the phenomenon "workplace learning", the focus is directed towards the different system levels from the macro- over the exo-, meso- and micro- to the chrono-system level (cf., Bronfenbrenner 1979). Goals, values, norms, visions, challenges, but also concrete content, actions and activities of vocational education and training (workplace learning) are thematized on the macro-system level (i.e. new technologies within libraries are evoking changes of work and service structures with new affordances at the workplaces and for necessary learning processes and new actions of the employees; see *Rantavuori, Engeström and Kerosuo*, this issue). On the exo-system level, aspects of balancing educational outputs (e.g. qualified personnel) and employment possibilities (especially with regard to the question of youth employment or a lack of highly skilled employees) are treated in relation to people from foreign countries who receive a 'green card' and ways they get recruited for jobs. On the meso-system level, organizational conditions of vocational learning in enterprises as well as in vocational schools are discussed (i.e. educational institutions are faced with increasing heterogeneity in their learner groups—when classes and courses become more culturally diverse due to globalization and corresponding migration as discussed in the contribution of *Täräs and Lasonen*, this issue). On the micro-system level, questions of concrete teaching, training, learning and working processes occur (i.e., analyses of perceived learning potential as focused within the contribution of *Rausch* in this issue, or analyses of work behavior for professional development like in the study by *Van de Wiel and Van den Bossche* in this issue). On the chrono-system level development and change going on within and between these system levels (from micro- to macro-system level and vice versa) become the focus for research (i.e. within the longitudinal developmental research studies of *Rantavuori, Engeström and Kerosuo* or *Täräs and Lasonen*, this issue).

The processes of **gaining knowledge on workplace learning** are multifaceted in addressing a broad range of issues (Billett 2008). Workplace learning can be

understood as neither a field of pure fundamental or applied research. It fosters a reciprocal relationship between theory and practice—a position anchored in Stokes' (1997) *Pasteur's Quadrant*-model of scientific research. This model promotes two dimensions involving understanding and usefulness (see Fig. 1) and, thereby, balancing the two aspects of 'rigor' and 'relevance' in a manner of "evidence-based practice and workplace policy" or "use-inspired strategic research" (see also Spiel 2009, for the field of developmental psychology; Pellegrino et al. 2001, for the field of educational psychology).

Conducting research according to the ideal-typical model of Stokes (1997), Pellegrino et al. (2001) emphasize a commitment to the improvement of complex systems—as it is the case with workplace learning. Therefore, a goal-oriented cooperation and co-development by researchers and practitioners are needed, whereby both sides bring in their special experiences and knowledge. By a mutual acknowledgement under the focus of theory-driven explanation and implementation as well as with respect to a time-consuming long-term project, solutions have to be identified and evaluated. Research on workplace learning—in this sense—is linked to standards of evidence as (1) to formulate research questions with regard to theoretical and practical problems which can be answered empirically. (2) This research should have theoretical relevance; (3) the research methods used must be directed to the research questions; (4) the coherence of research questions and their evaluation must be explicitly formulated; (5) the design has also to take into account the replication and the generalization of the studies including their results and (6) all research steps and the corresponding research results have to be documented for replication. Major interest in such a "use-inspired strategic research" is the focus on changes and development of educational practice (Shavelson and Towne 2002) also in the context of workplace learning. Under such "use-inspired strategic research" *Tynjälä* develops, within her contribution, a theoretical framework (a) helping to describe the complex phenomenon of workplace learning on the basis of theoretical assumptions and categories and (b) serving as a point of departure for raising rigor and relevant research questions. The survey study

Fig. 1 Pasteur's Quadrant-model of scientific research (Spiel 2009, p. 17, according to Stokes 1997)



of *Gegenfurtner, Lehtinen and Saljö* tries to up-date the practice of assessing the quality of expertise differences over the last 20 years to improve medical learning at the workplace considering technological changes—an important knowledge for producers and consumers of research results. The contributions of *Rausch* as well as that of *Van de Wiel and Van den Bossche* are delving into workplace learning processes, describing and analyzing affordances of real tasks to be fulfilled at the workplace including their perceived learning potential as well as motivation and strategies of work behavior used at the workplace for learning and development. The intervention studies run by *Rantavuori, Engeström and Kerosuo* as well as by *Täras and Lasonen* extend beyond individual learning to changing current work practices.

Workplace learning is increasingly gaining importance (cf. Malloch et al. 2011, p. 1). This can be shown for the political as well as for the scientific areas: With regard to policy, the far-reaching measures of the European Union (EU) demonstrate that vocational education and training—in particular, workplace learning—is seen as central means to reduce unemployment of youth and young adults (the youth unemployment amounts to 22.4 % on average within the EU: spreading e.g. from 7.9 % in Germany to Greece and Spain with more than 50 %) (ILO 2012). From a scientific perspective a number of these measures are not sufficiently proven nor are there enough sufficient theoretical concepts and theories to describe the phenomena of workplace learning with its various facets and relations (Malloch et al. 2011; Sawchuk 2011) nor any extended results on personal and context conditions fostering or hindering the processes of workplace learning (Johnson 2011). Nevertheless, we find a lot of international projects on workplace learning focussing on “labor-integrated learning” and “labor-related learning” e.g. (1) “Workplace learning” (Nieuwenhuis and Nijhof 2001; Tynjälä et al. 2006; Billett 2008; Vähäsantanen and Eteläpelto 2009; Daly and Gijbels 2009; Stenström and Tynjälä 2010); “developmental work research” (Engeström 1996, 1999); “workforce education and development” (Rojewski 2004); “vocational and occupational learning and development” (Achtenhagen and Grubb 2001; Rauner and Maclean 2009); and “theories on workplace learning” (Dochy et al. 2011); (2) on a structural program level: the discussion on alternating programs (comparable to the Dual Vocational System in the German speaking countries), is around internships that are respectively practical phases or educational monitoring (cf. Achtenhagen and Grubb 2001; Achtenhagen and Thang 2002; Baethge et al. 2006, preparing a VET-PISA); and (3) the constitution of Bachelor Programs, directly qualifying for the job on the tertiary educational level (Gräsel and Rübken 2010) as well as (4) measures for continuing education supporting lifelong-learning (cf. PIAAC: Programme for the International Assessment of Adult Competencies; ALL: Adult Literacy and Lifeskills—Survey; Tippelt 1999; Achtenhagen and Lempert 2000; Mayer and Solga 2008; Evans et al. 2011).¹

The contributions within this issue address some of these aspects and make promising steps to illuminating, explaining and/or addressing them.

¹ Correspondingly, we observe a remarkable increase in memberships within the special interest groups of scientific societies which deal with such questions and problems: e.g., EARLI SIG 14: Professional Learning and Development; SIGs Professional Learning and Workplace Learning of AERA; UFHRD: University Forum for Human Resource Development.

Päivi Tynjälä takes up the tremendous changes in the world of work and points out the correspondingly increased interest in research focusing on “learning taking place at work”, “through work”, and “for work”. Simultaneously, she reviews the wide and diverse approaches dealing with a variety of aspects within these “work-integrated” and “work-related” learning phenomena. She presents an extended literature review and integrates the various research strands into a tentative overall 3-P-Model of Workplace Learning: She divides workplace learning research into six lines of research: (1) studies describing the nature of workplace learning; (2) research on work identities and agency in workplace learning; (3) studies on the development of professional expertise; (4) analyses of competence development in vocational education and training (VET) as well as in higher education; (5) research on communities of practice; and (6) research on organizational learning. The intention of her conceptual paper is to foster an understanding of these complex phenomena of workplace learning and to evoke stringent research designs in this area.

Andreas Gegenfurtner, Erno Lehtinen and Roger Saljö focus on the process of assessing the quality of expertise differences in the domain of medicine. The increasing technological changes evoke a growing interest in improving medical education in the professional area. As “expertise” is the classical output concept of professional learning in the field of medicine the authors’ goal is to work out the current methodological state of assessing the superior skill in “comprehending medical visualizations” (e.g., X-rays, ultrasounds). They went on to conduct an extended database literature review (1990–2010) and organized their findings along three research questions: (1) Which sample, material, measures, and analytical methods did studies use to assess the quality of expertise differences? (2) Which expertise differences are revealed by different assessment categories? (3) How has assessing the quality of expertise differences matured over the past 20 years? The findings indicate that the assessment of expertise in the field of medicine has become more interdisciplinary over the last two decades, working with brain activity research, tracking eye movements, collecting and analyzing verbal data and observing representational practice. These results generate evidence-based recommendations for future research practice and for the design of professional learning environments that make workplace learning more effective.

Andreas Rausch attempts to elaborate the processes occurring during workplace learning in the field of commercial apprenticeship within the German Dual System (e.g. sales people, bank and industrial clerks). He implemented a diary method to overcome the shortcomings of retrospective self-reports (like questionnaires, interviews) and to approach more closely to the learning processes at workplaces themselves. The aim of his study is to identify work task characteristics that explain the variance of the (perceived) learning potential of a work task. The trainees document not only their actions within the diaries but also rate their given tasks with regard to their perceived learning potential—operationalized by ten task characteristics: e.g., challenge implied within the task, scope of action, received feedback etc. The results of regression analyses show that interesting work tasks, feedback and novelty of tasks are the strongest predictors of perceived learning potential. Furthermore, workplace specific learning conditions and the scope of action, supposed to be an important condition in school learning and human problem solving, were negatively related to the perceived learning potential. Apprentices seem to prefer close guidance to

develop their work-related actions. The results of this study give fruitful hints for the design of efficient and effective learning situations at the workplace.

Juhana Rantavuori, Yrjö Engeström and Hannele Kerosuo examine the empirical usability and methodological rigor afforded by the theory of expansive learning. This theory, rooted within cultural-historical activity theory, aims at explaining and guiding collective transformation efforts in organizations and workplaces. In their longitudinal Change Laboratory intervention study (2009–2011) conducted in an academic library the authors evoked such a transformation process. The goal of the intervention was to help the library professionals and managers in their efforts to redefine the services the library offers to different clients as well as the ways of working and organizing the work in the library to cope with the new challenges and demands libraries are confronted with—especially, severe budget cuts and effortless accessibility of online-literature. Using videography, the authors were able to analyze comprehensively all oral interactions and topical episodes in the series of intervention sessions ($N=4.184$ interactions across eight sessions). They identified the occurrences of expansive and non-expansive learning actions, but also several sub-types of actions as well as an iterative loop within the expansive learning cycle. They also identified and analyzed miniature cycles within the overall cycle of expansive learning in their Change Laboratory intervention. They also marked deviations from interventionists' instructional intentions and plans. This study demonstrates a comprehensive qualitative transformation of collective human activities at the workplace using the theory of expansive learning.

Marianne Teräs and Johanna Lasonen address issues arising from the increasing migration movements into OECD-states. They consider the challenges that vocational teachers face with diversity at colleges and workplaces by raising the following two research questions (RQ): (1) How do teachers prepare immigrant students for working life? and (2) What challenges related to intercultural competence do teachers face preparing immigrant students for working life? Within their study the authors run two formative interventions using Engeström's toolkit. The first was a "Change Laboratory" in a College of Social and Health Care located at the upper-secondary level. In the first intervention (RQ 1) the participants ($N=17$ students from eight different countries; $N=4$ teachers, $N=2$ school staff, $N=3$ researchers) took part in the study over 6 weeks ($N=211$ Topically Related Sets (TRS); 20 h). The second intervention—related to RQ 2—lasted 7 weeks with a final evaluation after additional 7 weeks. Here just ten teachers of the same cultural origin and two researchers participated in the discussions ($N=39$ TRS; 17 h). The dialogue was audio- and videotaped. The multi-voiced data were categorized in a first analysis on the basis of Topically Related Sets as the unit of analysis to quantify the perspectives (RQ 1). In a second analysis the tension utterances were identified, reflecting the challenges and problems involved in intercultural teaching, or conflicting opinions (RQ 2). The analyses were run using the software Atlas.ti. The results highlight five perspectives on preparing immigrant students for working life: (a) preparing for the tasks, (b) reflecting cultural differences, (c) contributing by bringing in issues from other disciplines and the workplace, (d) guidance by involving on-the-job trainers and (e) responding by referring to different attitudes, discriminations and stereotypes in intercultural encounters. The results associated with the second research question show that teachers are faced with challenges on three levels: (i) the individual micro-system level (i.e. recognizing language as an object and tool of learning); (ii) the

organizational meso-system level (i.e. sharing intercultural expertise on different issues within the college) and (iii) the societal macro-system level (i.e. realizing cultural law differences affecting teaching). The results imply explicitly that boundary-crossings give fruitful hints for enhancing workplace learning—especially, in health care.

Margje van de Wiel and *Piet Van den Bossche* focus on the activities physicians engage in to develop their professional expertise. On the basis of the theories of deliberate practice and self-regulation, the authors raise the question about physicians' activities, their motivation to engage in work-related learning and their self-regulated learning processes undertaken to learn from and for medical practice (like planning, monitoring, reflecting) and its contribution to expertise development. Seventeen residents and 28 experienced physicians in internal medicine were participants in their study. To gain insights into the activities in which the physicians are enacting, the authors used a qualitative interview survey. To secure information about their goal orientation, questionnaires were administered and for the assessment of their expertise, a case test was administered. The analyses were undertaken through content analysis for the interview data and quantifying the verbal expressions. There was also a second analysis combined with the quantitative self-reports of the questionnaire and the results of the case test. By ANOVAS and correlation analyses, different sub-groups of expertise were compared within the sample. Furthermore, deliberate engagement in work-related learning activities was neither related to goal orientation, nor to the case test performance, except for the experienced physicians' activities for keeping up-to-date. A central finding from this study for the individual and organizational levels is the focus on the need for learning to be seen and practiced as part of daily work and the provision of time for overcoming routines by reflection as a prerequisite for planning, monitoring and evaluating own learning processes at the workplace.

All contributions of this issue focus on “labor-integrated learning” as part of the labor process itself. Whereas the conceptual contributions of *Tynjälä* (giving orientation of critical factors influencing the learning process), of *Gegenfurtner, Lehtinen and Saljö* (working out current assessment methods for measuring expertise) and that *Rausch* as well as of *Van de Wiel and Von den Bossche* (describing and analyzing real work actions and tasks) relate to developing individuals' competence and expertise, the contributions of *Rantavuori, Engeström and Kerosuo* as well as of *Täräs and Lasonen* are related to the goal of participation and development of commonly shared work structures. Central for these studies is the interrelatedness of different system levels. Thus, the “megatrends” as metaphor for socio-economic changes (cf. [Buttler 2009](#)) like globalization evoke heterogeneity at workplaces and in vocational training classes which challenge the educational institutions and processes of workplace learning (see the studies by *Täräs and Lasonen*). The implementation of new technology forces e.g. libraries on the meso-level system to rethink their service and work practices (see study by *Rantavuori, Engeström and Kerosuo*) makes new tools and research instruments necessary to diagnose different levels of expertise as shown in the study by *Gegenfurtner, Lehtinen and Saljö*. These understandings also show a movement the other way round. The knowledge won by intensive workplace learning processes, as shown in the study by *Rausch* as well as *Van de Wiel and Von den Bossche*, on the micro-system level enables new arrangements for creating more

effective and efficient learning environments on the organizational meso-system level. The contributions in this special issue on Workplace Learning pose very important and relevant questions in a “use-inspired strategic” manner.

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Main Fields of Research:

- Modeling and measuring of competencies in professional and occupational contexts (Feasibility Study on VET-PISA)
- Intercultural Learning
- Entrepreneurship Education
- Curriculum-instruction-assessment triad in vocational education and training

Curriculum Vitae:

- Graduation at Georg-August-University Göttingen in the field of Human Resource Education & Management including Political Economy, Business Theory, Commercial Law
- Doctorate at Georg-August-University Göttingen
- Habilitation at Humboldt-University Berlin
- Full Professor at Ludwig-Maximilians-Universität München
- Call to Johannes Gutenberg-University of Mainz (rejected)