

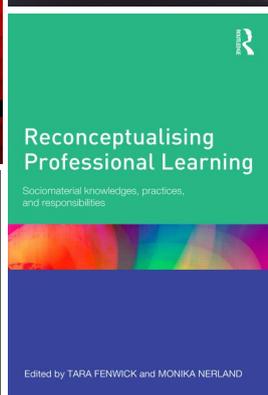
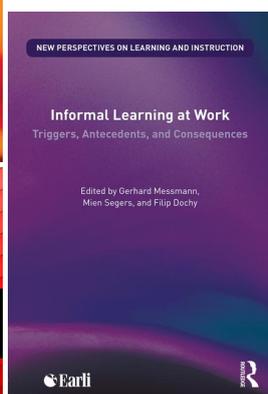
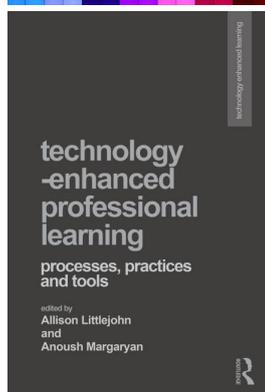
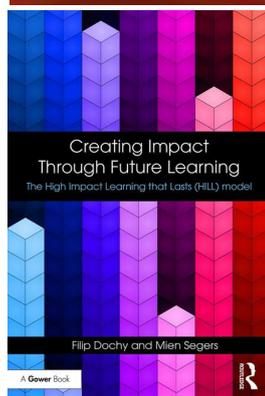
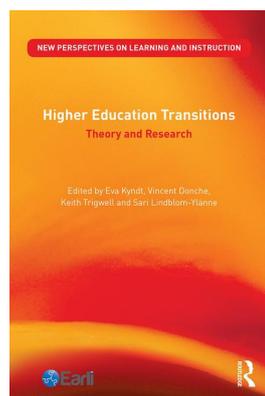
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# Professional Development

*Learning Processes, Practices & Tools*



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# THE LABOUR MARKET'S REQUIREMENT PROFILES FOR HIGHER EDUCATION GRADUATES

*Edith Braun and Julia-Carolin Brachem*

## Theory

In Europe and all over the world, higher education systems face the challenge of preparing an increasing number of students for the labour market (Arnove et al., 2013; Orr et al., 2011). In order to facilitate the transition from higher education to the labour market, it is necessary to prepare students for the labour market's requirements. While there is little empirical evidence about what specific activities higher education graduates have to perform at work, a lot can be read in the news about competences necessary to fulfil the demands of the labour market (Hamann, 2012; Bureau of Labor Statistics, 2014).

In this context, the contribution explores what the German labour market expects from students leaving the higher education system. Our aim is to confirm generic competences students need to possess upon graduation in order to successfully enter the labour market, and to get a clearer impression of which requirement profiles are found for different study and job areas as well as different hierarchical positions. Therefore, we consider a representative sample of working higher education graduates, asking the graduates themselves what they do in their workplace (*activities*) and which *requirements* they experience. The data are used to confirm areas of generic competences that are crucial for future knowledge workers. Furthermore, different activity profiles regarding graduates' area of study, occupational area and occupational status are analysed.

With regard to learning outcomes in higher education, 'competencies, skills and knowledge' acquired during the learning process have gained significant importance and have emerged as key concepts, especially in reference to quality assurance (European Union, 2011a). The increasing focus on generic competences has resulted in a strong shift towards the equipment of higher education graduates with relevant competences to avoid job-specific skills mismatches (European

Union, 2011b). Masten and Coatsworth (1998, p. 206) define competences as ‘a pattern of effective adaptation in the environment, [...] broadly defined in terms of reasonable success with major developmental tasks expected for a person of a given age and gender in the context of his or her culture, society, and time [...]. It carries the dual meaning, that there is a track record of such achievement (competent performance) and also that the individual has the capability to perform well in the future. It refers to good adaptation and not necessarily to superb achievement’. Furthermore, Blömeke et al. (2015) point out two meanings of competences, based either on performance or on dispositions. This chapter concentrates on generic competences, which are needed to handle various and challenging situations, enabling persons to shift knowledge, to use different tools and methods, and to interact with others in a responsible way (Green, 2009; Heijke et al., 2003; Rychen & Salganik, 2003). Against this background, the chapter explores job-relevant generic competences by asking higher education graduates what activities and requirements they experience at work. In this sense, we follow a performance-based definition of competences.

Considering graduate surveys is a productive way to gather representative information of labour market requirements. In surveys, competences are mostly assessed by self-reports which are criticised as being too vague (Braun et al., 2012). For example, some surveys ask higher education graduates to rate their own level of competence on a five-point scale, using relatively abstract descriptions (e.g. ‘analytical thinking’), though there is a lot of literature about how to formulate good questions to capture the construct to be measured (Lucas & Baird, 2006; Schwarz, 1999).

In order to formulate our questions as clearly and closely to performance as possible, we decided to follow the Job Requirements Approach (JRA). The JRA is an internationally applied survey method to explore the activities and requirements of employed persons (Felstead et al., 2007; Klaukien et al., 2013; Peterson et al., 2001). Thereby, the method relies on specific assumptions. One assumption is that asking employees what they actually do at work portrays the demands and requirements of the labour market. Another assumption is that employees can describe their daily activities and requirements in a less biased way than their own level of competences. This assumption leads to the approach’s recommendation to gather preferably information about employees’ activities and requirements. Another assumption of the JRA is that a certain match between employees’ activities at work and their own competences can be assumed and that, therefore, the JRA allows for measuring job-related activities and requirements as a potentially less biased proxy for job-related competences than direct self-rated levels of competences. However, we do not follow this last assumption that a match between employees’ work activities and competences can be assumed because self-reported competences cannot represent an equivalent for an objective assessment of competences. Nevertheless, the approach clearly specifies how to formulate survey questions that can help to identify important fields of job-related competences.

Against this background, we used the approach to identify labour market activities and requirements and derived fields of competences that are crucial for the successful completion of jobs.

Following the JRA principles, we developed a questionnaire to assess job-related activities and requirements of higher education graduates (Braun & Brachem, 2015). The questionnaire consists of 49 items that can be associated to the following nine theoretically identified areas of job-related activities and requirements:

1. Planning and organising of work processes
2. Promoting others
3. Leading
4. Dealing autonomously with challenging tasks
5. Information processing
6. Number processing
7. Using Information and Communication Technology
8. Physical performance
9. Communicating in foreign languages

For further details concerning the theoretical background and the development of the questionnaire see Braun and Brachem (2015).

## **Aims**

In this contribution, we aim to confirm areas of generic competences higher education graduates need in the labour market, using the data of a survey which applied a specially developed instrument about graduates' generic job-related activities and requirements (Braun & Brachem, 2015). Additionally, we want to explore which activities higher education graduates execute in their professional lives, and which activity profiles can be found regarding graduates' (a) area of study, (b) occupational area and (c) occupational status.

## **Method**

### ***Instrument***

The instrument about graduates' generic job-related activities and requirements was developed on the basis of an extensive literature review and an analysis of transcripts from employer interviews (Braun & Brachem, 2015). In this previous study, 49 generic activities and requirements were identified and formulated as single questions, following the recommendations of the JRA. Each question refers to the work context ('at work') and uses first tense ('I') to illustrate how often a person experiences certain activities and requirements (e.g. 'At work, I advise others'. or 'At work, I have to handle new tasks with which I have to familiarise myself first'.). The answers are based on a five-point Likert scale: (1) Never; (2) Less than once a

month; (3) At least once a month but less often than once a week; (4) At least once a week but not daily; (5) Daily.

## Data

The described instrument was applied in an online survey, which was conducted between December 2013 and February 2014 with higher education graduates from the graduate panels of the 'Deutsches Zentrum für Hochschul- und Wissenschaftsforschung' (DZHW) (Deutsches Zentrum für Hochschul- und Wissenschaftsforschung, 2015). The respondents graduated from German higher education institutions (all types; undergraduate and graduate level, except for doctorate level) in the years 2000/2001, 2004/2005 or 2008/2009.

The sampling procedure, which took place in the context of the graduate panel projects, covered the whole federal territory. The study area, the degree type and the higher education institution were considered as sampling criteria. A separate sampling procedure took place for the 'old' and the 'new' German states (Briedis & Minks, 2003; Briedis, 2007; Rehn et al., 2011).

## Sample

For our research we looked at higher education graduates at level 5 of the International Standard Classification of Education (ISCED). Only those graduates who worked at the time the survey was conducted or interrupted their employment for a shorter period of time (up to 14 months) and planned to return to their employer afterwards were taken into account ( $N = 10,511$ ). Hereof, 2,882 persons graduated in the years 2000/2001, 3,707 persons in the years 2004/2005 and 3,922 persons in the years 2008/2009.

Regarding the *areas of study*, based on a classification of the German Federal Statistical Office, the majority graduated in the areas of legal, economic and social sciences ( $n = 2,826$ ), languages and arts ( $n = 2,102$ ), mathematics and natural sciences ( $n = 1,926$ ) and engineering ( $n = 1,891$ ).

Regarding the *occupational areas*, categorised according to the German Classification of Occupations 2010, most of the graduates work in the health care, social, teaching and education area ( $n = 4,102$ ) as well as in the areas of business organisation, accounting, law and administration ( $n = 2,205$ ) and production of raw materials and goods, and manufacturing ( $n = 1,070$ ).

Regarding the *occupational status*, most of the graduates execute responsible ( $n = 6,026$ ) or leading functions ( $n = 2,460$ ). While responsible functions comprise the autonomous execution of activities on one's own responsibility without having any human resource responsibilities, leading functions contain extensive decision-making authorities and human resource responsibilities. In executive functions, however, employees accomplish tasks by following instructions and without having further responsibilities. For a detailed overview see Table 14.1.

**Table 14.1** Higher education graduates' area of study, occupational area and occupational status

<i>Area of study</i>	<i>N</i>
Languages and arts	2,102
Sports	53
Legal, economic and social sciences	2,826
Mathematics, natural sciences	1,926
Human medicine	570
Veterinary medicine	141
Agricultural, forestry and food sciences	464
Engineering	1,891
Art	281
<i>Missing information</i>	257
<b>Σ</b>	<b>10,511</b>
<i>Occupational area</i>	<i>N</i>
Military	6
Agriculture, forestry, farming and gardening	191
Production of raw materials and goods, and manufacturing	1,070
Construction, architecture, surveying and technical building services	479
Natural sciences, geography and informatics	832
Traffic, logistics, safety and security	122
Commercial services, trading, sales, the hotel business and tourism	284
Business organisation, accounting, law and administration	2,205
Health care, the social sector, teaching and education	4,102
Philology, literature, humanities, social sciences, economics, media, art, culture and design	961
<i>Missing information</i>	259
<b>Σ</b>	<b>10,511</b>

*(continued)*

**Table 14.1** Higher education graduates' area of study, occupational area and occupational status (*continued*)

<i>Occupational status</i>	<i>N</i>
Executive function	909
Responsible function	6,026
Leading function	2,460
Self-employment	777
<i>Missing information</i>	339
<b><math>\Sigma</math></b>	<b>10,511</b>

## Analysis

To confirm areas of generic competences higher education graduates need on the labour market, a confirmatory factor analysis was conducted with the statistics software 'Stata 13'. The responses to the 49 activity and requirement items, given on completely labelled and numbered five-point Likert scales, were treated as quasi-metric. In the estimation process the Maximum Likelihood (ML) method was used (Lüdtke et al., 2007).

To evaluate the internal consistency of the scales, Cronbach's Alpha ( $\alpha$ ) was considered and interpreted according to the following rules:  $\alpha > .90$  – Excellent Internal Consistency;  $\alpha > .80$  – Good Internal Consistency;  $\alpha > .70$  – Acceptable Internal Consistency;  $\alpha > .60$  – Questionable Internal Consistency;  $\alpha > .50$  – Poor Internal Consistency;  $\alpha \leq .50$  – Unacceptable Internal Consistency (George & Mallery, 2003).

To evaluate the overall model fit, several fit indices and cut-off criteria were considered (Backhaus et al., 2011; Beauducel & Wittmann, 2005; Browne & Cudeck, 1993; Weiber & Mühlhaus, 2010): (1) the Root Mean Squared Error of Approximation (RMSEA) ( $RMSEA \leq .05$  – Close Fit;  $RMSEA \leq .08$  – Reasonable Fit;  $RMSEA \leq .10$  – Acceptable Fit), (2) the Standardized Root Mean Squared Residual (SRMR) ( $SRMR \leq .08$  – Reasonable Fit;  $SRMR \leq .10$  – Acceptable Fit) and (3) the Comparative Fit Index (CFI) ( $CFI \geq .95$  – Good Fit;  $CFI \geq .90$  – Acceptable Fit).

To explore which activities higher education graduates execute in their professional lives, descriptive analyses were conducted, considering the different scale means and standard deviations of the beforehand-confirmed areas of generic competences. To analyse the different activity profiles regarding higher education graduates' area of study, occupational area and occupational status (see Table 14.1), group t tests ( $p < .01$ ) were conducted, comparing the means of single groups of graduates (group 1) to the means of all the other graduates in the sample (group 0). As most

of the comparisons in large-scale samples become significant, we only considered mean differences higher than or equal to .50 (*noteworthy differences*). The differences were calculated as subtractions (group 0 – group 1).

## Results

### *Labour market relevant areas of generic competences*

The first aim of this contribution was to confirm areas of generic competences that higher education graduates need in the labour market, based on a previously conducted literature review and interview analysis which revealed the following nine areas (Braun & Brachem, 2015):

1. Planning and organising of work processes
2. Promoting others
3. Leading
4. Dealing autonomously with challenging tasks
5. Information processing
6. Number processing
7. Using Information and Communication Technology
8. Physical performance
9. Communicating in foreign languages

The internal consistencies of the scales are good to questionable. The best internal consistency exists for the scale 'Promoting others' ( $\alpha = .81$ ), especially with regard to the small number of items. Acceptable internal consistencies can be shown for the 'Dealing autonomously with challenging tasks' ( $\alpha = .79$ ), 'Information processing' ( $\alpha = .79$ ), 'Physical performance' ( $\alpha = .77$ ), 'Planning and organising of work processes' ( $\alpha = .75$ ), 'Communicating in foreign languages' ( $\alpha = .74$ ) and 'Leading' ( $\alpha = .72$ ) scales. The 'Number processing' scale ( $\alpha = .62$ ) must be declared as questionable. The scale 'Using Information and Communication Technology' is without doubt unacceptable ( $\alpha = .16$ ). Therefore, we renounced this area and the associated three items in the following analyses ('At work, I use a (tablet) computer or a smartphone'; 'At work, I design websites or use social media to carry out public relations work'; 'At work, I develop software'). The confirmatory factor analysis, based on the eight areas with good to questionable internal consistencies, shows mixed results considering several fit indices and cut-off criteria: while the RMSEA (.07) and the SRMR (.08) indicate a reasonable fit, the CFI (.74) is clearly below its cut-off value of .90.

As we identified 49 important generic activities and requirements which graduates are supposed to fulfil on the labour market in a previous, theoretically and empirically based study (Braun & Brachem, 2015), it was a main theoretical interest to keep as many items as possible in the model. Probably, the overall model fit would be better if we had deleted more items. However, in that case we would lose some of the theoretically and empirically identified activities and requirements.

Therefore, we suggest keeping the presented model based on eight areas of generic competences, consisting of 41 out of 49 items. Consequently, eight items about the activities and requirements experienced at work could not be integrated and are therefore not part of the presented model ('At work, I treat or care for others'; 'At work, I develop technical equipment, machinery or systems'; 'At work, I work on tasks that are similar'; 'At work, I have to follow guidelines on how my work has to be done'; 'At work, I determine my pace of work independently'; 'At work, I use a (tablet) computer or a smartphone'; 'At work, I design websites or use social media to carry out public relations work'; 'At work, I develop software'). Table 14.2 presents an overview of the areas of generic competences and their internal consistencies ( $\alpha$ ) as well as the underlying items and factor loadings ( $\lambda$ ).

**Table 14.2** Conceptual areas of generic competences (overall model fit: RMSEA = .07; SRMR = .08; CFI = .74)

<i>Area of generic competence</i>	$\alpha$	<i>Items ('At work...')</i>	$\lambda$
Planning and organising of work processes	.75	I select personnel.	.43
		I organise work processes for others.	.71
		I schedule processes for others.	.74
		I create something together with others.	.40
		I check processes, objects or persons in terms of compliance with laws, regulations or standards.	.42
		I design events.	.44
		I present products, ideas or reports in front of others.	.51
		I assess the performance or quality of processes, objects or persons.	.60
Promoting others	.81	I educate, teach or train others.	.64
		I have to instruct and lead a group of persons in a structured way.	.79
		I support and motivate others.	.85
Leading	.72	I develop objectives or strategies for others.	.66
		I maintain contact with persons or institutions outside my organisation, such as customers, clients or authorities.	.36

<i>Area of generic competence</i>	$\alpha$	<i>Items ('At work...')</i>	$\lambda$
		I advise others.	.57
		I have to persuade others.	.69
		I negotiate with others.	.64
Dealing autonomously with challenging tasks		I have to detect potential difficulties before they occur.	.68
		I examine the causes of difficulties that occur.	.56
		I deal with complex difficulties which cannot be solved immediately.	.55
		I have to consider possible implications on other areas or persons.	.57
	.79	I have to handle new tasks with which I have to familiarise myself first.	.50
		I look for new tasks independently.	.41
		I deal with different parallel tasks under time pressure.	.53
		I have to react to unexpected situations.	.65
		I have to reflect on my own feelings and actions to derive consequences for the future.	.57
Information processing		I research complex issues.	.68
	.79	I read long specialised texts (longer than 10 pages).	.70
		I document complex issues.	.62
		I apply scientific methods, procedures or techniques.	.60
		I analyse information or data in a target-oriented way.	.60
		I produce long specialised texts (longer than 10 pages).	.58

*(continued)*

**Table 14.2** Conceptual areas of generic competences (overall model fit: RMSEA = .07; SRMR = .08; CFI = .74) (continued)

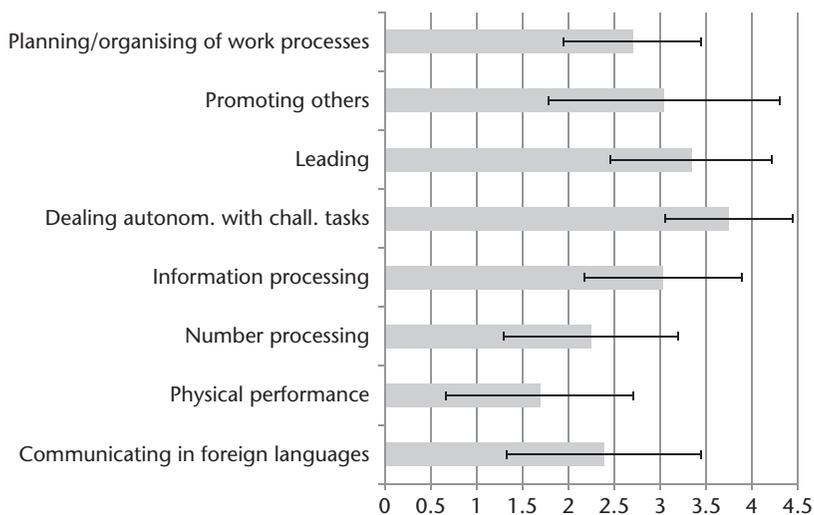
<i>Area of generic competence</i>	$\alpha$	<i>Items ('At work...')</i>	$\lambda$
Number processing	.62	I conduct complex calculations, such as model calculations.	.63
		I plan prices, costs or budgets.	.36
		I produce number-based charts or tables.	.82
Physical performance	.77	I am physically active for a long time.	.75
		I use my hands or feet to construct, adjust or create things or to do artistic work. <i>The operation of PCs is not included at this point.</i>	.80
		I operate technical equipment, machinery or systems. <i>The operation of PCs is not included at this point.</i>	.65
Communicating in foreign languages	.74	I maintain contact with persons from other cultures.	.58
		I communicate with others in a language other than German.	.88
		I use chat or Internet-based (video) communications, such as Skype, to share work-related information with others.	.50
		I produce specialised texts in a language other than German.	.72

### ***Higher education graduates' activity profiles***

The second aim of this contribution was to explore which activities higher education graduates execute in their professional life. Considering the means and standard deviations of the beforehand-confirmed areas of generic competences (see Figure 14.1), it can be shown that from a self-assessed point of view activities and requirements in the areas 'Dealing autonomously with challenging tasks' ( $M = 3.75$ ;  $SD = .69$ ) and 'Leading' ( $M = 3.34$ ;  $SD = .88$ ) are most commonly executed and experienced. In contrast, activities in the 'Physical performance' area are least commonly performed ( $M = 1.69$ ;  $SD = 1.02$ ). However, a certain variance ( $SD > 1$ ) can be observed in the areas 'Promoting others', 'Communicating in foreign languages' and 'Physical performance'.

### ***Differences between areas of study***

Considering the means of the areas of generic competences between graduates of different *areas of study*, some statistically significant and noteworthy differences ( $p < .01$ ;  $\Delta \geq \pm .50$ ) can be found (see Table 14.3). Activities and requirements



**Figure 14.1** Higher education graduates' activity profile.

in the area 'Promoting others' are executed and experienced more frequently by graduates of sports ( $\Delta = -1.20$ ), languages and arts ( $\Delta = -0.72$ ) and human medicine ( $\Delta = -0.53$ ). Physical activities are performed more often by graduates of veterinary ( $\Delta = -1.35$ ) and human ( $\Delta = -1.27$ ) medicine, art ( $\Delta = -0.91$ ) and sports ( $\Delta = -0.66$ ), compared to the other graduates in the sample (see Table 14.3, black edge).

On the contrary, activities in the area 'Promoting others' are executed less frequently by graduates of engineering ( $\Delta = 0.53$ ) and agricultural, forestry and food sciences ( $\Delta = 0.50$ ). Physical activities are performed less often by graduates of legal, economic and social sciences ( $\Delta = 0.59$ ), compared to the other graduates in the sample. While number processing activities are practised less frequently by graduates of languages and arts ( $\Delta = 0.58$ ), human medicine ( $\Delta = 0.54$ ) and art ( $\Delta = 0.54$ ), information processing activities are executed less often by graduates of art ( $\Delta = 0.64$ ) (see Table 14.3, grey edge).

Nevertheless, there are areas of generic competences which do not show any noteworthy differences ( $p < .01$ ;  $\Delta \geq \pm 0.50$ ) between graduates of different areas of study ('Dealing autonomously with challenging tasks', 'Leading', 'Planning and organising of work processes', 'Communicating in foreign languages') (see Table 14.3, light grey background), meaning that activities of these areas are performed to the same extent in the professional world across all graduates, no matter what they studied.

### ***Differences between occupational areas***

Considering the means between graduates of different *occupational areas*, the following statistically significant and noteworthy differences ( $p < .01$ ;  $\Delta \geq \pm 0.50$ )

**Table 14.3** Higher education graduates' activity profiles differentiated between areas of study

Area of study	Planning / organising of work processes		Promoting others		Leading		Dealing autonom. with chall. tasks		Information processing		Number processing		Physical performance		Communicating in foreign languages	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Languages and arts	2.77	0.79	3.58	1.31	3.43	0.86	3.78	0.71	2.86	0.86	1.80	0.76	1.59	0.82	2.31	0.95
Sports	2.94	0.84	4.20	1.04	3.29	0.99	3.74	0.75	2.59	0.82	1.78	0.95	2.34	1.11	2.11	0.93
Legal, economic and social sciences	2.72	0.73	2.87	1.15	3.51	0.85	3.77	0.67	3.00	0.85	2.39	1.05	1.26	0.59	2.39	1.08
Mathematics, natural sciences	2.64	0.74	2.91	1.24	3.04	0.92	3.70	0.66	3.27	0.82	2.43	0.88	1.76	1.05	2.79	1.12
Human medicine	2.61	0.81	3.51	1.06	3.59	0.81	4.09	0.61	3.41	0.75	1.75	0.84	2.88	1.49	2.24	0.73
Veterinary medicine	2.44	0.73	2.94	1.06	3.60	0.76	3.95	0.64	3.37	0.75	1.93	0.73	3.02	1.44	2.01	0.88
Agricultural, forestry, food sciences	2.62	0.68	2.53	1.13	3.23	0.88	3.56	0.65	2.90	0.88	2.35	0.89	1.85	1.11	1.95	1.02
Engineering	2.71	0.73	2.57	1.07	3.21	0.87	3.66	0.69	3.01	0.81	2.65	0.86	1.73	0.94	2.35	1.14
Art	2.67	0.82	3.27	1.42	3.23	0.88	3.62	0.74	2.41	0.89	1.74	0.73	2.57	1.20	2.15	0.84

Note: Black edge:  $\Delta \geq .50$ ; Grey edge:  $\Delta \geq .50$ ; Light grey background: Any noteworthy differences

can be found (see Table 14.4). Compared to the other graduates in the sample, activities and requirements in the areas 'Promoting others' ( $\Delta = -1.27$ ) and 'Physical performance' ( $\Delta = -0.61$ ) are executed and experienced more frequently by graduates working in the health care, the social, and the teaching and education sectors (see Table 14.4, black edge).

Most of the other graduates, working in the fields of natural sciences ( $\Delta = 0.71$ ), construction ( $\Delta = 0.67$ ), agriculture ( $\Delta = 0.65$ ), production ( $\Delta = 0.58$ ), humanities ( $\Delta = 0.56$ ), commercial services ( $\Delta = 0.54$ ) or business organisation ( $\Delta = 0.51$ ) promote other persons less frequently in their professional practice. Physical activities are performed less often by graduates working in business organisation, accounting, law and administration ( $\Delta = 0.66$ ). While information processing activities are practised less frequently by graduates working in commercial services ( $\Delta = 0.56$ ), number processing activities are executed less often by graduates in the health care and social sector ( $\Delta = 0.57$ ). Moreover, compared to the other graduates, activities in the area 'Communicating in foreign languages' are performed less frequently by graduates working in the construction ( $\Delta = 0.83$ ) and agriculture ( $\Delta = 0.69$ ) sectors (see Table 14.4, grey edge).

Again, there are areas which do not show any noteworthy differences ( $p < .01$ ;  $\Delta \geq \pm 0.50$ ) between graduates of different occupational areas ('Dealing autonomously with challenging tasks', 'Leading', 'Planning and organising of work processes') (see Table 14.4, light grey background), meaning that activities of these areas are performed to the same extent across all graduates, no matter where they work.

### ***Differences between occupational statuses***

Looking at the means of the generic competences areas, comparing graduates who hold different *occupational statuses*, the following statistically significant and noteworthy differences ( $p < .01$ ;  $\Delta \geq \pm 0.50$ ) can be found (see Table 14.5). Compared to the other graduates in the sample, graduates who hold leading functions, which include extensive decision-making authorities and human resource responsibilities, more frequently execute and experience activities and requirements in the areas 'Promoting others' ( $\Delta = -0.90$ ), 'Planning and organising of work processes' ( $\Delta = -0.58$ ) and 'Leading' ( $\Delta = -0.50$ ) (see Table 14.5, black edge).

On the contrary, the 'promoting others' ( $\Delta = 0.74$ ) and 'information processing' ( $\Delta = 0.63$ ) activities are performed less often by graduates holding executive functions in which they accomplish tasks by following instructions, without having further responsibilities (see Table 14.5, grey edge).

Areas which do not show any noteworthy differences ( $p < .01$ ;  $\Delta \geq \pm 0.50$ ) are 'Dealing autonomously with challenging tasks', 'Number processing', 'Physical performance' and 'Communicating in foreign languages' (see Table 14.5, light grey background), implying that graduates perform these activities to the same extent, no matter what type of function they hold.

**Table 14.4** Higher education graduates' activity profiles differentiated between occupational areas

Occupational area	Planning / organising of work processes		Promoting others		Leading		Dealing autonom. with chall. tasks		Information processing		Number processing		Physical performance		Communicating in foreign languages	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Military	3.13	0.58	3.22	1.13	3.10	0.64	3.69	0.47	3.14	0.90	1.50	0.51	2.22	0.69	2.00	0.65
Agriculture	2.62	0.67	2.40	1.09	3.25	0.84	3.53	0.63	2.88	0.87	2.38	0.88	2.06	1.22	1.72	0.96
Production	2.71	0.74	2.53	1.04	3.08	0.87	3.69	0.68	3.03	0.77	2.55	0.87	1.86	1.01	2.69	1.09
Construction	2.76	0.71	2.40	1.04	3.32	0.81	3.61	0.70	2.81	0.83	2.71	0.90	1.54	0.83	1.61	0.82
Natural sciences	2.52	0.67	2.39	0.97	2.94	0.88	3.66	0.64	3.18	0.70	2.44	0.86	1.46	0.86	2.75	1.19
Logistics, security	2.64	0.80	2.65	1.05	3.25	0.82	3.66	0.72	2.77	0.88	2.19	0.95	1.79	1.11	2.35	1.07
Commercial services	2.61	0.73	2.52	1.06	3.71	0.83	3.66	0.71	2.48	0.78	2.69	0.99	1.41	0.76	2.60	1.10
Business organisation	2.76	0.75	2.64	1.07	3.47	0.86	3.72	0.70	2.95	0.81	2.55	1.00	1.18	0.46	2.43	1.15
Health care, education	2.74	0.78	3.80	1.15	3.40	0.88	3.87	0.66	3.18	0.89	1.90	0.84	2.07	1.16	2.34	0.93
Humanities	2.62	0.72	2.53	1.11	3.37	0.88	3.62	0.70	2.77	0.85	2.14	0.96	1.45	0.83	2.37	1.05

Note: Black edge:  $\Delta \geq .50$ ; Grey edge:  $\Delta \geq .50$ ; Light grey background in heading: Any noteworthy differences

**Table 14.5** Higher education graduates' activity profiles differentiated between occupational statuses

Occupational status	Planning / organising of work processes		Promoting others		Leading		Dealing autonom. with chall. tasks		Information processing		Number processing		Physical performance		Communicating in foreign languages		
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	
Executive function	2.32	0.77	2.36	1.41	2.90	0.97	3.37	0.83	2.45	0.89	1.95	0.92	1.57	0.96	2.10	1.00	1.00
Responsible function	2.60	0.70	2.88	1.23	3.23	0.87	3.71	0.66	3.09	0.83	2.21	0.94	1.69	1.00	2.42	1.05	1.05
Leading function	3.14	0.65	3.72	0.97	3.72	0.72	3.99	0.58	3.11	0.79	2.50	0.96	1.62	0.93	2.51	1.11	1.11
Self-employment	2.52	0.81	2.88	1.23	3.51	0.87	3.71	0.77	2.91	0.90	2.13	0.90	2.08	1.29	2.13	0.92	0.92

Note: Black edge:  $\Delta \geq .50$ ; Grey edge:  $\Delta \geq .50$ ; Light grey background: Any noteworthy differences

## Discussion

All in all, eight areas of generic competences higher education graduates need in the labour market could be empirically confirmed. From a self-assessed point of view, graduates most commonly deal autonomously with challenging tasks and execute leading activities, while physical activities are most uncommonly performed.

Differences between graduates of different fields of study or occupational areas show up in the fields of 'Promoting others' and 'Physical performance'. Graduates who hold leading functions seem to have a specific activity profile in which promoting (human resource), planning and leading activities play a more prominent role compared to graduates holding other functions.

Remarkably, there are three areas that do not differ between graduates of different fields of study or occupational areas: 'Dealing autonomously with challenging tasks', 'Leading' and 'Planning and organising of work processes'. It seems that all graduates need to cope with such activities and requirements to a comparable extent in their professional lives. Consequently, these three areas seem to represent generic fields of competences, which are of the same importance for all graduates, no matter what degree they hold or where they work. This result might be of interest for curriculum developers and academic quality managers, policy-makers and employers as well as for the scientific community and the graduates themselves.

Moreover, the area 'Dealing autonomously with challenging tasks' is homogeneous for all occupational statuses. Therefore, the capability to manage challenges in an autonomous way seems to be highly important for all higher education graduates and might represent a significant factor for successful transitions from higher education to the labour market. This assumption has to be explored in further research.

It needs to be said that there are clear limits of our study. Having used a Germany-wide analysis sample, the results cannot be transferred to other countries offhandedly. Moreover, the CFI of the presented model of generic competences shows an unacceptable value. In general, the CFI compares the fit of a target model to the fit of an independent model, in which all variables are assumed to be uncorrelated. However, we have checked the model fit of alternative models, such as a single factor model, which have all been even worse (single factor model: RMSEA = .10; SRMR = .11; CFI = .46). One explanation might be the procedure of our study: our main aim was to explore in an empirical way areas of generic competences higher education graduates need in their daily work life. Therefore, we extracted generic activities and requirements from the literature and employer interviews, transferring these into an instrument which was then applied in a large-scale graduate survey, asking graduates how often they execute and experience such activities and requirements in order to derive labour market relevant areas of generic competences. Hence, the aim of the study was not to prove an existing theoretical model, but to provide an empirical base for areas of generic competences of higher education graduates.

So far, there have been many discussions about the labour market's requirements for higher education graduates that have not always been empirically founded. We want to lay a broader empirical base for the discussion about the generic requirements higher education graduates meet on the labour market. The presented findings will hopefully be considered for further graduate surveys to get a less biased view of graduates' generic job-related activities and requirements and job-relevant fields of competences. They might be especially interesting for large-scale surveys, depending on self-reports.

Against the background of the research on skill mismatches and the point of view that all different ways of competence assessment capture a certain part of competences (Allen & van der Velden, 2001; Badillo-Amador & Vila, 2013; Di Pietro & Urwin, 2006), we have to underline that the assumptions of the Job Requirements Approach should not be overestimated. Graduates' self-reports provide important information, but they do not represent an objective assessment of competence levels, as only tests can measure objective levels of competences. Nevertheless, asking graduates what they do at work gave us the opportunity to further explore the demands of the labour market and to identify labour market relevant areas of competences. Hence, further research on competences needs to consider all different ways of competence assessment to gather a complete picture.

Our results might hopefully be helpful for a future discussion about which competences should be instructed during higher education. We do not suggest that all labour market relevant competences should be promoted within higher education. Nevertheless, each higher education institution can decide for itself the competences they want to support. Also the scientific community needs to reflect on, to develop and to critically deliberate the demands of higher education institutions of the twenty-first century and which curricula and future knowledge workers they want to bring forth.

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# THE TRANSITION FROM UNIVERSITY TO WORKING LIFE

## An exploration of graduates' perceptions of their academic competences

*Tarja Tuononen, Anna Parpala and Sari Lindblom-Ylänne*

### Introduction

Employability can be constituted by a combination of individuals' characteristics and the state of the labour market (Brown et al., 2003). Thus, employability includes individual factors, personal circumstances and external factors (McQuaid & Lindsay, 2005). It can also be defined solely from an individual point of view emphasising the achievements, understandings and personal attributes that make individuals more likely to gain employment and be successful in their chosen professions (Knight & Yorke, 2002, 2003). Most research on the topic has explored students' employability and transition from university to work by concentrating on the relationship between the output of academic education and the demands of working life, as well as employers' expectations (e.g. Kavanagh & Drennan, 2008). Moreover, at the institutional level, the employability of graduates is often measured by graduate employment rates (e.g. Harvey, 2001). However, to find employment after their university studies, graduates must be able to identify their competences and be confident that they will succeed in working life. It is therefore important to explore the transition from university to work from the graduates' perspective (Johnston, 2003). Knight and Yorke (2002) have suggested a model for excellent employability. The model consists of four interrelated components: Understanding, Skills, Efficacy beliefs and Metacognition (i.e. the USEM model). In line with the USEM model, Bennett, Dunne and Carré (1999) developed a model of course provision to develop students' generic skills and employability. It consists of both disciplinary content and skills and generic skills, but also workplace experience and workplace awareness. In this study, we use the concept 'academic competences'; these include academic skills such as critical thinking, collaboration and communication skills, and problem-solving skills (e.g. Strijbos et al., 2015). Such skills can be developed and utilised in both university and work contexts (Bennett et al., 1999; Greenbank et al., 2009). Academic competence can therefore be defined as a multidimensional construct

of skills, attitudes and behaviours, including academic skills, study skills, academic motivation, interpersonal skills and academic self-conceptions (DiPerna & Elliott, 1999). In line with Knight and Yorke (2002) and Bennett et al. (1999), the aim of the present study is to capture the individual-level variation in graduates' evaluations of their academic competences, their confidence in becoming successful in working life, and the usefulness of work experience to their studies during the period of transition to working life, in order to gain deeper insight into the employability of graduates. Next, the elements of the USEM model and the model of Bennett et al. (1999) are discussed in more detail, starting from 'understanding and skills'.

### ***Understanding and skills***

Previous research has explored students' and graduates' assessments of the skills they have developed during their university education. Graduates from political science have most often mentioned critical thinking as well as analytical and communication skills as being the most important, whereas psychology graduates have mentioned the ability to reflect (Abrandt Dahlgren et al., 2006). Students have perceived oral and written communication skills, critical thinking skills, as well as problem-solving and teamwork skills to be the ones that have developed most during their university studies, and which they considered to be more important for their future careers than content knowledge (Crebert et al., 2004). Most of these graduates have also perceived that generic skills have directly contributed to their ability to find employment after graduation. Graduates' competences, for example working independently, using time effectively and meeting challenges, were positively related to subjective vocational success and future salary (Braun et al., 2011). However, there is also evidence of students failing to understand the importance of developing generic skills. In one study, only one in eight students mentioned that engaging in teamwork can improve employability (Greenbank et al., 2009). Similarly, some students did not consider the acquisition of transferable skills as a goal in itself (Gedye et al., 2004).

Work experience plays a crucial role in developing skills and consequently in the development of students' employability (Bennett et al., 1999). Students whose education has included gaining skills during work practice have been better able to see the direct relevance of such skills to their future employment (Dunne et al., 2000) and to find employment after graduation (Mason et al., 2009). Similarly, students have perceived both academic studies and internship to be helpful in developing their competences, but considered internship as more important than studies (Arnold et al., 1999). More precisely, communication skills, teamwork skills (Sleap & Reed, 2006; Vaatstra & De Vries, 2007; Crebert et al., 2004), problem-solving skills (Crebert et al., 2004) and the ability to link theory to practice (Trede & McEwen, 2015; Shaw & Ogilvie, 2010; Smith et al., 2007) have been perceived as developing particularly at work.

### ***Efficacy belief and metacognition***

Graduates need to have strong self-efficacy beliefs, in other words, a person's belief in his/her ability to succeed in a particular situation (Bandura, 1977). Self-efficacy beliefs play a key role in career choice and development (Bandura, 1997). Graduates

with high self-efficacy beliefs concerning their ability to search and find a job have had more interviews and job offers than graduates with lower self-efficacy beliefs (Moynihan et al., 2003). In addition, self-confidence has been found to develop in the context of both university (Sleap & Reed, 2006) and work (Ehiyazaryan & Barraclough, 2009; Shaw & Ogilvie, 2010). Further, students with work experience have been more confident about entering working life and have had higher expectations of job security (Oliver, 2011). We take the position that the concept of self-confidence in this particular context resembles self-efficacy beliefs, as both can reflect a belief in one's employability and success in working life.

Metacognition as a part of employability means that graduates need to be aware of their learning process and be able to reflect on their own actions (Knight & Yorke, 2003). Metacognitive skills are important for analysing one's competences and skills. This is especially true during the transition phase when seeking employment, but it is also important for professionals in order to manage work demands (Knight & Yorke, 2003). The relation between metacognition and work can be bidirectional. Work experience has been found to have a positive influence on students' ability to articulate their skills and knowledge, and how they see their skills being transferred to the work context (Ehiyazaryan & Barraclough, 2009). Many students struggle with metacognitive skills and many perceive reflection as difficult (Smith et al., 2007; Lindblom-Ylänne, 2003). It is important to better identify and understand these students.

Studies concerning the transition from university to working life taking the graduates' perspectives into account have mainly explored perceptions of competences and employability using quantitative surveys (e.g. Braun et al., 2011; Crebert et al. 2004). We argue that to be able to examine graduates' ability to reflect on their competences, we should explore how they are able to identify these competences themselves. Thus, there is a need for qualitative research on graduates' self-evaluations of their knowledge and skills, self-efficacy and metacognition as well as on their work experience and workplace awareness. The present study aims, firstly, to capture the variation in graduates' evaluations of their competences and, secondly, explore this variation at the individual level in order to create graduate profiles.

## Method

### *Participants*

A total of 58 master's graduates from the University of Helsinki participated in the study. The majority of the participants were female (76 per cent,  $n = 45$ ). Ages varied from 25 to 47 years ( $M = 29$ ). Most of the graduates were from the Faculty of Arts, 36 per cent ( $n = 21$ ), Faculty of Behavioural Sciences, 19 per cent ( $n = 11$ ) and Faculty of Social Sciences, 17 per cent ( $n = 10$ ). All had acquired work experience during their studies, and most (75 per cent) had work experience related to their studies. Altogether 33 graduates (57 per cent) had worked both during semesters and during summer. Nineteen (33 per cent) had only worked during semesters; of these, seven had worked full time. One student had only worked during holidays. Most of the graduates 25 (43 per cent) had worked less than 20h per week, eleven (19 per cent) had worked 20–34h and 22 (38 per cent) had worked weekly more than 35h.

## **Interviews**

The participants had received a questionnaire when they graduated in the spring of 2013. The questionnaire is used in another of our studies (Tuononen et al., 2015), where it is explained in greater detail. In the survey, the graduates were asked to provide their contact information if they were willing to participate in the study. Those who volunteered were then contacted by email and interviews were conducted by the first author. The semi-structured interviews focused on graduates' perceptions of their academic competences, and particularly on how, in the opinion of the graduates, the competences had developed during their studies. The interviews also dealt more broadly with the graduates' studying and learning at the university. Moreover, the graduates' work experience alongside their studies, their work situation at the time of graduation and their thoughts about their future success in working life were covered as well. The interview themes were formulated on the basis of the elements of the USEM model (Knight & Yorke, 2002). Clarifying questions were asked if the responses were unclear or less detailed. The interviews lasted from 24 to 99 minutes, and were recorded and transcribed verbatim. The participants' anonymity was ensured by giving them ID numbers.

## **Analysis**

The interviews were analysed using inductive content analysis (Elo & Kyngäs, 2007). The first phase of the analysis was carried out at the phenomenon level, and each theme (academic competences, confidence in success in working life, and usefulness of work experience) was analysed separately. The process of inductive content analysis includes open coding, creating categories and abstraction (Elo & Kyngäs, 2007). First, the graduates' evaluations of the themes were listed and coded. Subsequently, categories were created by combining qualitatively similar descriptions, and finally, main categories were created and named at a level of abstraction. The analysis of the interviews was conducted by all authors. The first author independently analysed the interviews by reading them and identifying initial variations. The third author then analysed 15 randomly selected interviews (26 per cent of the 58 interviews). The first and third author identified the same main categories but detailed criteria for categorisation were discussed together with all three authors and some categories were redefined. Following this, quotations from the interviews were selected to describe each category, and the second author read selected quotations to validate the analysis. All unclear cases were analysed and discussed together. After a closer analysis, most of the unclear descriptions could be classified in one of the existing categories.

In the second phase the aim was to create graduate profiles using a person-oriented approach. This approach sees the individual as an organised whole and takes a holistic view on an individual's development (Bergman & Magnusson, 1997). In the present study each graduate's descriptions and evaluations were analysed as one unit. Based on the categories found in the first phase of the analysis, the first author coded the interviews to determine combinations that were formed. A total of 11 profiles were identified. After a discussion among the three authors, categories having limited or problematic descriptions of practical academic competences, as well as low or no

confidence, were combined to reduce the number of profiles. Agreement on the coding and the profiles between all three authors was high. The profiles were formed based on graduates' evaluations of their academic competences and confidence in their success in working life because these were the elements most clearly distinguishable in the different profiles. After creating the final profiles they were explored in relation to graduates' evaluations of the usefulness of their work experience. In addition, graduates' background information, such as their major, the nature of the work experience (e.g. academic work or non-academic work) and previous education, was analysed in greater detail to find explanations for the differences between the profiles.

## Results

The results revealed variation in graduates' evaluations of their academic competences, confidence in success in future working life and how useful graduates' saw their work experience to be for their studies. Next, the variation in each theme is presented in detail. Table 15.1 summarises the variation in the themes.

**Table 15.1** Variation in evaluations of academic competences, confidence in success in working life and the usefulness of work experience

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1. Academic competences
1.1. Detailed analyses of demanding academic competences: critical thinking, academic writing skills, development of one's own thinking, communication skills
1.2. Limited descriptions of practical academic competences
Practical skills mentioned (e.g. language skills, IT skills)
Only a few competences mentioned or no concrete examples mentioned
1.3. Difficulties describing academic competences
No competences mentioned
2. Confidence in success in working life
2.1. High confidence in success in working life
2.2. Low confidence in success in working life
2.3. No confidence in success in working life
3. Usefulness of work experience for studies
3.1. High-level cognitive benefits (e.g. application of knowledge, development of one's own thinking)
3.2. Practical benefits (e.g. time management, social skills, enhanced motivation)
3.3. No benefits mentioned

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### ***Evaluations of academic competences***

The graduates provided various qualitatively different evaluations of how their competences had developed during their university studies. The first category consisted of detailed analyses and evaluations of demanding academic competences. Competences such as acquisition of knowledge, application of knowledge and critical-thinking skills were mentioned most often. In addition, evaluations of the development of one's own thinking, the ability to analyse different options, and being able to think more broadly were mentioned. Collaboration and communication skills including oral presentation and writing skills were also mentioned, among others. The following extract is typical of such descriptions:

*Well, I think that the studies have developed my competences quite well – for example, my own thinking and my ability to see different perspectives, analyse and bring something new, and also my ability to think critically. All have been developed.*

*(Agricultural sciences)*

The second category consisted of limited descriptions and evaluations of practical academic competences. These evaluations revealed that graduates were able to describe their competences narrowly. Only a few competences were mentioned, usually practical ones such as language and information technology skills. Thus, compared to the previous category, these evaluations focused more on practical skills than higher-level cognitive competences, as in the following extract:

*Well it is quite limited, or at least it is difficult for me to analyse. Probably basic language skills and IT skills. My studies were not practical in a way that I could somehow directly say that these were the working life competences that were taught.*

*(Humanities)*

Moreover, there were also vague evaluations to the effect that graduates had acquired certain competences but were unable to provide concrete examples of them:

*I believe that if I get a job in my own academic field, I have competences to work or at least I have a degree.*

*(Humanities)*

The third category consisted of evaluations that reflected difficulties in describing any academic competences acquired during studies. Some evaluations even revealed that students had developed no generic competences while at university:

*Well, I was thinking about this before and unfortunately I have to say that nothing [no academic competences have been developed].*

*(Humanities)*

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There were claims that university studies were extremely theoretical and therefore evaluations to the effect that students had not developed any useful competences for working life. Moreover, in some descriptions, having difficulty analysing competences and skills was expressed:

*At this point, I probably cannot analyse what I have learned when I was doing my master's thesis, what I learned from doing it.*

*(Humanities)*

### **Confidence in success in working life**

Although the graduates' evaluations did reveal differences with regards to confidence in success in working life, most evaluations showed high confidence. Moreover, the evaluations revealed very realistic views of working life. Evaluations showing high confidence were given even if competition in the labour market was considered to be intense. Evaluations in this category also emphasised self-confidence and flexibility in order to manage the demands of work, as the following extract shows:

*Yes, of course you need to have such capabilities that you would dare to say that you know your own limits if you are not able to do something ... of course, the economic situation at the moment worries me, and in fact, layoffs are going to begin in our workplace ... I do feel that I certainly can find some kind of job, and if necessary I can change fields ... So, self-assurance and self-confidence are really important to have.*

*(Humanities)*

There were also evaluations that revealed low confidence concerning success in working life, such as:

*Well, on the one hand, I feel that I know some things. But then somehow if I now look at my qualifications that I have from the schools, I think that I don't have any proper knowledge or any kind of profile that someone out there is looking for. So I'm a bit worried about that. Especially now when I have to search for a job.*

*(Humanities)*

*Well, sometimes I have and sometimes I don't have [confidence]. It depends on the day (laughs). Sometimes I am really excited and so on ... For a long time I have been a bit terrified. And even when I had the degree done I intentionally prolonged it because there was nothing [no work].*

*(Humanities)*

Some evaluations showed no confidence because graduates had no work experience in their own academic field:

*Maybe I have low self-esteem or self-confidence in my own abilities at the moment ... I'm afraid that I sound too pessimistic in terms of working life ... Perhaps it's just because I don't have a job in my own field and I feel that it is so hard to get ... But time will tell. Maybe then when you get a job, you realise that you can do this, that you have competences to do it, but before that ...*

*(Humanities)*

### **Usefulness of work experience for studies**

There was also variation in how graduates evaluated the usefulness of their work experience to their studies, and three categories emerged: high-level cognitive benefits, practical benefits and no perceived benefits. The first category consisted of descriptions of work experience helping students to link theory to practice, develop their ability to apply knowledge, or develop their own thinking. One graduate evaluated the usefulness of her work experience in the following way:

*Well, of course, you can see how the theory can be applied to practice, and when you do practical work then you maybe remember these theories. And then when you learn a new theory, you are able to think about what kind of situations you can apply it to, so in that sense, of course it supports.*

*(Social sciences)*

Some evaluations in this category showed that working motivated students to study, and helped them to concentrate on what was essential. Moreover, the ability to see one's own strengths and weaknesses through work experience was mentioned, as below:

*Well, yes, work motivated me quite a lot to study because when you do translation work for pay you take it more seriously ... and you want to give the best image of your own professional skills, so of course it then motivates you to develop these skills.*

*(Humanities)*

In addition, some evaluations showed that working provided a different perspective on the studies and made them more meaningful:

*You can direct your studies because you can see their relevance to working life ... and what kind of things can be useful. It makes studying more meaningful.*

*(Humanities)*

The second category comprised descriptions of the practical benefits of work experience. Most of the graduates' evaluations belonged in this category. The descriptions showed, for example, that working helped students to schedule their studies and use their time more effectively. Moreover, acquired time-management and social skills were mentioned. A few evaluations revealed that working was beneficial for studying by providing data for course work or a master's thesis topic:

*It gave me data that I could use in assignments, so I can say that there have been some practical benefits too.*

*(Social sciences)*

The third category comprised evaluations to the effect that work experience had no benefits for studying. Some evaluations mentioned work and studies being very different in nature, and therefore no connection could be made between them:

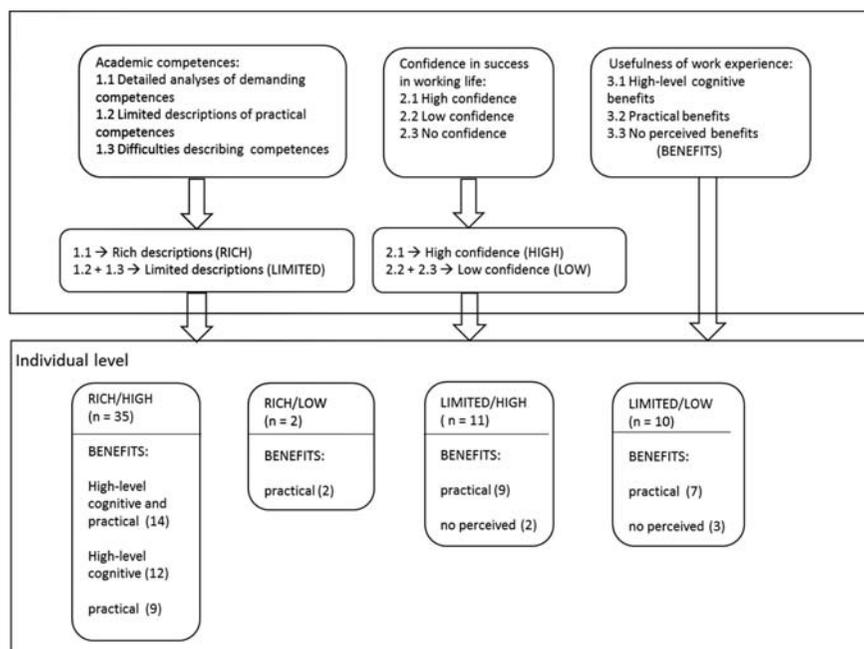
*It's a different kind of job that is not related in any way to university studies. I have gained a lot of experience but it does not support my studies because it's so different.*

*(Humanities)*

### ***Variation in graduates' evaluations at the individual level: graduate profiles***

After capturing the variation in the specific themes at the phenomenon level, we explored the kinds of combinations these themes formed at the individual level. Four profiles were formulated based on graduates' evaluations of academic competences and confidence in success in working life: rich descriptions/high confidence, rich descriptions/low confidence, limited descriptions/high confidence and limited descriptions/low confidence. The profiles were then examined in relation to graduates' evaluations of the usefulness of their work experience to their studies, and the results showed that the evaluations of the graduates in these profiles differed. The process of creating the profiles is illustrated in Figure 15.1. Graduates in all profiles had work experience from their own academic field: 81 per cent of graduates representing rich descriptions and evaluations and 77 per cent of graduates representing limited descriptions and evaluations.

The first profile, *rich descriptions/high confidence*, represented graduates with rich descriptions and evaluations of academic competences as well as evaluations of high confidence in success in working life. These graduates were able to provide deep analyses of demanding competences and also mentioned a number of various competences. They also perceived their work experience as being beneficial to their studies. However, the graduates differed in the kinds of benefits they described. Almost half perceived both high-level cognitive and practical benefits. There were also graduates who reported either high-level cognitive or practical benefits.



**Figure 15.1** The process of creating the profiles: phenomenon- and individual-level analyses.

The second profile, *rich descriptions/low confidence*, consisted of graduates with rich descriptions of academic competences. They reported practical benefits from work but had low confidence in their success in working life.

The third profile, *limited descriptions/high confidence*, consisted of graduates with limited descriptions of practical competences showing high confidence in success in working life. Most of these graduates described practical benefits of their work experience. However, two graduates in this profile were unable to describe any benefits of their work experience. In the fourth profile, *limited descriptions/low confidence*, graduates also varied regarding their evaluations of the usefulness of work to their studies. Some graduates reported practical benefits of work experience and others were unable to describe any benefits of their work experience.

### **Differences in current work situation between the profiles**

We also explored whether differences existed between the profiles concerning the graduates' work situations at the time of their graduation (see Table 15.2). The results revealed that most of the graduates in the profile *rich/high* had a job by the time of their graduation. In addition, most had a job that corresponded to their degree. A total of 4 out of 31 graduates in this profile were looking for a job that corresponded

**Table 15.2** Work situation of profiles at time of graduation

	<i>Rich/high</i>	<i>Rich/low</i>	<i>Limited/high</i>	<i>Limited/low</i>
Had a job at time of graduation	31	1	9	7
Unemployed at time of graduation	4	1	2	2

to their degree. Only four graduates were unemployed and seeking a job. The two graduates representing the profile *rich/low* differed from each other: one had a job related to his academic degree, and the other was unemployed. In the profile *limited/high*, nine graduates had a job at the time of their graduation but three were looking for another job that related to their academic degree and two graduates were unemployed. The profile *limited/low* featured greater variation in the graduates' current working situation than did the other profiles: seven graduates had a job, but of these, two were in work that was unrelated to their academic studies. Also, two graduates were unemployed and one was continuing with another master's degree.

## Discussion

The present study explored different elements of employability from graduates' perspectives at the time of graduation. The results showed variation between the graduates' perceptions of their academic competences, confidence in success in working life and usefulness of their work experience for their studies. We now focus on the profiles in order to discuss the meaning of the results in more detail, and because they also include the variation within categories. The results revealed four profiles that differed in terms of evaluations. The first profile represented graduates with *rich descriptions and high confidence* in success in working life. These graduates were able to describe various demanding competences and provide detailed analyses of them, and had high confidence in success in working life. Similarly, graduates from political science stated that their critical thinking as well as analytical and communication skills had developed while at university (Abrandt Dahlgren et al., 2006). These graduates with *rich descriptions/high confidence* were also able to describe different benefits of their work experience. Most perceived high-level cognitive benefits, such as being able to apply knowledge to practice and develop their own thinking. Practical benefits were also mentioned, such as the development of time-management and social skills. The resulting profiles replicated previous studies showing that the ability to link theory to practice (Trede & McEwen, 2015; Shaw & Ogilvie, 2010) as well as problem-solving and communication skills (Crebert et al., 2004) were developed through students' work experience. Thus, graduates in the profile *rich descriptions and high confidence*

were able to reflect on their competences acquired in different contexts. In other words, they were able to transfer those skills to another context, which usually requires students to have high-level learning skills and opportunities to apply their knowledge (Bennett et al., 1999). In working life there is a need for experts who are able to integrate material from different sources, combine new knowledge to prior knowledge and apply knowledge differently in different situations (Kirby et al., 2003). These are some of the elements of a deep approach to learning, which means students' endeavoring to understand the subject matter by analysing it and relating new material to knowledge already acquired (Entwistle, 2009; Entwistle & Peterson, 2004). Research has indicated a positive relationship between generic skills and a deep approach to learning (Kreber, 2003; Lizzio et al., 2002). Thus, it seems that the graduates here with rich descriptions and evaluations of academic competences were applying a deep approach to learning because they were able to describe various competences and perceived high-level cognitive benefits of their work experience for their studies.

The second profile represented graduates with *rich descriptions and low confidence*, who reported that the reason for their low confidence was their lack of academic work experience in their own study field and that they were consequently unsure whether they had the competences to succeed in working life. It might also be the case that these graduates were very analytical and critical, and because they had no academic work experience, were uncertain about and critical of their competences. However, it should be noted that there were only two graduates in this profile.

Two other profiles – *limited descriptions/high confidence* and *limited descriptions/low confidence* – consisted of graduates with limited descriptions, but differed as to whether they had high or low confidence. Compared to the graduates within rich profiles, graduates with limited profiles perceived no higher-level cognitive benefits of their work experience, although some had academic work experience in their own study field. However, practical benefits of work experience were perceived in both rich and limited profiles. This is in line with previous research showing that students had difficulties identifying skills learned at work and transferring them to another context (Marshall & Cooper, 2001). Common to these two limited profiles was graduates who described practical benefits of work and graduates who mentioned no benefits. Graduates in the profile *limited descriptions/high confidence* had limited descriptions of their academic competences but still high confidence concerning success in working life. These graduates said that because of their work experience, or because they had a job when they graduated, they had high confidence in success in working life. This is in line with research which has found that work experience enhanced students' confidence (Ehiyazaryan & Barraclough, 2009; Shaw & Ogilvie, 2010). Research has also shown that students with work experience were more confident about entering working life, that they had higher expectations of job security (Oliver, 2011), and that their work experience helped them to choose a career and succeed in entering it (Shaw, 2012). The results of the present study indicate that graduates with high confidence in success in working life most often were employed in academic work in their own study

field at the time of graduation. However, there is a possibility of bias here due to the fact that students with jobs at the time of transition might have found it easier to be confident about working life success compared to their unemployed counterparts.

One reason for graduates perceiving that they had not gained any competences from working life might be that they already had a significant amount of work experience and competences. Because they had had a long working history, they might have thought that university studies did not provide them with any new skills or competences, or they might have had different study objectives. In addition, previous research has shown students not seeing both the importance of developing skills and the benefits of these skills for their employability (Greenbank et al., 2009). Further, it has been found that students in different situations can understand employability in different ways. For example, for older students with work experience, the emphasis on employability can mean the development of a subject-specific understanding that complements what they have learned, whereas for young students entering university it can mean developing beyond the discipline (Knight & Yorke, 2002).

The variation between the participants' evaluations indicates differences in their metacognitive skills. Graduates with rich descriptions and evaluations seem to have had better metacognitive skills because they were able to analyse their competences more thoroughly. On the other hand, some graduates were unable to reflect on their own abilities, and it might be the case that the graduates with limited descriptions were lacking in metacognitive skills. Lindblom-Ylänne (2003) showed that first- and second-year law students had difficulty evaluating their studying practices and the quality of their learning; in other words they lacked metacognitive skills. Our study indicates that graduates in the transition phase may have the same kind of difficulty as students at the beginning of their studies.

A few graduates had limited descriptions and high confidence even though they were unable to see the usefulness of their work experience. These graduates had either work experience in their own academic field or a previous education and profession in a practical field. Some with a background in vocational education and a practical field might have been used to learning in a more practical way. However, the results showed graduates in other profiles also mentioning that they would like more practice in their studies and that studies were too theoretical. Similarly, Ruohoniemi and Lindblom-Ylänne (2009) found that students in a professional discipline emphasised the role of the practical side of their studies and the importance of knowing how to apply acquired knowledge to practice.

The use of qualitative methods revealed a variation in the graduates' evaluations and also differences in their metacognitive skills. Most of the research to date has explored the development of competences and skills through surveys (e.g. Sleep & Reed, 2006, Vaatstra & De Vries, 2007). The present study showed that when graduates were asked about their academic competences not all were able to describe them, or they provided limited descriptions. In many studies, students have given high scores in terms of academic competences and skills gained, resulting in a skewed variance (Arnold et al., 1999; Sleep & Reed, 2006;

Vaatstra & De Vries, 2007). This therefore raises the question of whether students answer these questionnaires on the basis of their own opinion or instead on what they think would be the 'right' answer. This would be important to explore in more detail.

The results of the present study are in line with employability models emphasising that acquiring and recognising competences are related to high self-efficacy beliefs (Knight & Yorke, 2002; Bennett et al., 1999). In the present study, most of the graduates had rich descriptions and evaluations of their academic competences, and confidence in succeeding in working life. In addition, the role of metacognition and self-efficacy was emphasised. Metacognition is important because without the ability to reflect on one's competences, graduates remain unaware of the competences they may have, and, further, are unable to perceive the usefulness of their work experience. This is crucial in the transition phase in order to gain employment after graduation, as emphasised in the USEM model (Knight & Yorke, 2002). It was worrying that graduates with *limited descriptions and low confidence* in this crucial phase were found. Moreover, it was notable that graduates with otherwise similar profiles differed in their levels of confidence. It seems that supporting metacognitive skills and sense of confidence is important in enhancing students' employability, and that this should be emphasised more at university. The present study has three practical implications that may help students in the transition phase. Firstly, emphasising the importance of acquiring different academic competences during studies and stressing to students the usefulness of these competences in future working life could help them to develop and recognise competences (e.g. Davies, 2000). An activating learning environment involving problem-based or project-oriented learning has been found to facilitate the development of competences (Schaeper, 2009; Vaatstra & De Vries, 2007). This would similarly not only support students' metacognitive skills but also their study processes in general, which has been shown to be related to working life as well. Tuononen and colleagues (2016) showed that students' study processes, especially their ability to search for understanding and create meaning, are related to their academic work. Secondly, students should be encouraged to reflect on their work experience and integrate it into their studies (Davies, 2000) and be supported when doing so. Thirdly, it would be worth teaching students how to articulate their employability as well as take advantage of their real-world experience (Ehiyazaryan & Barraclough, 2009). Employability should be made more explicit to students already during their studies, so that they are better prepared to enter working life.

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# 8

## INFORMAL LEARNING AT WORK

What do we know more and understand better?

*Herman Baert*<sup>1</sup>

### Introduction

Both in the practices of Human Resource Development and in the research into the training and professional development of staff for and in work environments, much attention and effort has been given over the past few decades to informal learning in the workplace. This comes to expression once again in this book with a meta-synthesis of research (Kyndt et al., Ch. 2) and the results of recent research.

### *HRD practices*

Various motives and considerations are at the basis of managers' and HRD professionals' interest in workplace learning. One of these is the popular conviction that a person can only fully learn a profession and how to do certain functions or jobs through hands-on experience. Immersion in the reality on the work floor, confrontation with "real-life" questions and problems, and focusing specifically on solutions for which one has to immediately search and process relevant information and knowledge and find appropriate alternatives and solutions through experimentation are tantamount to learning while working. Those who believe in this view are eager to refer to John Dewey's concept of "*learning by doing*".

But there's more. Motives related to the limitations and criticism of formal off-the-job courses and training also play a role. Formal courses in the context of education can indeed provide a basis, but are often not able to respond promptly to developments that are well under way in innovative businesses and organisations. Various factors constitute constraints and obstacles, such as long-term procedures for education and educational reforms, an institute of education's financial limitations when it comes to investing in the latest technologies and tools, or the time necessary for the extra training or retraining of teachers. It is thus telling that, in particular,

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large companies and powerful sectors on the labour market set up their own training centres and corporate universities which are very directly attuned to job performance and also concentrate on learning in the workplace in more formal or more informal ways. Furthermore, the impact or the transfer of formal training courses in terms of behavioural change of employees and teams is not on the whole considered significant. Figures circulate, whether or not based on research, of off-the-job-training as having an effective and lasting impact of just 10–40 per cent. On top of this there are the financial costs involved, not only for the programme development, the trainers, the venues, the travel and accommodation expenses, but also for employee absence on the work floor and the possible substitution of employees who are attending a training course. If employees can learn in the workplace, there is no problem – it is thought – of having to transfer what has been learned in the formal learning environment to the working environment, and the abovementioned costs can be reduced if not eliminated: this is the widely accepted line of reasoning. This is the thinking of practitioners who like to appeal to the concept of the “*learning organisation*” put forward by Chris Argyris (e.g. Argyris & Schön, 1996) among others. It also appeals to young professionals who want to learn a great deal while working in order to optimise their employability and their career opportunities. “Learning while working” is almost as important for them as “working while learning”, with learning in the workplace being seen as a driving force for professional development. In times of the so-called “war for talent”, offering learning opportunities becomes a means of attracting and retaining employees, in particular employees in the knowledge-intensive and innovative sectors.

### ***Research on learning in the workplace***

Researchers’ still-increasing interest in learning in the workplace is without doubt stimulated by HRD practices and the need that they have for more clarity and more insight into the impressionability and efficiency of this phenomenon. In this regard, programmes and subsidies for practical and policy-oriented research have made and still make it possible to set up research projects. (See, for example, some of our own research projects: Baert, H., De Witte, K. & Sterck, G. (2000); Baert, H., De Rick, K. & Van Valckenborgh, K. (2006); Baert, H., Clauwaert, L., & Van Bree, L. (2008).) However, the research interest extends further than the desire to serve practice and policy and, at least as far as scientific institutes and academic researchers are concerned, also has the aim of contributing to the appropriate development of theory. (See, for example, some of our own projects: Baert, H. & Govaerts, N. (2012); Kyndt, E., Govaerts, N., Dochy, F. & Baert, H. (2011); Kyndt, E. & Baert, H. (2013) and also the theoretical work by, for example, Marsick, V. J. & Volpe, M. (red.) (1999); Eraut, M. (2004); Tannenbaum, S. I., Beard, R. L., McNall, L. A. & Salas, E. (2009); Marsick, V. J. & Watkins, K. (2015).) Indeed, in the most frequently used didactic models and frameworks for instructional design and the learning theories on which they are based, they concern intentionally planned, systematic and targeted forms of learning in specifically organised

environments and specific delivery modes such as courses, seminars, computer-aided learning, handbooks and distance learning. Informal learning in the workplace differs fundamentally from this because it takes place in an environment that has been in the first place intentionally organised for working, and because in this context learning, with programmatically established learning objectives and didactic methods, is neither the primary nor the explicit reason. In order to conceptualise informal workplace learning, to describe it and to explain it, and also to be able to effectively influence and optimise it, it is necessary to have one's own theoretical framework.

## Questions and approach

The questions that we wish to discuss in this concluding article are therefore the following:

- Do the contributions of the researchers in this publication lead to conceptual clarity with respect to the concept of “informal learning at work”?
- Is it possible, on the basis of the articles, to develop one single universal and empirically founded theoretical framework or model?<sup>2</sup>

Conceptual clarity refers to the definition of a phenomenon in an unequivocal way so that it allows for a valid description and analysis, which subsequently permits researchers to make statements about one and the same reality on the basis of measurements of operational variables. This is a primary condition necessary in order to be able to compare research results.

A theoretical framework means a model that includes, in a universal way, the most powerful factors<sup>3</sup> and relevant variables which encourage, or on the contrary discourage, informal workplace learning and where the relations between these factors and variables are empirically defined. Model building can fulfil an essential role in the creation of a refined description and imaging, in the articulation of research hypotheses and the development of activities intended to bring about improvement, as well as in the realisation of such activities. A theoretical framework or model has necessarily to be a simplified image of a complex reality. The advantage of this abstracting reduction is the clarity it provides of what is essential in order to understand a phenomenon and to intervene forcefully. The limitation is that certain factors and/or variables can escape attention in specific situations, with a distorted understanding and inadequate intervention as a result.

Taking this into account, when considering the second question we must ask ourselves whether one single model of the complex reality of informal learning in the workplace is actually possible. This will logically depend on an unequivocal definition of learning in the workplace, but will be just as dependent on the possible and decisive differences with respect to target populations and types of organisations/workforce units, and/or work environment and task characteristics of the staff (see Kyndt et al., Ch. 2). The state of the research must prompt us to be

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cautious when attempting to develop one single universal model. Indeed, Kyndt et al. determine in their review study that “during the last decade, a substantial amount of research on the factors that influence informal workplace learning has appeared [. . . *but* . . .] despite these endeavours, there is a lack of overarching theoretical frameworks combining the results of the individual studies.” What is then possible on the basis of the contributions compiled in this book?

Being aware that scientific knowledge is established progressively and is continually evolving, the questions as they are formulated above sound absolute and ambitious. It is therefore more realistic to put the questions in relative terms, namely as follows. Has more conceptual clarity been established with these recent publications than before, and can a more developed and empirically based theoretical framework or model be developed?

Putting things into perspective like this raises the need for points of reference in order to determine possible progress. To which state of affairs does one revert in order to then measure the progression that the chapters in this book might provide? And to what extent does this book offer a reliable point of reference when it comes to the state of the knowledge in this area? Regarding this latter reference point – the current state of the art – a strength and a limitation immediately become apparent. Kyndt et al.’s Chapter 2, a review study with a fairly broad exploration of the international literature and with the ambition of making a meta-synthesis, is a valuable contribution. The fact that a limited number of authors present their most recent research results is a limitation.

We have chosen the results of our own research, carried out between 1997 and 2010, as a point of reference for a previous phase of the current research and the recent knowledge development. This is a pretentious and disputable choice, for which the following justification – which is open to discussion – is given. We discuss two paths of research and what they signify in terms of material for a first point of reference.

In 1997, we – Baert, De Witte and Sterck – began a three-year research project about HRD policy in social profit organisations in Flanders, which has 6 million inhabitants and is one of the Regions that make up the Federal State of Belgium. It was comprised of three phases: (1) a large-scale and extremely extensive survey on the extent to which HRD policy in these organisations had been developed, (2) an action research phase with 40 organisations to jointly improve certain aspects of their HRD policy and practices, and (3) a phase to develop a handbook to design and carry out a high-quality HRD in social profit organisations. In each of these phases, attention was given to informal learning as one of the aspects of the HRD. In other words, the international literature was in all phases explored and used for conceptualising, operationalising and optimising workplace learning (see Baert, De Witte, & Sterck, 2000).<sup>4</sup> Subsequent research and, by no means least, multiple contacts with practical experience (such as post-academic courses with the handbook as a guide and advisory meetings with HRD professionals) led, in 2010, to a thoroughly revised edition of the abovementioned handbook (Baert et al., 2011). In view of the increased interest in the policy and practice of workplace learning and the stream of publications, the chapter on workplace learning has as a result received

a substantial update and a more prominent place in the second version. Definitions and theoretical frameworks from these studies and publications will be used below.

During the 2005–08 period, two research projects were carried out that specifically dealt with workplace learning. One project sought indicators of high-quality workplace learning (Gielen & Lauwers, 2007), and a second research project developed a cartography of the conditions for workplace learning in labour organisations (Baert, Clauwaert & Van Bree, 2008). In these projects, use was also made of the available international literature at that time (see *ibid.*, fns 4 and 7, and the list of references) and of numerous interviews with HRD-professionals and employees on the work floor. These results will also be used to help answer the main questions in this chapter.

## **Do the chapters provide (more) conceptual clarity?**

### ***Work and the workplace***

It is striking that in the chapters in this book, no definition is given of the general concepts of “at work” and “the workplace”, although a specific explanation is indeed given throughout of what sort of work is meant in the study presented (for example, innovative jobs in IT, engineering work, chefs and kitchen staff, radiologists, auditors, social workers in community centres, teachers in schools having pupils with additional support needs . . .). We refer here to the conclusion we formulated on the basis of our previous research in order to come to a definition of workplace learning in what follows. We have not found any indications in the chapters for adapting the following definition.

We understand by the concept “workplace”, different work situations in which an employee repeatedly finds himself or herself, and the work processes that take place there. Examples of these are: conducting a sales meeting with clients, examining and treating patients, starting up and implementing an innovative digital communication project, assembling cars, cleaning offices, carrying out security operations, keeping the books, flying an aircraft, etc.

The various work situations simultaneously refer to physical places, where work processes are undertaken by people on their own, but in general in virtual contact with others, or together with colleagues, or where people meet colleagues in the margins of work. Examples of these are: the meeting room during a work-related discussion, the assembly hall where cars are built with robots, the computer desk in the office of a bank, the coffee corner or staff restaurant where people talk (about work or otherwise) with colleagues; the home of the customer or patient who is being visited, the reception desk of a hotel where the receptionist serves guests, the operating theatre of a hospital, the room in one’s own home from where one teleworks, the office of the boss with whom a performance review is taking place, etc. (Baert et al., 2008, p. 10.)

What we want to indicate with these numerous examples is that the very great diversity of work and workplaces must make us alert when we wish to attempt to

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develop one single universal theoretical framework for informal learning at work. However, before discussing this, we will first examine more closely the concept of “workplace learning” or “learning at work.”

### ***Learning at work***

Partly on the basis of the available literature at the time from the most authoritative authors, and on the basis of numerous conversations with researchers and practitioners with whom we worked together, we formulated the following definition of workplace learning:

Workplace learning is a process of continual change in the competences, knowledge, skills and attitudes respectively of employees and teams of employees, in situations in or near the workplace that have the high-quality execution and work progress as primary objective. “What” (learning content), “how” (learning process) and “when” (learning period) is learned lies in the first instance in the hands of the learning employee and the work processes in which he or she plays a role. Key people and employees in the labour organisation can facilitate and encourage this learning by creating, more or less as policy, favourable conditions and conditions in the employee’s environment (including work environment), that can be used to learn. Depending on the readiness to learn and the learning ability of the employee, and the extent to which he or she is aware of the opportunities for using the workplace conditions to learn, the competency development will take place less or more intentionally or incidentally and be less or more extensive.

*Baert et al., 2008, p. 20; Baert et al., 2011, pp. 198–199*

Which elements from the contributions published here can lead to a reformulation of this definition? We review these elements and then use them for an adapted definition.

The qualification “*informal*” does not occur in the “learning at work” terminology or in the abovementioned definition, and this is a conscious choice. There were two arguments for this. A first argument is related to the, in our opinion, proliferation of terminology. In UNESCO’s authoritative and frequently quoted publications from the 1960s onward, there was a continual reference to formal, non-formal and informal education.<sup>5</sup> All three of these concepts refer to the environment in which the learning takes place. In brief, this refers to:

- (a) Formal: an environment that is intentionally and specifically created with the intention of acquiring knowledge and expertise and that leads to an officially recognised diploma or certificate;
- (b) Non-formal: an environment in which learning does indeed take a central place, together with social networking and recreation for example, but that does not lead to a diploma, but possibly does lead to a recognition of the acquired skills, and

- (c) Informal: environments with a different main objective than learning and developing skills (such as producing, providing services, practising sport, creating art, etc.), but where, *in the process* and *on reflection*, a person can learn, individually as well as jointly with others.

Learning in the three environments is always a process of change in the knowledge, attitudes and/or skills of a person or a group of people, a team. It is therefore not the learning itself that is formal, non-formal, or informal, but the environment in which it takes place. It is for this reason that “informal” is not included in the concept definition.

A second argument – that moreover has more weight – relates to the difficulty of making a radical distinction between formal and informal learning. Both the literature (see e.g. Doornbos et al., 2008, quoted in Kyndt et al., Ch. 2) and our own research indicated strongly that it is here a question of a continuum or a “sliding scale of formality”. In other words, the environment in which learning takes place and the way in which people learn can be or become less or more formal. Figure 8.1 demonstrates this by way of a number of examples.

Are both arguments still valid in 2018? If we stick to terminological purism, the answer is yes. If, however, we take the widespread linguistic usage into consideration – in the everyday speech of practitioners and policy makers as well as in the scientific literature – then we must accept that the terminology of “formal and informal learning” has become widely used. This is in our opinion difficult to deny any more. Nevertheless, Boud and Rooney begin their chapter with: “We acknowledge that ‘informal learning’ is a contested term subject to a number of definitions” (Ch. 7, p. 135). On the one hand, they take a broad perspective that “understands informal learning as a phenomenon that is *not* the result of some planned and structured educational or training activity”. On the other hand, they emphasise that

. . . understanding informal learning as embedded in practices differs from accounts of informal learning that see learning as “a thing acquired by individuals” [...], or as a phenomenon independent of the context in which it occurs, or as something that individuals do alone.

*Ibid.*, p. 135

Through a practice approach, they understand learning “as phenomena dependent on the activities, practices, and socio-material arrangements in which it is located” (Ch. 7, p. 135). I can endorse this line of reasoning inasmuch as no negative definitions have crept into my first definition either, and because this is not only a question of learning as an individual, but also of teams in the sense of “the collective ‘property’ of groups” (Kemmis, 2005, p. 393, quoted in Boud & Rooney, Ch. 7, p. 137). Moreover, work processes, work situations and physical places are included in the definition of a workplace, and the relationships or interconnectedness with work processes and conditions in work situations and places are also indicated in the concept of “workplace learning”. All the same, Boud and Rooney’s chapter, and their reference (that we also previously used) to the work of Billett and the “social

<i>Informal workplace learning</i>		<i>Formal workplace learning – on the job learning</i>		<i>Training – off the job learning</i>
←		→		
<p><b>Learning by doing</b></p> <ul style="list-style-type: none"> <li>• Practising routines and procedures</li> <li>• Solving problems that occur during the working situation</li> <li>• Performing difficult tasks with assistance</li> <li>• Job rotation</li> </ul> <p><b>Learning through looking up information</b></p> <ul style="list-style-type: none"> <li>• Looking up information in manuals, handbooks or work instructions</li> <li>• Searching by following computer instructions</li> </ul> <p><b>Learning from colleagues</b></p> <ul style="list-style-type: none"> <li>• Asking for advice and assistance</li> <li>• Talking about work experience together</li> <li>• Working together with a more experienced colleague</li> </ul> <p><b>Learning from others</b></p> <ul style="list-style-type: none"> <li>• Learning from customers, patients, users, suppliers, etc.</li> <li>• Networking (including in learning networks)</li> </ul>	<p><b>Learning through coaching and instruction</b></p> <ul style="list-style-type: none"> <li>• Consulting and discussing with a coach</li> <li>• Getting explanation or instructions from your colleague or manager</li> </ul> <p><b>Learning through giving training</b></p> <ul style="list-style-type: none"> <li>• Learning through helping, showing someone the ropes, or training colleagues</li> </ul> <p><b>Learning through self-analysis and reflection</b></p> <ul style="list-style-type: none"> <li>• (Narrative) journal</li> <li>• Portfolio</li> </ul> <p><b>Learning through evaluation and feedback</b></p> <ul style="list-style-type: none"> <li>• Performance review</li> <li>• Assessment interview</li> <li>• Competency assessment</li> </ul> <p><b>Godfather/ Godmother/ mentoring</b></p> <p><b>Peer consultation</b></p>	<p><b>Workplace training</b></p> <ul style="list-style-type: none"> <li>• Leittext-method</li> <li>• Attending demos (demonstration video or PC demo)</li> <li>• CAL (Computer Aided Learning)</li> </ul> <p><b>Introduction programme for newcomers</b></p> <ul style="list-style-type: none"> <li>• Introductory course</li> <li>• Initiation course</li> </ul> <p><b>Supervised work placement/ internships</b></p> <p><b>Project groups</b></p> <ul style="list-style-type: none"> <li>• Study groups as part of a learning programme</li> <li>• Quality circles</li> </ul>	<p><b>Formal education</b></p> <ul style="list-style-type: none"> <li>• Secondary education</li> <li>• Adult education</li> <li>• Higher education</li> <li>• Post-graduates</li> </ul> <p><b>Specific professional training and supplementary training from</b></p> <ul style="list-style-type: none"> <li>• Labour market training agencies</li> <li>• Professional associations</li> <li>• Commercial training providers</li> <li>• Suppliers of equipment</li> </ul> <p><b>E-learning &amp; web based training and correspondence courses</b></p> <p><b>Professional in-house training</b></p> <p><b>Congresses, conferences, seminars, trade fairs</b></p>	

FIGURE 8.1 The sliding scale of informal and formal learning (Baert, 2014, p. 187)

informal learning activities” indicated by Gerken et al., and the distinction “learning from oneself and learning from others” (Gerken et al., Ch. 5, p. 82) do encourage me to give the social or interactive dimension – which they call the “sociality of work” – and the changes or innovation of/in teams in a labour context a nevertheless slightly more prominent place in a reformulation. But, according to Boud and Rooney, “This is not to say that *all* workers *always* learn through undertaking a practice” (Ch. 7, p. 145).

Their request for consideration of even broader approaches to “the physical, social and political contexts of work” is already partially included in the above definition of the workplace and of workplace learning, but should in our opinion receive explicit (or more explicit anyway) attention in the construction and reconstruction of a theoretical framework.

The nature of informal or everyday learning at work can be a little more accurately defined than “the process” used in our definition. In Chapter 5 by Gerken et al. and in the reference to Mulder (2013), there are multiple references to informal learning activities (that) are defined as cognitive and physical learning activities (that lead to cognitive activities), with the interesting addition: that can be implicit, deliberate or reactive (see also Eraut, 2004). Adding to this that the specified activities imply the gaining of experience and reflection on this experience (see also the reference to Dewey in the review by Kyndt et al., Ch. 2) may describe even more substantially the singularity of learning in the workplace.

I have objections to the addition of the frequently occurring characterisation of informal learning (see also the review by Kyndt et al., Ch. 2) that “informal workplace learning can be defined as spontaneous, unplanned learning that occurs at any time in work contexts”. Here too the definition is negative (“unplanned”). But, above all, I do not believe the so-called “spontaneity” of that learning. People only learn when they are triggered to do so (see below) and have a learning readiness, develop learning attitudes and learning intentions, and see activities and conditions (see below) in the workplace as opportunities they can make use of to learn and therefore also make efforts to learn (through reflection). Furthermore, this learning can be facilitated by the creation, more or less as policy, of favourable conditions for learning. It therefore seems to me more appropriate to define it as more or less intentional and more or less incidental, respectively continuous, rather than speaking of “spontaneous learning”. Taking this argumentation further, it is not appropriate to include in a definition, as does occur frequently, that informal learning occurs in contexts that are not explicitly created to evoke learning (see also the review by Kyndt and Baert 2013). Here too, the definition is negative, and here too, the fact that conscious intentional favourable conditions can be created for informal workplace learning is ignored.

This latter comment must not be misunderstood. The favourable conditions for learning at work are not the learning stimuli that are offered in formal and non-formal learning environments such as an instruction, an exercise, or a case study. Those favourable conditions, which we will discuss more fully below, are for example a positive learning climate or a management leadership style that is focused

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on development. Employees' learning at work is namely elicited through problems, questions, changes, challenges, etc. in the work itself, or in the work processes. It is for this reason that the addition to the definition of the factor "triggers" warrants recommendation. That happened already in the definition and the list of six characteristics of informal learning provided by Watkins and Marsick (1992) and Marsick and Volpe (1999) and confirmed by Kyndt et al. who cited "triggered by a jolt that can be internally or externally situated" (Ch. 2, p. 13). Grohnert et al. (Ch. 4, p. 66) refer in this respect to the research stream that has demonstrated the value of critical incidents for learning and future performance improvement.

In addition to the question of what lies at the start of the learning process – the triggers which have just been mentioned – the question also arises of what the end point or the objective of workplace learning is. Posing that question is somewhat unusual because in previous articles, one also reads that learning at work is "something *unstructured* in terms of learning objectives". The formulation of the question can be contested for two reasons. Goal-orientation presumes namely "knowing what precedes learning and what achievement is desired" and subsequently intentional, focused and organised efforts to reach objectives, as is intended in educational settings and – generally at least in part – brought about. Learning in the working environment differs fundamentally from this because working is focused on the (high-quality) production of products or services. As stressed by Hirschmann and Mulder (Ch. 3, p. 1) and Grohnert et al. (Ch. 4, p. 65), the aim of behaviour at work is to solve a problem, find a solution, etc. In other words, it is to improve work; learning as such is not the aim of behaviour at work and it occurs as a by-product of work activities and tasks. Boud and Rooney also posit that "those who deploy them do not see themselves as enacting a learning function within the organization involved, they are simply 'doing their work'" (Ch. 7, p. 145). We established similar conclusions in our research into learning patterns in organisations and teams (Baert & Govaerts, 2012). The additional comment of Boud and Rooney on activities at the workplace is interesting, however: "Additionally, they are not understood as primarily serving a learning function. Rather, they serve a substantive organizational purpose." (Ch. 7, p. 145) It is indeed likely that learning at work benefits the organisation, but matters may also be learned that are not of importance for the strategic goals of the organisation or are even in conflict with them. In relation to the former, we have in mind the learning results that can be important for an employee's career (as well) and that help him or her to find work in another organisation and realise his or her ambitions. In the second case, it can relate to finding personal "informal" solutions for example, for quality norms and procedures that deviate from the "formal requirements and rules" set by the organisation and its monitoring bodies. Bearing these considerations in mind, the addition may be made to the definition of (the outcomes) of workplace learning that it may be of benefit to the organisation and to the career of the employee.

Making use of the above elements, drawn from the preceding chapters in this book, we seek to redefine and better conceptualise respectively the phenomenon of learning at work.

*Learning at work* is a process of change in the competences, knowledge, skills and attitudes respectively of employees and teams of employees that comes about embedded in situations in or in close proximity to the workplace. The change is triggered by disturbances such as critical incidents, errors and challenges in the work processes in which the employees complete tasks together, with the high-quality execution and innovation of the work as the primary objective. The cognitive and physical learning activities (that lead to cognitive activities) can be implicit, deliberate, or reactive. The employee is the initial and main agent for “what” (learning content), “how” (forms of learning) and “when” (learning period) learning takes place. Managers, HRD professionals and colleagues in the labour organisation can facilitate and encourage this learning by creating favourable organisational conditions as well as conditions in the employee’s work environment that can be used to learn. Depending on the readiness to learn, the learning intentions and the learning ability of the employee, and the extent to which he or she is aware of the opportunities for using the workplace conditions to learn, the competency development will take place less or more intentionally or consciously and less or more incidentally or continually. It can be both to the benefit of the organisation and its teams as well as to the individual benefit of the employee’s career.

Elements of this definition that have not previously been discussed will be explained as part of the presentation of the theoretical framework.

## **The development of our initial theoretical framework**

In order to be able to describe and elucidate learning at work and to be able to effectively influence and optimise it, more is needed than a definition of the concept as developed above. A theoretical framework or model is indispensable for this. What we mean by a theoretical framework in this article is not only an ordered list of factors and/or variables that are intended to map out the main aspects of a phenomenon, but also a definition of those factors and measurable variables and the presumed relationships between them (Miles & Huberman, 1994). With a model, a further step is taken by empirically examining the impact of the variables and their effective mutual relationships. According to this understanding, a model is an advanced form of scientific knowledge development.

Is it possible to develop a single universal and empirically more founded theoretical framework or model on the basis of the chapters in this book than we have up to now presented and employed in subsequent research and in interventions in practice between 1997 and 2010? In the “Questions and approach” section, we have already indicated that – for several reasons – there is some doubt as to whether establishing a single theoretical framework or model is possible, and that, at the very least, caution is called for in the attempt to do so. We will therefore first present the conceptual framework that we developed previously and explain the reasoning or underlying theoretical approach. We will then do the same for the frameworks discussed in the chapters, at least insofar as they were submitted to empirical research or were the result of such. It will become apparent that establishing a single universal

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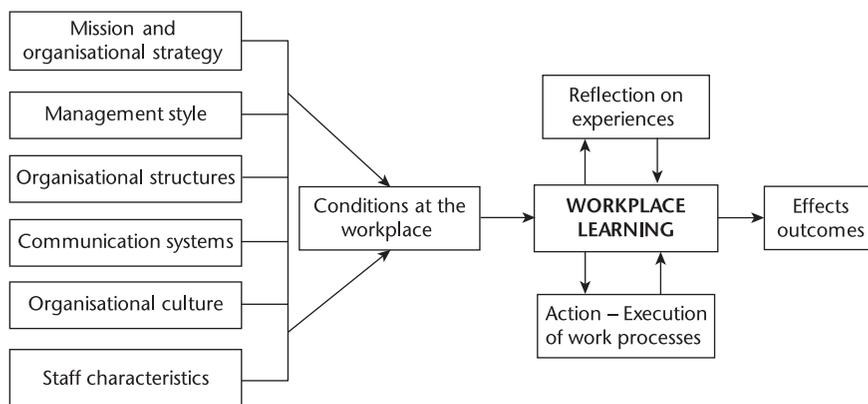
and comprehensive model is (as yet) not possible, but that an improvement of the scientific quality of our framework is. In that sense, this “theoretical framework synthesizes existing theories and related concepts and empirical research, to develop a foundation of a new theory” (Rocco & Plakhotnik, 2009, p. 9) and to provide a reference point for the interpretation of new findings (Merriam & Simpson, 2000, cit. in Rocco & Plakhotnik, 2009, p. 4).

### *A theoretical framework at the start*

As was indicated in the “Questions and approach” section, between 1997 and 2010 we developed and revised a theoretical framework of learning at work in a number of studies, making use in that process of the international literature and our own research results. We are presenting this framework here as a relative reference point in order to subsequently be able to situate progress in the knowledge development.

Figure 8.2 gives a general picture of the results at the time. It gives an overview of the relevant factors that are to be made operational, using variables in terms of organisational and behavioural indicators. We explain this and refer selectively to a few sources from which we drew inspiration without, however, covering the whole literature review again.

For the construction of this model, above all, shorter or longer lists of influential factors were found in the literature, but only a few conceptual or theoretical frameworks that also mapped out the relationships between the factors or variables of the phenomenon of learning at work. Examples of these are Sambrook’s “Holistic framework of factors influencing work-related learning” (2005, p. 2) and Eraut’s conceptual framework (2004, p. 268). They group together – each in their own way – a number of variables under “context factors” (such as organisation culture, managerial support, work structure, social relationships, etc.) and “learning factors” (staff characteristics such as motivation, confidence and commitment, etc.) We also



**FIGURE 8.2** Influencing factors for learning at work (Baert et al., 2000, p. 175; Baert et al., 2011, p. 210)

wanted to include the process character of workplace learning (more) explicitly in the conceptual framework that we developed. To this end we made use of the CIPO base model (Context – Input – Process – Output) that is used in many fields and the decision-making process that forms its dynamic.

As far as that is concerned, the context factors or (stimulating or inhibiting) conditions for learning are given in six groups on the left in Figure 8.2. The conditions are the job-related activities, available tools and forms of interaction in the work environment which employees can use to learn to the extent that they feel triggered to learn. The learning process itself comes about through the interaction between working and reflecting on what takes place during that work in terms of critical incidents and errors, problems and questions, or challenges to approach (or to learn to approach) matters in a better or different way. When competencies are developed through the learning process and knowledge is generated and shared, this leads to effects or outcomes that can be beneficial for the functioning of the employees, their teams and the organisation and/or for their career.

### ***Factors and variables with an impact on learning at work***

As mentioned, we found various lists of factors and variables in the literature that can influence learning in the workplace. Some have been used (deductively) in or have arisen (inductively) from empirical research, both quantitative and qualitative. Examples of those lists that inspired us back then are: the Canadian Survey of Informal Learning Practices (Livingstone, 2001), research on “Learning intensive jobs” and the “Learning conditions” of the Norwegian Institute for Labour and Social Research (Skule, 2004; Skule & Reichbron, 2002). Also the Canadian research “Learning at work – workplace appraisal of informal learning” (CEW, 2007) and the subsequent research “The Workplace Informal Learning Matrix” (CEW, 2007)<sup>6</sup> assessed skills acquired on the work floor (“Working with others”, “Oral communication”, “Problem solving”, “Decision making”, “Learning skills”). The research carried out on behalf of the United States Department of Labor in which “work-related activities with the greatest chance of informal learning” were assessed (EDC, 1998) correlated closely with the approach to workplace learning that we examined at the time.

In Table 8.1, we give an overview of the relevant originally selected variables, supplemented with the additional variables (in italics) that are provided by the chapters in this book. For the “conditions at the workplace” factor, the unaltered list which we verified on the basis of a literature review and via a research questionnaire (Baert et al., 2008, p. 87–92) and was also applied in subsequent research (Kyndt, Dochy & Nijs, 2009) follows here first. The list of conditions in Table 8.1 reflects not only all those things that actually happen or can happen on the work floor, but is also an expression of a choice of activities and facilities that one wishes to take into account on the sliding scale of formal–informal learning. That this is an optional choice is apparent, for example, from the choice that Boud and Rooney make in terms of the multiple forms of informal learning. They

posit: “The practices primarily serve some function other than bringing about learning. This means that mentoring and coaching (which have some deliberate pedagogical intent) are excluded” (Ch. 7, p. 139). They do mention – without compiling a quasi-exhaustive list – site walks by engineers, rehearsals, meetings, safety practices/audits, reception work, acting up, council workers as result of a fire, taking a break and/or eating together (Ch. 7).

We defined “conditions at the workplace” as activities and facilities created in the social, material and informational environment of the workplace by agents of the organisation (e.g. managers, HRD professionals, supervisors) and by the employees themselves, so that they and other employees can use them for learning and not just for work and job-related purposes (Baert, et al., 2008). We prefer “conditions” above “resources”, because these conditions also include the “learning practices” that Boud and Rooney identify in their studies in this book and those to which they refer in other studies: performance appraisals, coming into the office and work design (Boud & Rooney, Ch. 7, p. 140). These conditions also concern the activities that link different innovation tasks and the corresponding work activities employees carry out in the innovation process, such as acting upon feedback, proactively seeking information and seeking for help (Gerken et al., Ch. 5, p. 83). Similar activities used by teachers in their CPD (Continuing Professional Development) are “professional discussion”, “collaborative conversation” and “being observed and receiving feedback” (Shanks, Ch. 6, p. 125). The six specific categories that we distinguished were later on grouped in three general categories by Kyndt, Dochy and Nijs (2009, p. 373).

An overview now follows of the specification and operationalisation of the context factors or conditions for learning that are given in six groups in Figure 8.2. Table 8.2 gives an overview not only of the factors and originally selected variables that influence learning at work, but also of the most influential additional variables and of the original variables (in italics and with an additional reference) that are confirmed on the basis of empirical research reported in the articles in this book. In this table, we do not make a distinction between triggers and antecedents, because sometimes a factor can be a trigger in one case and an antecedent in another case. For example the factor “employability”: the need to keep up one’s employability can be a trigger, but a well-developed and sustainable employability can be a helpful disposition for (informal) learning. Please note in this regard that some variables can have both a facilitating and an inhibiting impact. For example, the factor “strategy of the organisation”: a strong involvement in determining the strategy of an organisation and making it operational can provoke and influence learning, but an intensive participatory approach with a lack of final and shared decisions can inhibit the commitment and the motivation to learn.

### ***Outcomes or consequences of informal learning at the workplace***

When we conceive the output of informal learning processes as sustainable changes in the behaviour of the worker, due to acquiring new competences, knowledge,

**TABLE 8.1** Learning conditions: categories and items

<i>General learning conditions</i>	<i>Specific learning conditions</i>	<i>Items</i>
Communication, interaction, cooperation and participation	Work organisation	Consult other departments Results of inquiries Trade union meetings Internal job openings Job rotation Common breaks
	Internal learning networks	Work groups Intervision Debriefings Project teams Self-directing teams Common rooms
	External learning networks	External colleagues Visit other organisations Demonstrations Guest speakers Community of practice
Feedback, evaluation, coaching and reflection	Individual learning coaching	Personal development plan Job controls Walk along with colleague Contact person Coach Internship Buddy system Godfather/godmother Trial period Mentor Complex assignments
	Individual work coaching	Feedback on functioning Coach Functioning consultation Career consultation
Information	Information systems	Knowledge of decisions Job aids Databases Newsletter Internet Work e-mail address Phone Library Log TV CD-ROMs Idea box Quality manual Reports, files Radio

**TABLE 8.2** Context factors and variables that influence informal learning at work

<i>Factors</i>	<i>Original variables</i> <sup>1</sup>	<i>Additional variables</i>
Mission and organisational strategy	<ul style="list-style-type: none"> <li>• The presence and consciousness of an explicit mission and (long-term) strategic vision of the organisation</li> <li>• Participation and commitment to the determining of strategy</li> <li>• Citing learning as a source of dynamic in the strategy of the organisation to be(come) a learning organisation</li> </ul>	
Management style	<ul style="list-style-type: none"> <li>• <i>Creating time for analysis and reflection</i> (Kyndt et al., Ch. 2) (Grohnert et al., Ch. 4)</li> <li>• Being oneself an example of learning while working <i>Communicating their own challenges and mistakes</i>, Grohnert et al., Ch. 4)</li> <li>• <i>Giving constructive feedback</i> (Kyndt et al., Ch. 2) (Grohnert et al., Ch. 4)</li> <li>• Stimulating innovation initiatives</li> <li>• Facilitating collaborative decision making</li> <li>• Promoting working together</li> <li>• <i>Appreciation and support of efforts to learn</i> (Kyndt et al., Ch. 2) Superior feedback: rewards for proficiency (Skule, in Kyndt et al., Ch. 2)</li> </ul>	<ul style="list-style-type: none"> <li>• Democratic leadership and people having some control (Skule in Kyndt et al., Ch. 2)</li> <li>• Intensification of jobs reduces the time for learning (Hirschmann &amp; Mulder, Ch. 3)</li> </ul>
Organisational structures	<ul style="list-style-type: none"> <li>• <i>Autonomy and room for manoeuvre in the individual execution of a job</i> (Kyndt et al. Ch. 2)</li> <li>• <i>Task complexity and challenge</i> (Kyndt et al., Ch. 2) (<i>“More engagement in – especially social-cognitive – learning activities while accomplishing a complex work task”</i> Hirschmann &amp; Mulder, Ch. 3)</li> <li>• <i>Variety in the job</i> (Kyndt et al., Ch. 2)</li> <li>• Learning potential of a job</li> <li>• Diversity and complementarity in teams</li> <li>• Self-directing teams</li> <li>• Availability of learning conditions/resources</li> </ul>	<ul style="list-style-type: none"> <li>• Workload (Kyndt et al., Ch. 2)</li> <li>• High amount of information processing (Hirschmann &amp; Mulder, Ch. 3)</li> <li>• Management position (Gerken et al., Ch. 5)</li> </ul>
Communication systems	<ul style="list-style-type: none"> <li>• <i>Promotion of the circulation of knowledge</i> (Kyndt et al., Ch. 2)</li> <li>• Openness towards information and knowledge from inside and outside the organisation</li> <li>• Communication between all units of the organisations</li> <li>• Introduction courses for new employees</li> <li>• <i>Time and space for social contact among employees</i> (Kyndt et al., Ch. 2)</li> </ul>	<ul style="list-style-type: none"> <li>• Proximity/distance to work of colleagues (Kyndt et al., Ch. 2)</li> </ul>

<i>Factors</i>	<i>Original variables<sup>1</sup></i>	<i>Additional variables</i>
Organisational culture	<ul style="list-style-type: none"> <li>• <i>Open learning climate</i> (Grohnert et al., Ch. 4) (Watkins &amp; Dirani, 2013)</li> <li>• <i>Mutual trust</i> (Kyndt et al., Ch. 2)</li> <li>• Encouragement to take well-reasoned risks</li> <li>• Openness to learn from mistakes</li> <li>• Appreciation of critical questions</li> <li>• Minimal regulatory guidance and control, maximal dialogue and initiative</li> <li>• Command of time pressure</li> </ul>	<ul style="list-style-type: none"> <li>• Receiving collegial support (Kyndt et al., Ch. 2) (Shanks, Ch. 6)</li> </ul>
Staff characteristics	<ul style="list-style-type: none"> <li>• Readiness and motivation to learn</li> <li>• Learning competences for self-directed learning</li> <li>• Self-efficacy (Hirschmann &amp; Mulder, Ch. 3)</li> <li>• Competences for teamwork and team learning</li> <li>• <i>Openness to give and receive feedback</i> (Gerken et al., Ch. 5) (Grohnert et al., Ch. 4)</li> <li>• The will to innovate</li> <li>• <i>Tolerance for unpredictability and uncertainty – skills for coping with change</i> (Kyndt et al., Ch. 2)</li> </ul>	<ul style="list-style-type: none"> <li>• Tenure (Kyndt et al., Ch. 2) and the number of different job functions taken up in an organisation (Gerken et al., Ch. 5)</li> <li>• Amount of task experience, including critical experiences (Grohnert et al., Ch. 4)</li> <li>• Age and preference for individual/social learning (Kyndt et al., Ch. 2)</li> <li>• Hierarchical position and support for learning (Kyndt et al., Ch. 2)</li> <li>• Meta-cognition: knowing about one's knowledge, judgement processes and one's actual performance (Grohnert et al., Ch. 4)</li> <li>• Initiative (Lohman, Skule in Kyndt et al., Ch. 2)</li> <li>• Workload and job demands (Skule in Kyndt et al., Ch. 2)</li> <li>• Outgoing or nurturing personality (Kyndt et al., Ch. 2)</li> </ul>

*Note:*

1 See the list of literature with, in addition to our own research and publications, the following as primary sources: Bandura (1997); Education Development Center (1998); Ellinger (2005); Ellström (2001); Eraut (1994); Marsick & Watkins (2015); Onstenk (1994); Sambrook (2005); Skule (2004); Sterck (2004); Straka (2004); Tjepkema (2003); Van Biesen (1989); Van Woerkom (2003).

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skills and/or attitudes or renewing or updating them, the question of the outcomes or consequences is: what are the ultimate benefits for the employees and managers individually and for the organization as a whole?

Important to consider is that outcomes or consequences of informal learning can be expected or even intended, but they are different from formal learning: they cannot be defined at the start of the process of learning in terms of reaching clear-cut objectives. The ways of measuring or assessing the learning outcomes will be discussed later. Here, we present an overview of the outcomes or consequences as we identified them earlier and we add the outcomes reported in the studies published in this book (see italics), irrespective the rigour of the assessment, the methods and techniques used and the specific context and the timeframe in which they are reached. Some of the outcomes can be at the same time operating as antecedents for learning. For instance, a learning culture and improving a learning culture in an organisation are both an antecedent or a condition and an outcome for (informal) learning. And benefits can be mirrored and conceived as mutual benefits. Also important is to keep in mind that many of the outcomes listed in Table 8.3 can also be produced by formal learning activities and that it cannot be concluded that informal learning is best suited for obtaining these results.

**TABLE 8.3** Possible outcomes or consequences of informal workplace learning (adapted from Baert et al., 2011)

<i>For the individual workers</i>	<i>For the team(s) and the organization as a whole</i>
Innovative work behaviour (Gerken et al., Ch. 5)	Innovation and continuous renewal (Gerken et al., Ch. 5)
Job satisfaction	Consumer or client satisfaction
Flexibility	Commitment and corporate sense
Keeping their job and maintaining viability	Retention of workers
Employability for changing his job during the career	Capacity to deal with strategic changes
Job mastery, Performing high-quality judgements (Grohnert et al., Ch. 4)	Quality gains
Promotion/advance career	Improved team and organisational performance
Financial rewards	Monetary benefits and savings
Trust	Trust
Love and joy of learning	Improve the learning culture

## Towards a theoretical framework revisited

Before starting with an exercise of further model development, we are taking a moment to ask whether it is possible to develop and empirically substantiate one single comprehensive and universal framework. The fact that none of the

contributors to this book makes any attempt to do so, or had that intention, could already be an indication of the hopelessness of pursuing this. What has been done until now? Also with Kyndt et al. (Ch. 2, p. 12), it can be established that “During the last decade, a substantial amount of research on the factors that influence informal workplace learning has appeared. However up to now, no effort has been made to review these findings in a systematic manner”, possibly leading to the construction of a new theoretical model. They do however indicate that “some theoretical studies do exist” and they briefly discuss the studies carried out by Brooks and Supina, (1992), Billett (1995) and Kwakman (2003), and they also make use – as we previously have done – of the authoritative work of Marsick and Volpe (1999). These authors continued their efforts to develop a more mature model called “the social interaction version of triggers, antecedents and consequences of informal and incidental learning at work”. Kyndt et al. (Ch. 2) make no mention of the model of Tannenbaum et al. (2009), although it involves a design with the characteristics of a similar comprehensive theoretical framework with similar components that we included in our first model. So what can our ambition be, taking into account the research reported in this book?

As emphasised by many authors, the phenomenon of learning at work is a complex one, in which a very great number of factors and variables play a role. This means that summarising the whole reality in a single model must necessarily involve a reduction, given the current knowledge and the manageability of the framework in research and publications. The question arises of what the guiding principles will be for such a reduction. Part of the answer relates to the purpose of the model development. This purpose may involve on the one hand being able to describe and explain the phenomenon (see also Boud & Rooney, Ch. 7), and “ultimately *understand* more about it” and on the other hand, being able to influence it. This can lead to differences between an explanatory and an influential model, knowing that it may not be possible to influence or manipulate all factors and variables that have a facilitating or inhibiting role and are therefore not all relevant for the inclusion in a framework or model. For example, when the age of an employee plays a role in informal learning, this is an established piece of data, good to know and explain, but with little or no significance for an intervention because it cannot be changed. The learning climate in an organisation for example can, however, change through conscious interventions and unplanned stimuli. Another part of the answer involves the process of model construction, which may take place in a deductive or inductive manner. Deductive construction means that an existing theory is used, for example, a learning theory or a social change theory, in order to make an application and realisation for the phenomenon of “learning at work”. This focuses the researcher’s attention and is in this way inevitably selective. Basically, an inductive way of working involves the identification, on the basis of empirical-analytical research, of factors and variables and their impact and the identification of relationships by way of statistical techniques and analyses. It is however naive to think that an inductive approach could grasp the complete reality, even after extensive research. Indeed, for the construction of a certain measuring instrument or even for the most

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open observation possible, an appeal will have to be made, consciously or unconsciously, to conceptual categories which inevitably focus the attention in a selective way and make observations and measurements feasible.

Instead of exclusively choosing one of the two development tracks, we want to keep, following the approach of the grounded theory, to the adductive track which goes to and fro between deduction and induction (Glaser & Strauss, 1967; Strauss & Corbin, 1994) that we already followed in constructing an initial theoretical framework. This means taking a theory of learning and change as a departure point and using this to select and define a number of relevant concepts and then test them against and complete them with variables that have been empirically shown to be influential. This is what Soulliere et al. (2001) mean with conceptual modelling as “the three simultaneous, explicit, continuing respecification dialogues: the nature and dimensionalization of concepts, the relative importance of concepts, and the nature of relationships among concepts.” Subsequent research must then demonstrate whether the presumed relationships between the factors and variables actually arise and to what extent they have an impact.

The abovementioned criteria that a theoretical framework must meet are: it must give an albeit reduced, but still valid picture of the reality, and provide a selection of relevant factors and variables that are research-based and manageable in optimisation practice terms and which are empirically measurable and tested and of which the mutual relations can be or have been mapped out. We add to this that we focus our attention specially on factors and variables that can be influenced, without falling into the trap that influencing is optimally possible without first understanding or giving the impression that intensively descriptive and explanatory research as well as action-research in relation to the effectiveness of the interventions would be unnecessary.

## **Reframing the initial theoretical framework**

None of the chapters in this book puts forward a (new) more or less comprehensive model for learning at work. Most of them – and especially the empirical studies by Gerken et al. (Ch. 5) and Grohnert et al. (Ch. 4) – do however include variables and (empirically verified) relationships that are stimulating for a reframing of the model that is presented in Figure 8.2. We make use of these elements and also of a reflection on earlier contributions we have made to the development and partial empirical testing of a theoretical framework. Inspired by Marsick and Watkins (2015), special attention will be given to the process of learning itself, as a Dewey-influenced problem-framing/problem-solving cycle and depicted by Stephenson (2015) as a spirograph. We first discuss the factors and the variables that we want to include and subsequently organise them in a framework.

### ***The influential factors and variables for learning at work - revisited***

Since we wish to illustrate the dynamic of learning at work as an individually driven and by context and social interaction triggered and nurtured process, we are opting

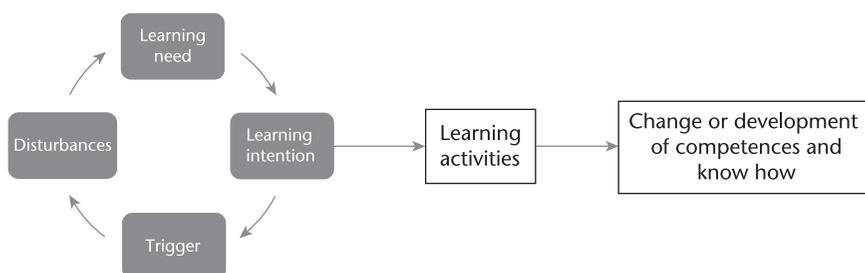
to retain the CIPO base model with its process rationale that we previously used. To conceptualise both the context (C) and the process of input, process and output that the individual goes through (I-P-O) for this choice, we found support in Tynjälä's view (quoted in: Kyndt et al., Ch. 2, p. 14):

It is important to notice that both the individual and the environment deserve attention . . . While the organisation of work sets the context and conditions for learning, it continues to be the reciprocal interaction between the individual and the workplace that determines learning.

*Tynjälä, 2008, p. 141*

The learning process (P) as a process of change can however be even better conceptualised then the “reflection on action” as depicted in Figure 8.2, when it is presented as a (implicit and/or explicit) decision-making process with a succession of triggers (critical incidents and errors, problems and questions, unexpected results, challenges to approach matters better or differently<sup>7</sup>), that provokes disturbances (see also Hirschmann & Mulder, Ch. 3),<sup>8</sup> and possibly also a learning need, that subsequently can lead to a learning intention,<sup>9</sup> and to the undertaking of learning activities that can lead to a (sustainable) change of competences and knowledge (with effects for the organisation and/or the career of employees – see also Dochy et al., 2011). This process scheme is analogous to the theoretical frameworks developed by Baert, De Rick and Van Valckenborgh (2006) and Boeren, Nicaise and Baert (2010) with respect to learning in organisations and in adult education. It has been co-inspired by Fishbein and Ajzen's theory of the reasoned action (1980) and the review of the research relating to the antecedents of employees' involvement in work-related learning by Kyndt & Baert, 2013). We will take up this process chain – visualised in Figure 8.3 – further on as a central part of the theoretical framework.

The relationship between working and learning or work activities and learning activities can be even more correctly depicted when we emphasise their interconnectedness. In this regard, we want to answer Boud and Rooney's plea to position discussion of informal learning as part of everyday working life (Boud & Rooney, Ch. 7). This is made possible by not placing the learning activities in



**FIGURE 8.3** Process factors of learning at work

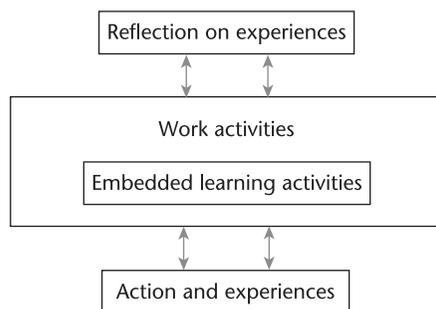
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the workplace – the learning practices – separately, as we did with the “conditions at the workplace” – but to situate them in the activities in the workplace taken in their entirety (as we have defined them above). By the embedded learning activities of the work-related learning activities we mean making use while learning of the work activities and facilities created in the social, material and informational environment of the workplace by agents of the organisation (e.g. managers, HRD professionals, supervisors) and by the employees themselves, so that they and other employees can use them for learning and not only for work and job-related purposes.

By putting extra emphasis on the embedded character of the learning activities, we align ourselves with Fenwick et al. (2011) and Boud and Rooney who “understand learning as phenomena dependent on the activities, practices, and socio-material arrangements in which it is located” and with Kemmis (2005) (quoted in Boud & Rooney, Ch. 7, p. 137), who suggests that “Practices are not the ‘possessions’ of individual practitioners” but are “the collective ‘property’ of groups.” In other words, a practice approach is more cognisant of the collective and integrated nature of work because a practice is a shared enterprise that extends beyond any individual person or discrete set of work processes (ibid.).

For the work-embedded activities to be actual learning activities, they must, in addition to an active component, also include a reflective component. This has to do with action and reflection as dimensions of learning while working and working while learning. We take up both of these components once again, certainly in light of the literature review of Kyndt et al. in Chapter 2, which reveals reflection as a crucial factor as well as the numerous times that the other contributors in this book also specifically refer to it. See for example, the definitions of informal learning as “learner initiated behaviour that involves action and reflection” (Gerken et al., Ch. 5, p. 82) and of reflection as “the engagement in thoughtful consideration about one’s experience to uncover insights and see connections and consequences” (ibid., p. 84). Boud and Rooney add to this: “What also becomes obvious, is how learning is mediated through talk or chat” (Boud & Rooney, Ch. 7, p. 146). Figure 8.4 gives a visual presentation of this.

What Figure 8.4 indeed shows is that informal learning is by essence embedded in work activities and that reflection is crucial, but it doesn’t clarify the dynamics of the



**FIGURE 8.4** Working and learning: embedded activities

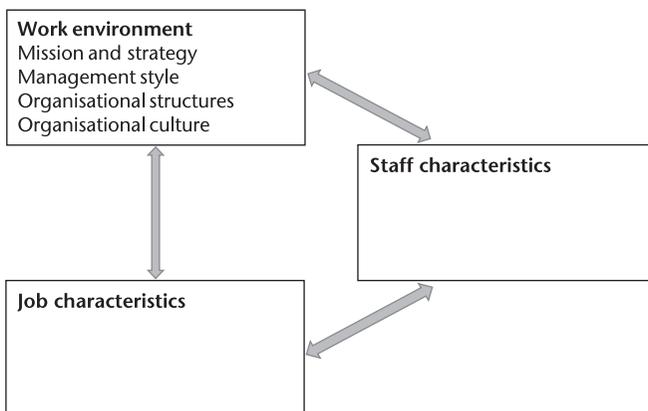
learning process itself. The research findings by Gerken et al. in Chapter 5 are already more detailed and at the same time more specific with respect to the context and the focus on innovation. Their Figures 5.1 and 5.2 represent the empirically observed dynamics of reflection and innovative work behaviour connected to the process from the opportunity of exploring new ideas to the realisation of these ideas. When compared with the Marsick and Watkins model of informal and incidental learning as a socially constructed process (Marsick & Watkins, 2015), the first one seems to be compatible but the second one offers a more general and advanced solution to revisit this part of our initial theoretical model. For this reason it will be integrated in Figure 8.6.<sup>10</sup>

Kyndt et al. (Ch.2, p.16) conclude from their meta-synthetic literature review that by using the content analysis method they identified thirteen themes that could be brought under three broad categories: personal characteristics, work environment factors, and job characteristics. We are regrouping the six context factors that we initially distinguished in three main groups, since this was more logical and consistent, as shown in Figure 8.5. We are making no further subdivision except for the work environment, and the content overlaps with the thirteen themes that Kyndt et al. distinguish, but is limited to a selection of variables which have been shown to be or are accepted to be crucial.

However, this rearrangement has as a consequence that the content of the three factors presented in Table 8.2 – namely organisational structures, organisational culture and staff characteristics – also need to be regrouped. This gives the following picture in Table 8.4. The original and the additional variables are combined here.

### ***A comprehensive theoretical framework revisited***

We now bring all the elements discussed above in a synthetic overview with an indication of the main relationships between the factors (see Figure 8.6). It is beyond the scope of this chapter, insofar as the impact of and all interaction between the variables is conceived and has already been empirically established, to visualise



**FIGURE 8.5** Context factors that influence learning at work

**TABLE 8.4** Factors and variables with an impact on learning at work – revisited

<i>Factors</i>	<i>Variables</i>
Mission & organisational strategy	<ul style="list-style-type: none"> <li>• The presence and consciousness of an explicit mission and (long-term) strategic vision of the organisation</li> <li>• Participation &amp; commitment to the determining of strategy</li> <li>• Citing learning as a source of dynamic in the strategy of the organisation to be(come) a learning organisation that is open to support continuous renewal</li> </ul>
Management style	<ul style="list-style-type: none"> <li>• <i>Creating time for analysis and reflection</i> (Kyndt et al., Ch. 2) (Grohnert et al., Ch. 4)</li> <li>• Being oneself an example of learning while working</li> <li>• <i>Communicating their own critical experiences</i>, Grohnert et al., Ch. 4)</li> <li>• <i>Giving constructive feedback</i> (Kyndt et al., Ch. 2) (Grohnert et al., Ch. 4)</li> <li>• Stimulating innovation initiatives</li> <li>• Facilitating collaborative decision-making</li> <li>• Promoting working together</li> <li>• <i>Appreciation and support of efforts to learn</i> (Kyndt et al., Ch. 2)</li> <li>• Superior feedback: rewards for proficiency (Skule, in Kyndt et al., Ch. 2)</li> <li>• Democratic leadership and people having some control (Skule in Kyndt et al., Ch. 2)</li> <li>• Intensification of jobs reduces the time for learning (Hirschmann &amp; Mulder, Ch. 3)</li> </ul>
Organisational structures	<ul style="list-style-type: none"> <li>• Diversity and complementarity in teams</li> <li>• Self-directing teams</li> <li>• Availability of learning conditions/resources</li> <li>• Management position (Gerken et al., Ch. 5)</li> </ul>
Communication systems	<ul style="list-style-type: none"> <li>• <i>Promotion of the circulation of knowledge</i> (Kyndt et al., Ch. 2)</li> <li>• Openness toward information and knowledge from inside and outside the organisation</li> <li>• Communication between all units of the organisations</li> <li>• Introduction courses for new employees</li> <li>• <i>Time and space for social contact among employees</i> (Kyndt et al., Ch. 2)</li> <li>• Proximity/distance to work of colleagues (Kyndt et al., Ch. 2)</li> </ul>
Organisational culture	<ul style="list-style-type: none"> <li>• <i>Open learning climate</i> (Grohnert et al., Ch. 4)</li> <li>• <i>Mutual trust</i> (Kyndt et al., Ch. 2)</li> <li>• The encouragement to take well-reasoned risks</li> <li>• Openness to learn from mistakes</li> <li>• Appreciation of critical questions</li> <li>• Minimal regulatory guidance and control, maximal dialogue and initiative</li> <li>• Command of time pressure</li> <li>• Receiving collegial support (Kyndt et al., Ch. 2) (Shanks, Ch. 6)</li> </ul>
Job characteristics	<ul style="list-style-type: none"> <li>• <i>Autonomy and room for manoeuvre in the individual execution of a job</i> (Kyndt et al., Ch. 2)</li> <li>• <i>Task complexity and challenge</i> (Kyndt et al., Ch. 2) (“<i>More engagement in – especially social-cognitive – learning activities while accomplishing a complex work task</i>” Hirschmann &amp; Mulder, Ch. 3)</li> </ul>

<i>Factors</i>	<i>Variables</i>
	<ul style="list-style-type: none"> <li>• High exposure to demands (Skule in Kyndt et al., Ch. 2)</li> <li>• <i>Variety in the job</i> (Kyndt et al., Ch. 2)</li> <li>• Learning potential <i>and intensity</i> of a job (Skule in Kyndt et al., Ch. 2)</li> <li>• Workload and job demands (Skule in Kyndt et al., Ch. 2)</li> <li>• High amount of information processing (Hirschmann &amp; Mulder, Ch. 3)</li> </ul>
Staff characteristics	<ul style="list-style-type: none"> <li>• Readiness and motivation to learn</li> <li>• Prior learning; competences for self-directed learning; self-efficacy (Hirschmann &amp; Mulder, Ch. 3)</li> <li>• Competences in teamwork and team learning</li> <li>• <i>Openness to give and receive feedback</i> (Gerken et al., Ch. 5, Grohnert et al., Ch. 4)</li> <li>• The will to innovate</li> <li>• <i>Tolerance to unpredictability and uncertainty – skills for coping with change – skills for coping with change</i> (Kyndt et al., Ch. 2)</li> <li>• Tenure (Kyndt et al., Ch. 2) and the number of different job functions taken up in an organisation (Gerken et al., Ch. 5)</li> <li>• Amount of task experience, including critical experiences (Grohnert et al., Ch. 4)</li> <li>• Meta-cognition: knowing about one's knowledge, judgment processes and one's actual performance (Grohnert et al., Ch. 4)</li> <li>• Initiative (Lohman, Skule in Kyndt et al., Ch. 2)</li> <li>• Age and preference for individual/social learning (Kyndt et al., Ch. 2)</li> <li>• Hierarchical position and support for learning (Kyndt et al., Ch. 2)</li> <li>• Outgoing or nurturing personality (Kyndt et al., Ch. 2)</li> <li>• The task experience within a specific domain and its validity (Grohnert et al., Ch. 4)</li> </ul>

*Note:*

1 We separated in this table the category 'job characteristics' from the category "staff characteristics".

and discuss all of them in detail. The chapters in this book give a more refined picture of a selection of variables.

We will however take up one element – namely, the results – that we did not discuss (anew) above. In the presentation of our initial theoretical framework we put forward that when competences are developed through the learning process and knowledge is generated and shared, this leads to effects or outcomes that can be beneficial for the functioning of the employees, their teams and the organisation and/or for their career. With the arrows in Figure 8.6, which link effects with work environment, with staff characteristics and with job characteristics, we suggest that the dynamic can take place in two directions. Three possible examples: successful learning experiences demand not only an open learning climate, but achieving this can, within the organisation, extend the learning climate to more employees and teams and/or strengthen it. The ability to process a certain amount of information is without a



doubt a condition for being able to learn from action and experience. However, the fact that informal learning processes also do succeed will more than likely increase the processing capacity of individuals and teams. Competences for teamwork and team learning are to a certain extent necessary for informal learning in embedded activities, but at the same time, it may be accepted that positive learning experiences also contribute to the further development and spreading of these competences.

Although the examples given here formulate the likely mutual effect relations, they still maintain a hypothetical character. The chapters in this book do not offer too much in the way of empirical support in this regard. The research of Grohnert et al. (Ch. 4) shows that – under certain conditions – learning at work can lead to high-quality judgements by professionals. Gerken et al. (Ch. 5) demonstrate that informal learning can result in the idea realisation and the acceptance of innovations. Boud and Rooney (Ch. 7) mention in the studies effects on the safety of employees and on the mutual understanding between employees and clients. Hirschmann and Mulder (Ch. 3) refer to a possible improvement of problem solving with IT professionals. But in the majority of these chapters, effects and the reciprocal relations are not the focus of the contribution.

## Conclusion and discussion

Taking the initial theoretical framework that we developed in the 1997–2010 period as our point of reference, and what the articles in this book currently offer, we asked two questions:

- Do the contributions of the researchers in this publication lead to (more) conceptual clarity with respect to the concept of “informal learning at work”?
- Is it possible, on the basis of the articles, to develop one single universal and empirically founded theoretical framework or model?

The answer to the first question is, in our opinion, convincingly positive, in the sense that, with the help of elements that many researchers brought to the fore, we were able to define learning at work with precision. In our opinion, this revised definition makes it possible to come to (more) valid and comparable research questions and designs. The decisiveness of this statement can at the same time be put in perspective, first because we take our initial definition as the overriding point of reference, and subsequently because in this domain of science and research, only seldom does a definition succeed in being generally accepted and used.

The second question must be answered in a nuanced manner. The chapters and our reflection on the basis of our reading of them have made it possible for us to revise and improve our initial theoretical framework. The revision gives a clear (or clearer) insight into the underlying theories about learning and change and has in all respects a comprehensive character, also through the – still manageable – multiplicity of factors and variables for which the empirical basis has been shown.

At the same time, it must be recognised that the relationship between the many factors and variables relies above all on conceptual assumptions and has only been empirically tested for certain sets of factors and variables. Moreover, it must be recognised that the theoretical framework is a reduction of the complexity of the phenomenon, a reduction that is substantially driven by a certain view of learning and change. If other views and other selections of – at least in part – other factors and variables are taken, the development of theory or model building will lead to other results. It is as a result not possible to conclude that the revised framework is universal, although it may be for many and various organisations, teams and employees and significant contexts and may promote targeted research. However, even then, caution is still called for in making generalised conclusions, since empirical verification of factors, variables and their mutual relations is still fully underway.

### ***Further research***

The setting-up of further research is therefore recommended in order to examine whether the presumed relationships between the factors and variables do indeed occur, in extremely diverse contexts (industrial and service sectors, small and large organisations, routine and innovative work environments and jobs etc. and for diverse types of employees and careers) and to what extent they have an impact.

In setting up that research, the following suggestions deserve to be taken to heart:

- Although we could design a comprehensive theoretical framework of informal learning at the workplace mapping the most influential variables, the reality of how informal learning is taking place and what outcomes are attained is very diverse. A better understanding of this type of learning requires complementary research based on learning histories and individual biographies of learning. Narrative approaches of learning histories of a variety of employees in a variety of regions, organisations and career paths must be encouraged. See, for example, Hodkinson et al.'s "Learning lives project" (2004).
- Boud and Rooney (Ch. 7, p. 149) recommend that "practices should be units of analysis in future studies of informal learning and that frameworks which privilege the socio-cultural elements of work itself, rather than notions of curriculum and pedagogy, be taken as a starting point for the discussion of learning."
- Much research makes use of self-reporting by way of written questionnaires. It is worth recommending making use of mixed methods (combinations of qualitative and quantitative research) with, for example, case studies with observation followed by questionnaires (see e.g. Grohnert et al., Ch. 4) or the Vignette Technique (see Hirschmann & Mulder, Ch. 3). This is especially so when it comes to assessing the outcomes of informal learning alternatives for the traditional ways of measuring outputs and outcomes of formal learning are needed. The use, for example, of the critical incident technique and of approaches like the theory-of-change evaluation and the theory-of-action analysis, the Strategic Leverage through Learning<sup>©</sup> and the Learning Network theory could be alternatives.

- Although a variety of staff and managers is covered by all the studies reviewed and reported in this book and by some of the studies with mixed samples, it remains unclear how important the differences among these categories could be and if these differences hold constraints for developing a universal, comprehensive theoretical framework of informal learning at the workplace. For instance, the idea by Eraut (2004) that the contextual factors trigger informal learning in particular for knowledge workers, professionals and managers, all of whom bring intrinsic motivation, critical thinking and problem-solving skills to the task at hand, raises questions. Are workers in routine jobs on the shop floor, with restricted responsibilities and low(er) literacy levels and education, less triggered or triggered in a different way compared to others? Are the need, the motivation, the degree of self-directedness, the modes of learning, the amount and/or the benefits of informal learning for them, compared to knowledge workers, professionals and managers, different, less relevant or in one way or another compensatory for their confined formal training records? And what about the ethnic and cultural differences of the employees and managers in local and international companies and enterprises? More systematic comparative research could be helpful to better depict and understand the variety and the complex reality of informal and incidental learning according to the actors involved.
- (More combined) account should be taken in research designs of the subjective approach of experiences and perceptions and also of the objective approach of diverse aspects. A specific application of this is the recommendation of Hirschmann and Mulder (Ch. 3, p. 58): “Thus, in future research, the perceived complexity of work tasks should be taken into account, in addition to the objectively measured complexity of work task, in order to be able to control if the objective complexity is interpreted as intended.”
- While in this book much attention goes to process aspects and context variables, it is striking that the measurement of (specific) effects, their relevance and sustainability and the empirical establishing of the outcomes or added value hardly receives any discussion. The belief in the (added) value of informal learning at work or “everyday learning” can benefit from more empirical substantiation.
- Longitudinal research with multiple measurements over a longer period seldom occurs. The suggestion made by Grohnert et al. (Ch. 4) thus deserves the necessary attention and efforts: “In environments where professionals change employers, tasks or fields more often, measures need to be included that capture the different kinds of experiences in their respective learning contexts.”
- The focus in this book and in the revisited theoretical framework is on informal learning at the workplace. First of all, we must keep in mind, as Shanks stresses in relation to teachers (Ch. 6), that most employees are involved in different and changing groups at their workplace and that they have varying levels of access to other colleagues. Deepening our insight in informal learning as a differentiated and evolving reality requires multiple case studies. Moreover, informal learning is

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also taking place in other social networks and communities of practice such as families, sports clubs, trade unions, political parties, grass-roots groups, and so on. It would be interesting to explore if and how the informal learning of an individual in different contexts is complementary, supportive, mutually beneficial or not, and if the same or different variables – with the same or different impact – are influential.

### ***Promoting and facilitating informal workplace learning***

Although attention in this article has primarily been given to the conceptualising of learning at work and the development of a theoretical framework, with empirical substantiation, in the direction of a model, we finally wish to reflect very briefly on the possible interventions for the optimisation of learning at work.

While we started this chapter with the observation that over the past decades much attention and effort has been given to informal learning at the workplace, we notice at the same time that valuing informal learning and its outcomes is still not evident in all sectors. Where diplomas and certificates are decisive eligibility criteria for recruitment and promotion, informal learning is not fully in the picture. For instance, in Shanks's chapter on teachers in school environments (Ch. 6), a reference is made to the statement by Eraut, Alderton, Cole and Senker (2000) that, compared to formal learning, informal learning is undervalued and that research by Kennedy (2011) is showing that current policies on teacher learning in Scotland still favour more formal types of CPD over informal or incidental learning. A precondition for valuing informal workplace learning is of course the recognition and the validation of what is learned. Methodologies and instruments like assessment centres and portfolios are more and more implemented, although differences among countries (e.g., the USA versus Belgium) and sectors (e.g., public administration and health care versus ICT and financial branches) remain strong. These differences also exist when it comes to rewarding informal learning outcomes in terms of a better position in the labour market, more flexible access to jobs and (financial and/or "social") promotion in one's career. The issue of the valuing of informal learning – that was mentioned but not elaborated on in the chapters – is given special attention in the context of a future-oriented policy of lifelong learning and the creation of a learning climate in society (Baert, 2014).

When writing our handbook for a strategic VTO policy (*Vorming, Training, Opleiding* – Formation, Training, Education) back in 2000 and 2011, we emphasised that informal or workplace learning may not be formalised in the way that educational programmes, courses and training off-the-job are formalised. Formalisation is destructive for the nature and possibilities of informal learning in embedded activities at the workplace. It is by influencing and changing the context factors and variables that informal learning, which is initiated and directed by the employees and their teams, can be optimised. It is precisely for this reason that we have given preference in the theoretical framework to variables that can be influenced or manipulated. A few examples should be sufficient to clarify this. An expansion of

the possibilities for contact between employees and the stimulation of trust and psychological safety will have a positive influence on the development of a learning need and a learning intention. Managers who encourage the taking of well-reasoned risks, who are open to mistakes being made and appreciate critical questions will certainly come across learning employees. In giving employees the opportunity and the time to think along with them regarding the strategy of the organisation, they will not only be able to expect more commitment, they will also challenge their employees to prepare themselves more for the future by acquiring other new competencies. Or as Gerken et al. (Ch. 5, p. 95) write

... organisations should illustrate how employees can use reflection as a powerful tool to smoothen the accomplishment of work tasks during innovation processes. For instance, supervisors may encourage employees to examine their performance and underlying assumptions during and after work tasks. This could be done by supporting their ideas through feedback but also by providing on-demand support for their questions.

A similar idea from the perspective of leadership is launched by Grohnert et al. (Ch. 4): leaders can develop an open climate and communicate values supportive of learning by “communicating their own critical experiences, asking for honest input from different levels of the hierarchy, and publicly rewarding learning of colleagues.” Managers also can discuss the processes and the outcomes of learning in the workplace during appraisal interviews (see e.g., Hirschmann & Mulder, Ch. 3).

This belief in optimisation may not hinder a critical stance to the promotion of informal learning at work. Boud and Rooney (Ch. 7) point out that promoting informal learning can effectively inhibit it and seeking to influence informal learning holds potentially counterproductive effects. Too much emphatic promotion can give workplace learning an obligatory character and in this way replace the intrinsic or autonomous motivation with an extrinsic and controlled motivation that may elicit a resistance to learning. At the same time, it should not be overlooked – something that frequently happens, in our opinion – that promoting learning in the workplace also involves financial investments and expertise with respect to the dynamics of learning.

## Notes

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2 The terms “conceptual framework”, “theoretical framework” and “model” are often used interchangeably in the literature. See for example, Rocco and Plakhotnik (2009). In this article, when speaking of a conceptual framework we mean an ordered set of factors and/or variables that are intended to delineate the primary facets of a phenomenon. A theoretical framework goes a step further and makes the recordable or measurable variables and the assumed relationships between them more explicit. A model goes another step further, in particular by specifying the impact of the variables and their mutual relationship and by empirically substantiating this. A model is in this sense an advanced form of scientific knowledge-development.

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- 3 We use “factor” as an umbrella concept for a cluster of variables that are interconnected.
- 4 The list of references contains among others a selection taken from the leading sources that were consulted at the time.
- 5 See for example, UNESCO (1972).
- 6 In the first research, questionnaires, observations and interviews were used as research instruments to assess the job skills. Both managers and employees were included in the sample. The “Workplace Informal Learning Matrix” was developed on the basis of these results. Skills relating to the following domains were studied through this research instrument: “Working with others”, “Oral communication”, “Problem solving”, “Decision making”, “Learning skills”. This matrix additionally accessed the workplace culture, leadership skills and diversity and culture. It was used with a hundred “supervisors and middle managers”.
- 7 Examples of triggers are: rapid changes in the global, technologically-driven environment characterized by knowledge work, collaborative and innovative work structures, flatter organizations that are decentralized, strong relationships with customers who increasingly seek input into design of products and services, and flexible partnerships with suppliers for rapid, lean, just-in-time production and delivery and initial performance.
- 8 Hirschmann and Mulder (Ch. 3) refer to Piaget for conceiving disturbances as perceived as errors, unexpected results of actions, or knowledge gaps.
- 9 The formulation of a learning intention takes up a central role within the decision-making process with respect to an engagement in learning activities. The intention to participate in learning activities is a robust predictor of actual participation in learning activities (Baert et al. (2006), Kyndt et al. (2011), Kyndt & Baert (2013)).
- 10 The exploration of opportunities for improvement, generating new ideas and strategies and implementing these in the organization mentioned in the framework of Gerken et al. (Ch. 5) are covered respectively the learning spirograph of Stephenson (2015) and by the process of “fram[ing] the trigger in consultation with voices from the past & present, collaboratively examin[ing] alternatives and select[ing] solutions/actions and implement[ing] solution/actions with others” in Marsick and Watkins’s Model of Informal and Incidental Learning (2015). See figure on: [https://www.researchgate.net/publication/273343428\\_Promoting\\_Assessing\\_Recognizing\\_and\\_Certifying\\_Lifelong\\_Learning/figures](https://www.researchgate.net/publication/273343428_Promoting_Assessing_Recognizing_and_Certifying_Lifelong_Learning/figures).

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# 6

## VITAL BUT NEGLECTED

### The informal learning of new teachers in Scotland

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#### Introduction

Student-centred learning has been the focus of school teaching for many years in many countries but teachers' own professional learning has not, in turn, changed to be learner-centred. Teacher professional learning often entails one-off activities that can be understood as one-size-fits-all. This study, however, focused on the situated learning of new teachers, in particular, their informal learning as they moved from being a novice on the periphery of communities of practice in their schools. This informal learning builds on the new teachers' past experiences and learning histories, may be triggered by their classroom experiences and interactions with their colleagues, and can result in increases in their confidence and changes in their practice. Important factors in their learning include the workplace learning environment, the support of their head teacher, their mentor and other colleagues. The teachers' own individual learning dispositions may also be a significant factor in their learning.

This mixed methods study arose as part of the research project around an undergraduate teacher education programme called "Scottish Teachers for a New Era" (STNE). The programme was designed to change the way trainee and new teachers are educated and supported, creating a six-year continuum spanning initial teacher education and early career learning.

The study involved questionnaires and semi-structured interviews with two cohorts of new teachers. The teachers explained how they learnt from classroom experience and from and with their colleagues. Antecedents to learning include the school workplace learning environment and the teachers' individual learning dispositions. These antecedents can also be triggers alongside other catalysts for learning

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such as having a pupil with additional support needs and teaching a new topic. There are individual and organisational consequences of the teachers' informal learning, such as a teacher's increased confidence and increased opportunities for learning between colleagues.

Learning is understood here as changes in social practices as a new teacher becomes more experienced, and moves from being a novice to being a more active participant in their communities of practice. This can be seen as a way of learning as becoming (Hodkinson et al. 2008). There have been arguments relating to the importance of everyday or informal learning as opposed to formal learning in professional development programmes for teachers (Webster-Wright 2009). While learning in formal contexts is important, by concentrating on this alone, much of the learning that takes place in workplaces is undervalued (Eraut et al. 2000). Learning at the beginning of a career will include both informal conversations with colleagues, formal organised events and individual personal reflection. This study began with a focus on formal continuing professional development (CPD), until pilot interviews and questionnaire run-throughs with new teachers highlighted the importance of their informal learning.

While more attention is being paid to the informal learning of teachers, for example participation in work groups, discussing and sharing learning (HMIE 2009), this may be more related to budgetary pressures than an acceptance of the central role of informal learning in the workplace. In the public sector in the UK, there is evidence of a shift away from using expensive external providers due to financial pressures (Jewson et al. 2014). Current policies on teacher learning in Scotland still favour more formal types of CPD over informal or incidental learning (Kennedy 2011). Formal learning is seen as taking place off-the-job and informal learning occurring on-the-job whereas both happen on- and off-the-job with formal learning such as mentoring by a designated mentor and observation happening at work (Eraut 2007) and informal learning happening at formal off-site events. Much informal learning does take place at work involving a "combination of learning from other people and learning from personal experience, often both together" (Eraut 2004, p. 248). By recognising and supporting informal learning, organisations could improve workplace practices throughout the development of new and different strategies (Boud et al. 2009). With austerity measures following the 2008 financial crash, there are also budgetary reasons for encouraging informal learning at work rather than formal training by external providers. While year-on-year reductions in formal learning participation in the education sector in the UK have been traced to before the 2008 economic crisis (Jewson et al. 2014, p. 7), this pattern is likely to continue.

People who complete initial teacher education in Scotland and fulfil other eligibility criteria are guaranteed a one-year contract as a new teacher in a school in Scotland. Their class contact or teaching time is meant to be 80% of that of a fully registered teacher. Non-teaching time is when colleagues can spend time together and learn and develop together (Hodkinson and Hodkinson 2005), and can be both an antecedent and a trigger for learning. The new teachers are assigned an official

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mentor who is based in their school or the education authority and who they are meant to meet weekly to discuss progress in relation to satisfying the Standard for Full Registration (GTCS 2012). The mentor and the head teacher must observe the new teacher during the year and decide if they have met the required standard.

The Teacher Induction Scheme was introduced in Scotland in 2002 with new teacher learning understood as formal CPD to be recorded first in an interim and then a final profile document. However, new teacher learning can also be understood as informal learning on the periphery of a community of practice with workplace colleagues. “Legitimate peripheral participation” is the term used by Lave and Wenger (1991) to explain the process of becoming a member of a community of practice providing “a way to speak about the relations between newcomers and old-timers, and about activities, identities, artefacts, and communities of knowledge and practice. It concerns the process by which newcomers become part of a community of practice” (p. 29).

## **Communities of practice and situated learning**

The concepts of communities of practice and legitimate peripheral participation provide an explanation of how novices learn. The action of participating in a social practice, such as working as a teacher in a school, is a way of belonging to a community. The fact of becoming a member allows participation, and thus learning, to take place. The learning can be viewed as changing participation through changing practice (Lave and Wenger 1991). As practice develops and changes in and through social relationships, the new teacher learns how to be a teacher in that community of practice and moves away from the periphery towards the centre. This may be in strongly or weakly framed communities of practice (Boud and Middleton 2003).

Criticisms of situated learning theory include the lack of reference to power relations or to individual agency or formal learning, the absence of explanation of how new knowledge is created or what is learnt rather than what is happening and that workplaces differ (Hodkinson and Hodkinson 2005; Edwards 2005; Cairns 2011; Fuller and Unwin 2011). People are often involved in many different and changing groups of people at work (Boud and Middleton 2003) or other learning opportunities outside of work, so “place” must incorporate a wider sense of workplace (Evans et al. 2006). It has been argued that adaptive learning or preservation takes place in communities of practice rather than new or expansive learning (Gustavsson 2009).

Furthermore, learning to teach is not a technical undertaking but also “a political endeavour entailing the negotiation of complex organisations with multiple actors who may resist the idea of newcomers” (Curry et al. 2008, p. 661). Research into workplace learning will not always highlight positive examples of learning as workplace practices may support or obstruct learning (Webster-Wright 2009). This is important as “Workplaces are contested terrain, and access to activities and guidance are not uniformly distributed across those in the workplace. Therefore, although

learning at work is inevitable and ongoing, it is selective and contested” (Billett 2001, p. 20).

Learning to teach can be thought of as an isolating and individual pursuit, with reflection playing an important role in making sense of what is happening in the classroom. The ability to reflect on one's own actions seems to be vital for informal learning (Marsick 1987). This may include “reflection-in-action” and “reflection-on-action” (Schön 1983 and 1987). Teaching yourself appears to be an underestimated but important way to learn (Felstead et al. 2005). Individual learning is closely related to how much an individual participates, how trusted and confident they feel and the kinds of support they receive (Eraut et al. 2000, Skår 2010). Workers may develop the art of “learning-by-walking-around” and dropping in on someone and asking what they were doing or discussing current problems (Granath et al. 1995, cited in Collin 2008, p. 381).

As part of the Scottish Teachers for a New Era programme at the University of Aberdeen, this project set out to explore the learning of teachers in their first year of teaching. Initially, it was planned to research the formal continuing professional development of those who had graduated from the redeveloped initial teacher education programme. However, after reviewing the literature and piloting initial questionnaires and interviews with new teachers, it became apparent that learning from their own and others' practice should be an important focus of the research. Informal learning from the teachers' experience in the classroom, from discussions with colleagues and observations of others' practice, and the support of colleagues and head teachers were identified as potential factors in how the new teachers learnt about their professional practice. Therefore, the following research question and subquestions were devised:

How do new teachers learn in the workplace?

- a) What are the antecedents to their learning?
- b) What are the triggers for their learning?
- c) What are the consequences of their learning?

## Methodology

A mixed methods approach was adopted for three reasons: firstly, to offset the limitations in using only one method; secondly, to use the quantitative data to inform the development of questions in the interview schedules; and finally, to provide a more comprehensive understanding of new teacher learning (Plano Clark and Ivankova 2016). The quantitative data highlighted key areas to explore in depth through the qualitative data collection phase. This can be explained as: [quan + qual -> QUAL].

The study follows a sequential explanatory design with questionnaires producing quantitative and qualitative data which were used to develop the qualitative research instrument, namely a semi-structured interview schedule. The advantages of a sequential explanatory design are that it is straightforward and allows opportunities for the exploration of the quantitative results in more detail, while the

**TABLE 6.1** Visual model for mixed methods sequential explanatory design (adapted from Ivankova et al. 2006)

<i>Phase</i>	<i>Procedure</i>	<i>Product</i>
Quantitative data collection	Self-selecting web-based and paper questionnaire	Numeric and text data (interview transcripts, documents)
	Data screening Frequencies Chi square test SPSS quantitative software v.18	Descriptive statistics, missing data Text data from open-ended questions
Connecting quantitative and qualitative phases	Coding text data from open-ended questions Developing interview questions	Emerging themes Interview protocol
Qualitative data collection	Individual in-depth telephone or face-to-face interviews CPD documentation	Text data (interview transcripts, documents)
Qualitative data analysis	Coding and thematic analysis Within-interview participant and across-interview participant theme development Cross-thematic analysis Developing questionnaire and interview questions QSR NVivo qualitative software v.8	Visual model of interview participant analysis Similar and different themes and categories Cross-thematic matrix
Quantitative data collection	Self-selecting web-based questionnaire	Numeric and text data
Quantitative data analysis	Data screening Frequencies Chi-square test SPSS quantitative software v.18	Descriptive statistics, missing data Text data from open-ended questions
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Qualitative data collection	Individual in-depth telephone or face-to-face interviews CPD documentation	Text data (interview transcripts, documents)
Qualitative data analysis	Coding and thematic analysis Within-interview participant and across-interview participant theme development Cross-thematic analysis QSR NVivo qualitative software v.8	Visual model of interview participant analysis Similar and different themes and categories Cross-thematic matrix
Integration of quantitative and qualitative results	Interpretation and explanation of the quantitative and qualitative results	Discussion Implications, future research

disadvantages can be the length of time and amount of resources needed to collect and analyse both types of data (Ivankova et al. 2006).

Table 6.1 shows the different stages of the mixed methods study and where and how the data was integrated.

### ***Design of the research instruments***

To understand the study, it is necessary to explain the design of the questionnaires and interviews and how each of the research instruments was analysed. A number of previous questionnaire studies of beginning teachers were taken into account when devising the instrument for this study in terms of how questions had been phrased and how to uncover information (Jones 2002, Williams 2003, Burn et al. 2003, Johnson and Birkeland 2003, Hodkinson and Hodkinson 2003, Hodkinson and Hodkinson 2005, Pearson and Robson 2005, Clarke et al. 2007 and Hagger et al. 2008). In particular, the studies by Meirink et al. 2009 and McGregor 2003 were useful and a question from each of these studies was adapted and included in the questionnaires. Teachers were asked about what they did when they were considering changing their practice, to establish whether they learnt on their own or with and from colleagues (adapted from Meirink et al. 2009). Teachers were asked about how often they undertook various activities with colleagues in their school. This was to provide an insight into the level of collegiality in the school and how much informal learning it was possible for the new teacher to be engaged in and was adapted from one in the McGregor study (2003). Questions were asked about the new teachers' involvement in learning at work, about the support they received from their mentor, head teacher and other workplace colleagues. For example, in the questionnaires, respondents were asked "How have you been learning to be a teacher in your induction year?" and "Who have you learnt from the most in your induction year?"

### ***Interview design***

Each of the two sets of interviews started with background questions to put the interview participants at ease (Kvale and Brinkmann 2009). They were asked the same questions in both interviews: about their involvement in professional development and learning at work and about workplace politics, their appointed supporter/mentor, head teacher and other colleagues, including non-teaching staff. Participants were asked if they received peer support from other induction-year teachers including their university peers. Questions were asked about their school if this had not already been covered. The final section of the interview looked back at their initial teacher education and looked ahead to their future learning as a fully registered teacher.

### ***Interview sample***

As representative a sample as possible was sought but was dependent on who volunteered. Male teachers were approached and asked to be interviewed as initially

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all the volunteers were women. Thus, as well as volunteer sampling, where participants are sought on a voluntary basis from a pool of potential participants (Cohen et al. 2007), quota and purposive sampling, where participants with particular traits or characteristics are sought (ibid.), were implemented.

### ***Questionnaire design***

The questionnaires were devised using Snap software and then analysed using the Statistical Package for Social Sciences (SPSS) (Kinnear and Gray 2009). In order to provide some information on the proportions of respondents answering questions in a particular way, a simple frequency-based analysis was implemented. Associated open response questions provided some qualitative insights into these quantitative response profiles. In addition, a Chi squared analysis (Kinnear and Gray 2009) was implemented to investigate any relationships between data items – for example, to establish if respondents’ opinions on the induction year and associated support were related to the position held by their mentor, or if there was a relationship between the position of the mentor and how often the induction year teacher and mentor met. For the items investigated, there were no statistically significant relationships uncovered.

The first questionnaire responses to open-ended questions were grouped together; these answers were used as the basis for some of the closed questions in the second questionnaire. The primary purpose of the questionnaires was to provide useful information in preparation for the interviews. Analysis was developmental and complementary in that the methods were used sequentially, thus the descriptive statistics provided a picture of the sample and provided areas for further exploration with the interviewees, but the quantitative and qualitative data gathered from the questionnaires were also integrated with the interview data at a later stage in the analysis of the research findings.

### ***Interview analysis***

The interview transcripts and the qualitative data from the questionnaires were imported into NVivo (a computer assisted qualitative data analysis software programme) and coded line by line both inductively and deductively until no new codes emerged. The researcher chose to work “manually” by reading the texts and choosing categories that seemed to be mentioned rather than starting with the most frequently used words. By categorising and sorting the data in this way, it was possible to produce a list of key themes (Taylor-Powell and Renner 2003). Although there is no guarantee that first impressions will be avoided altogether, easy access to the data meant that documentation could be revisited easily and as every action in NVivo can be dated, it is possible to see whether, for example, one particular code was used only at a particular stage of the coding process. While qualitative data analysis software like NVivo can facilitate the coding process, the software cannot actually perform the data analysis (Holton, 2010). The researcher still has to interpret

the data and make sense of it. To ensure the validity, trustworthiness and thoroughness of the research, the coding process was repeated and coding and recoding was performed in an iterative way (Holton 2010). Coding and codes were reviewed throughout the process and the codes and the coding structure were refined and adjusted in order to reflect the data as accurately as possible. It is hoped that the researcher was able to remain objective and open to different possible answers to the research questions and that there were no expectations strong enough to cause researcher bias. Nine codes were created after reading and re-reading the interview transcripts and the responses to open-ended questions in the questionnaires. These codes and short descriptions are provided in the Appendix to this chapter.

### ***Mixed methods analysis***

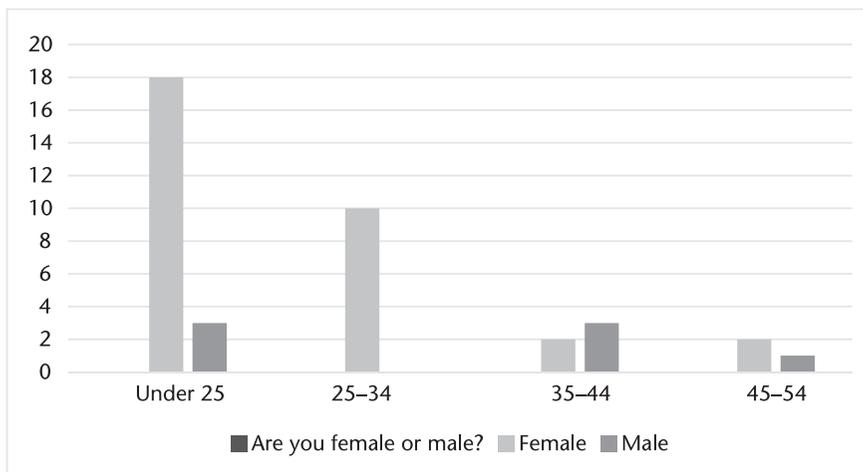
In the study, analysis was developmental and complementary in that the quantitative and qualitative data were used in sequence, and the descriptive statistics provided a picture of the questionnaire respondents' views and supplied areas for further exploration with the interviewees. Then the qualitative data gathered from the open-ended questions in the questionnaires was integrated with the interview data at a later stage of the analysis. The individual learning dispositions were created from a combination of answers to the interview questions after it became apparent that there were very different views emerging in relation to the teachers' attitudes towards learning. This part of the analysis was done on paper, with each interviewee's answers to particular questions laid out in a table for ease of comparison.

### ***Response rates and demographics of research participants***

Questionnaires were sent out to former students from the previous year who had agreed to be contacted by the University of Aberdeen for research purposes and a subset who had volunteered to be interview participants. In the first year of the study 267 new teachers were sent the questionnaires. The first questionnaire was completed by 39 new teachers (response rate = 14.6%) and the second completed by 102 new teachers (response rate = 38.2%). Eight teachers were interviewed twice. In the second year of the study, 170 new teachers were sent the questionnaires. The first questionnaire was completed by 54 new teachers (response rate = 31.7%) and the second completed by 48 new teachers (response rate = 28.2%). In the second year, ten teachers were interviewed.

The lower response rates can be partly explained by the long working hours of new teachers. They have sole responsibility for their class for the whole year for the first time and must satisfy the requirements of the Standard for Full Registration with assessments made by their mentor and their head teacher. They are in a vulnerable situation with a temporary post, with many hoping to work in the same school or education authority the following year (Shanks 2014). As Sax et al. (2003) have noted in relation to university students, there are lower and lower response rates with online and paper-based questionnaires. Interviewees needed to

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**FIGURE 6.1** Age of respondents by gender (questionnaire one, year one)

be reassured about their anonymity so that there could be no repercussions from their participation in the study. Thus data has been anonymised and no identifying details of the teachers or schools have been disclosed in accordance with ethical guidelines (SERA 2005).

For the first questionnaire in the first year of the study, the personal demographic data collected from the respondents, for example, their age, gender and sector, had similarities in the proportions of attributes in each category as the total population of induction year teachers in Scotland (GTCS 2009, pp. 24–27). The Chi-square test was performed to check how confident it was possible to be concerning the similarity of the respondent attributes. It is possible to be 95% confident that the dataset is similar in terms of age, gender and sector.

Although the second questionnaire in the first year of the study had more respondents they did not reflect the demographics of the total population.

The findings and discussion section below is organised according to the themes of the antecedents, triggers and consequences of informal learning.

## Findings and discussion

The findings cover how the new teachers thought they were learning to be a teacher, who they said they were learning from, which activities they learnt from, their previous learning experiences and how they had changed as a result of their learning.

Both the interview participants and the questionnaire respondents were asked whether they learnt from their colleagues. For example, in the second questionnaire of the first year of the study, in order to determine if the new teachers recognised or were aware of learning from colleagues, they were asked to rate the statement “I learn from my colleagues.” The response was 100% agreement broken down into

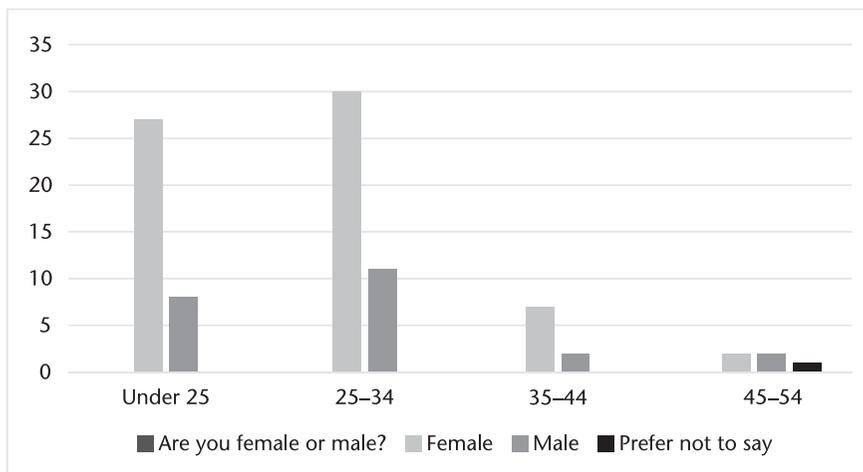


FIGURE 6.2 Age of respondents by gender (questionnaire two, year one)

63.4% strongly agreed and 36.6% agreed. Similarly, in response to the statement “I use feedback from others to further my learning”, there was 100% agreement with 62.2% strongly agreeing and 37.8% agreeing.

In answering the question “How have you been learning to be a teacher in your induction year?”, colleagues were referred to directly or indirectly (for example, observation of others) many times (see Table 6.2 below). Pupils were referred to in two responses to do with assessment and one response of getting to know the children.

TABLE 6.2 How have you been learning to be a teacher in your induction year? (questionnaire two, year one)

How have you been learning to be a teacher in your induction year?	Open ended responses with statements grouped (n=40)
Observation of others	28
Being in class or being a teacher	26
Reflection/self-assessment/self-evaluation/learning from mistakes	17
Discussions with colleagues	15
Formal CPD and meetings	15
Mentor	11
Asking questions or advice	10
Reading	9
Trying new ideas/ taking risks	9
Others observing me	6
Preparation/planning/organisation	6

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A key issue in relation to the learning of induction year teachers appeared to be their informal learning. However, the new teachers did not identify it as informal learning, for example, they referred to discussions with their mentor or another key colleague, support and advice from colleagues, discussions with colleagues in general, and observing others teaching.

The new teachers did not talk of formal continuing professional development as being their most important learning and even when the new teachers were at formal CPD events it was actually the social activities that were the most important:

So it's a chance to socialise with other probationers in the area, which is just, it's, it's really nice, because then you kind of, that's when you really open up. That's, that's probably the best part of the day to be honest.

While the interviewees' CPD documentation contains many references to formal learning, both in school and outside school, it was examined to investigate to what extent informal learning was documented in their official profiles and action plans. Continuing professional development has to be recorded against the Standard for Fully Registration under the headings "Local Authority CPD", "School CPD" and "Personal CPD", for example "Managing Pupil Behaviour". Although the majority of entries are to do with formal events, CPD sessions or meetings, under Personal CPD teachers did include entries such as "professional discussion", "share ideas", "collaborative conversation" and "collaborative discussion" (teachers in year one of the study). Much of this informal learning was taking place with the new teachers' colleagues.

The antecedents to the teachers' learning included their initial teacher education at university and formal professional learning events such as courses on Moving Image Education and teacher conferences. An important antecedent to informal learning was the workplace learning environment which included the support of the head teacher, the induction mentor and other colleagues. The teachers' own individual learning dispositions were a significant factor behind their learning. Antecedents were also triggers for learning with a supportive learning environment being a precursor to learning as well as the catalyst for learning. The learning environment will be considered as an antecedent and individual learning disposition as a trigger but they are interrelated.

## **Antecedents**

As an antecedent to learning, new teachers found support from colleagues more important than support from their official mentor. For specific areas of their jobs – planning and preparation, pupil assessment and subject knowledge – they preferred to go to colleagues for advice and support. This may be because the mentor is in a promoted role rather than being a classroom teacher and because the mentor has an assessment role alongside their support role. The teachers were learning from their mentor, but they were learning more from their colleagues and their pupils.

### *Discussions with colleagues*

Discussions with colleagues were found to be important for new teachers and indicated how informal workplace learning appeared to play a more significant part in their professional learning than formal CPD events. In questionnaire one of the second year of the study, 100% of respondents agreed that they learnt by talking to colleagues (71.7%, strongly agreed and 28.3% agreed). In the second questionnaire that year, every respondent agreed with the statement "I learn by talking to colleagues", with 60.4% strongly agreeing and 39.6% agreeing. This shows that the new teachers continue to understand that they are learning in their conversations with colleagues, although the proportion strongly agreeing has gone down over the year. This may be because the induction year teachers have become more confident in the five months between questionnaires.

In the first questionnaire of the second year, respondents were asked to choose the three types of experience that they had found the most useful so far in their induction year. This question was used to elicit information on which type of professional learning experience appears most useful to new teachers after three months in post.

### *Useful and important learning activities*

In questionnaire two of the second year, respondents were asked to indicate how important certain activities had been to their learning in the induction year rather than asking for the three most useful activities. This was to uncover the induction year teachers' views on all the different types of activity that are available. The

**TABLE 6.3** Three most useful experiences (questionnaire one, year two)

<b>Which <i>three</i> types of experience have you found the most useful so far? Please click on three.</b>	<i>(n=53)</i>
Doing the job (classroom experience)	94.3%
Discussions with colleagues	52.8%
Having a mentor	35.8%
Trying out new ideas/taking risks	32.1%
Reflection/self-evaluation	26.4%
Local Authority Core Support Days	22.6%
Observing other teachers	20.8%
Others observing me teach	15.1%
Being shown how to do things	5.7%
Courses and/or conferences	3.8%
School in-service days	1.9%
Research on the Internet	1.9%
Reading	1.9%

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**TABLE 6.4** Percentages of respondents rating specific activities as very important (questionnaire two, year two)

<i>Activity</i>	<i>Very important</i>
Doing the job/classroom experience	95.8
Trying out new ideas/taking risks	72.3
Discussions with colleagues	70.8
Observing others	58.3
Reflection/self-evaluation	56.3
Having a mentor	52.1
Others observing me	37.5
Being shown by others how to do things	35.4
Local Authority Core Support/Probationer Days	25
Courses and conferences	22.9
School in-service days	10.4

activities have been placed in descending order of percentages of the very important response.

Table 6.4 shows that the overwhelming majority of respondents view *doing the job/classroom experience* as very important for their learning. In comparison, more formal activities such as school in-service days, courses and conferences have the lowest percentages of very important. Informal activities appear more important to the respondents than formal activities.

### ***Relationships with adults and children***

Relationships with adults and children were an important antecedent to learning.

In the first questionnaire the new teachers regarded informal learning – doing the job and discussions with colleagues – as the most useful professional learning. Interviewed teachers' three most important learning activities were working with other teachers, talking over problems and being observed and receiving feedback and, as an interviewee put it, "getting on with it."

### ***Professional development activities***

At both interviews in both years of the study, participants were asked about the professional development they had been involved in. The interviewees referred to both the informal and formal learning they had undertaken. How they had been learning was noted as well as what they said they were learning. There were many informal ways that the induction year teachers were learning, such as peer work and peer assessments, observing and shadowing, chatting to other staff and sharing ideas, and visiting other schools. It is not possible to say how effective this learning is but this is what the new teachers felt they were learning from. The teachers' formal

learning activities included central mentor meetings, training events in school, a university Masters programme and local authority probationer days. The informal learning referred to in the interviews was also noted in the GTCS profile documentation provided by the teachers (see below).

### ***Observing others***

In the second year's first questionnaire, 98.1% strongly agreed or agreed that they learnt from observing others with 1.9% neutral. In questionnaire two, all respondents agreed that they learnt from observing others. This shows the importance beginning teachers place on observing others teach and discussing issues with colleagues. This is a key advantage of the reduced teaching load for new teachers in Scotland. It gives them time to watch other teachers in their own school and in other schools where possible. They can see how teachers work with other pupils and also with their own pupils. The questionnaire responses suggested that observation was an important issue to raise with the interviewed teachers if they did not speak about it without being prompted.

Observations of other teachers and observations of the new teachers themselves appear to be a vitally important component in their learning. Some referred to being observed and implementing the feedback they had received. Others mentioned talking to colleagues and implementing new ideas. Some of the interviewees spoke of observing colleagues and then adapting the practices they had seen. There is a danger, of course, that if teachers are simply following their colleagues' practice, without reflecting on it or doing their own research, they will become enculturated into the current way of doing things rather than finding their own way or creating a new way of working with pupils. Although the ideas may be new to the novice teachers, they may in fact be the established practice in that and other schools.

### ***The importance of colleagues***

For both questionnaire respondents and interviewees, the importance of colleagues was a recurring theme, as well as the relationship with pupils and the learning environment of the school. The interviewed teachers understood they were learning from colleagues: one observed a colleague's lessons and "got some good ideas as to how I could do that with my own children". Another said they learnt "through the kids", finding out what worked and what didn't work. The new teachers said they learnt from their mentor, from their colleagues and from their pupils. In the new teachers' continuing professional development records, three of the interviewed teachers had recorded their "personal CPD" as learning from "professional discussion", "share ideas", "collaborative conversation", rather than just formal events or meetings. One of the new teachers' most important colleagues is their official mentor.

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## ***Mentors***

The new teachers received different levels of support from their mentor; for example, in terms of the frequency they met, this is one way that the learning environments differed. One of the interviewed teachers struggled to meet with their mentor:

. . . what happened was we would go like sometimes a month, maybe two months without having a meeting, and it was, you were meant to have one every week . . . I found that really difficult trying to find time to meet up with him, that was another quite a big problem that we were having.

## ***Informal mentors***

The mentor relationship can be an important part of the learning environment, but often, if the support was not provided by the official mentor, then it was found from informal sources around the new teacher. Colleagues in general played a more central role in the new teachers' learning. Just as the level of support of the mentor might differ, so did the level of support from colleagues. An expansive learning environment can amplify the effects of supportive colleagues and good mentoring while an individualistic one can reduce the mentor's influence on a new teacher (Williams et al. 2001). While quality mentoring supports teachers in their first teaching posts (Greenlee and Dedeugd 2002), informal activities, such as discussions and meeting outside the school day, are preferred over more formal mentoring support (Parker et al. 2009; Eraut 2004).

## ***Learning environment***

Antecedents for learning include a supportive learning environment; as Lave and Wenger (1991) indicated, what and how new entrants learn grows out of the environment in which they are situated. For new teachers, learning through peripheral participation occurs inside and outside the classroom while they carry out their work activities. This includes talking over problems with a colleague and reflecting on their experiences (Schön 1983). The teachers in this study had varying levels of access to other teachers to discuss issues and they had different opportunities to observe other teachers and to visit other schools.

The teachers' learning environment or school or workplace context has a profound impact on their first year of teaching (Johnson and Birkeland 2003). The learning environment can hold both expansive and restrictive practices, for example, there may be a close collaborative working culture or an isolated, individualist one. An example of an expansive learning environment came from a questionnaire respondent who was surprised by "how quickly I felt like a teacher and part of the school and the fact that other colleagues come to me for advice". While an example of a more restrictive practice was highlighted in a questionnaire respondent's comment "lack of support from the head teacher until late on in the year has

affected my confidence the most". These practices highlight the differences that can be identified between schools with more or less expansive learning environments.

### ***Expansive learning environment***

The findings highlight how in an expansive learning environment new teachers have a wider range of learning opportunities and greater support from colleagues to help them in what is a very demanding year. The learning environment is a key antecedent to learning. In expansive learning environment, teachers' professional learning is not confined to off-the-job activities or specific events at work. When a teacher explains something to a colleague, for example, they are engaged in a learning relationship (Unwin and Fuller 2003). In schools with more expansive rather than restrictive practices, new teachers are treated as members of the community of practice of teachers who contribute ideas and share knowledge with colleagues.

### ***Restrictive learning environment***

Restrictive learning environments may be close to what Skruber (1987) described as bureaucratic or non-clarifying learning environments with expansive ones being similar to clarifying learning environments. Informal learning opportunities, and the organisational conditions within a school, play an important role in encouraging and supporting teacher learning and changes in practice (Mesler Parise and Spillane 2010). The presence or absence of learning affordances shapes the learning of new teachers. Not all are placed in expansive learning environments, for example one interviewed teacher explained that in their school there was "a big negative group and trying out new things is seen as a bad thing."

This did not set the new teacher back as there was another new teacher in the school who provided peer support. While peers can provide support to new teachers, head teachers play an even more pivotal role in new teachers' workplace learning.

### ***Role of head teachers***

The head teacher is a key figure in the transition process for new teachers (Tickle 2000) and likely to be in charge of access to learning opportunities and to decide how work is distributed and organised (Fuller and Unwin 2004a). If a manager pays greater attention to the allocation and structuring of appropriate work, then learning can be improved (Eraut 2007). The support of managers and the flow of information to employees have also been found to be important (Ashton, 2004). Hierarchical structures, leadership, cultural practices and personal relations in workplaces all influence access to knowledge and people's experiences, including how their learning is supported or restricted (Skår 2010, Skruber 1987). One of the interviewed teachers felt particularly undervalued by their head teacher, saying they were used only "as probationers" meaning treated as temporary induction year teachers, and

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that they were kept in their place and that they were “not quite the same value as others”. This can be contrasted with the situation for two of the teachers who were asked by the head teacher which class they would prefer to teach.

### ***Feedback***

Feedback from superiors and management support for learning are two of the seven conditions that have been found to promote informal learning in the workplace (Skule 2004). Head teachers play a key role in encouraging teacher collaboration in their school (Flores 2001, Greenlee and Dedeugd 2002, Stanulis and Burrill 2004). New teachers in supportive environments are more likely to seek advice and overcome their doubts and difficulties more effectively (Greenlee and Dedeugd 2002). Head teachers who promote “a collaborative school culture and resource model”, who answer questions and make themselves available for new teachers, more effectively support new teachers (Fantilli and McDougall 2009, p. 824). Those in charge of new teachers could do more to highlight what the new teachers contribute to their schools (Fox et al. 2011). Varying degrees of acceptance and support from head teachers and colleagues towards new teachers were linked to the antecedents for learning. For new teachers in restrictive learning environments, their circumstances may have changed little from before the implementation of Scotland’s Teacher Induction Scheme (see Draper et al. 1997).

A school which appreciates its new teachers and uses their experiences is demonstrating expansive practice: “A key characteristic of an expansive learning environment is the belief that people at all levels across the organisation possess valuable skills and knowledge and have the capacity to learn” (Unwin and Fuller 2003, p. 19).

The learning environment is both the backdrop to new teachers’ informal learning and factors within it can also trigger that learning. Antecedents and triggers are interrelated, as a teacher in a learning environment with support sees the benefit in trying out new ideas and has the confidence that they will be supported in this approach even if it does not go to plan immediately.

### **Triggers**

There were several triggers to learning for the new teachers, such as close physical proximity to supportive colleagues, developing close interpersonal relationships with colleagues, the observation of other teachers’ practice as well as collaboration and discussion with colleagues. Other triggers for learning were classroom experience, trial and error and learning from pupils. The new teachers’ own individual learning dispositions and the interaction between their learning environment and their learning disposition were also catalysts for their learning.

### ***Physical proximity to colleagues***

Most questionnaire respondents at the end of the induction year indicated they were learning most in their own classroom. Physical proximity to colleagues is an

important trigger for learning; as Hodkinson and Hodkinson (2005) pointed out, it allows teachers “to work closely together and spend non-teaching time together providing opportunities for positive learning and development” (p. 127). Most of the interviewed teachers were based beside colleagues teaching the same subject (in secondary schools) or the same stage (in primary schools). Having easy access to a mentor, in the same building or nearby and who has expertise in the new teacher's subject area can help new teachers (Barrera et al. 2010). Proximity to colleagues' work areas is a factor which influences teachers' engagement in informal learning activities, especially those at the beginning of their careers (Lohman 2006).

### ***Interpersonal relationships***

New teachers need good-quality interpersonal relationships in and around school so that they have the chance to ask for advice and talk over issues (Kelchtermans and Ballet 2002). New teachers themselves identify collegial interaction as an important working condition (Johnson and Birkeland 2003), just as nurses find it useful to follow and observe more experienced colleagues who are “good at something” (Skår 2010, p. 15). Similarly, hairdressers realised they would learn more effectively if, rather than working alone, they shared ideas with colleagues (Unwin et al. 2007). However, learning in and from social relations at work can be a double-edged sword as relationships can be both a source of pleasure and pain (Collin 2008).

At work, when people want to know something, they will, without thinking, move towards certain people whom they believe have the capacity (and perhaps goodwill) to help them (Unwin and Fuller 2003). However, these helpful colleagues, and their role in the induction of new teachers, are barely acknowledged in many schools. It takes time for new teachers to find out who they can go to for help and advice about different topics and who they should leave alone. Being able to “ask the silly questions” and to drop in whenever necessary was important for the interviewed teachers who were able to do this in their school and this practice was sorely missed by those who felt they could not do it where they worked.

### ***Observation of colleagues***

The observation of other teachers was another important learning activity for the new teachers in the study, for example, “I changed my whole style of, of doing art with the children. And that was from actually observing another class” and “I observed a few of her lessons and got some good ideas as to how I could do that with my own children.”

Compared to more experienced teachers, new teachers are more likely to use observations and informal discussions with colleagues to learn (Richter et al. 2011). The reduced timetable provides time for observing other teachers and is an important antecedent for learning – having the time to do it and a trigger for learning – seeing a new way to practise activities and/or new ways of being a teacher. Time has been found to be a factor that influences teachers' engagement in informal workplace learning activities (Lohman 2006).

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There are many ways that people learn through work: asking questions, locating useful people, listening and observing, learning from errors, giving and receiving feedback, and through mediating tools (Eraut 2007). Observing others in the classroom is an important way for new teachers to learn in the workplace. People need to be able to connect what they see others doing with their own practice so that by discussing what has been observed they are able to learn (Guile and Griffiths 2001). The new teachers considered observations as more important than being shown how to do things and all the formal professional development they took part in. The interviewees spoke of observing colleagues and then adapting those practices for use in their own classroom. Not only did they learn by observing others, in addition they referred to being observed and implementing the feedback they received from mentors and head teachers.

### ***Collaboration with colleagues***

Another trigger for learning was collaborating with other teachers. Through collaboration new teachers can explore uncertainties related to general teaching and learning issues as well as context-specific ones related to their school and classroom. Collaboration with other teachers is not intrinsically positive as it may reinforce existing beliefs, norms and values and so may not necessarily be an agency for change or enhanced professional practice. Two types of collaboration have been identified in relation to new teacher learning: spontaneous and structured (Williams et al. 2001). Spontaneous collaboration, being informal, unplanned and opportunistic, leads to the paradox that “the characteristics that take induction practice beyond the satisfactory and into the realms of excellence are, by their nature, not amenable to statute or external mandate” (p. 265).

While spontaneous or serendipitous collaboration is highly valued by new teachers and induction mentors it is “impossible to legislate for or to provide through formal imposition” (Williams et al. 2001, p. 263). The strongest predictor of teacher change in mathematics and English classroom practice in one study was collaborative discussion between teachers (Mesler Parise and Spillane 2010). Collaboration with experienced subject or stage colleagues, team teaching and informal mentoring are important ways that new teachers’ development is supported (Fantilli and McDougall 2009). It has been found that teachers collaborate more at the start of their careers (Richter et al. 2011).

### ***Discussions with colleagues***

New teachers learnt from discussions with colleagues, including their designated mentor. These discussions were the backdrop to their overall learning and also a trigger for learning. Research participants understood that discussions with colleagues were very important for their learning.

Informal feedback is a key part of learning for new professionals (Eraut et al. 2000, Eraut 2007). Learning occurs while people are busy carrying out their work activities (Billett 2002a). Casual, incidental learning is seen as an inevitable way to

learn (McNally 2006). New teachers want opportunities to share concerns with colleagues or discuss teaching and learning issues (Kelchtermans and Ballet 2002; Johnson and Birkeland 2003). Interactions with colleagues were very important to the new teachers. Interviewees and questionnaire respondents appreciated their discussions with colleagues about work and also being able to discuss “non-work” matters with colleagues, “switch off” from work and relax at break and lunch times.

### ***Classroom experience***

Most surveyed and interviewed teachers felt they were learning most often through working in the classroom. One way they learnt in the classroom was through trial and error. Interviewees said how important it was to take risks as well as responding to feedback from pupils. This is a type of personal learning (Eraut 2004). For learning to occur, there needs to be a trusting relationship between the learner and the workplace colleague providing knowledge and support. A good relationship means the learner having confidence to make mistakes, and have them corrected, or good practice identified, without losing face or feeling vulnerable (Ashton 2004). While there may be good relationships there can be tension if new teachers feel they do not have the opportunity to innovate and instead are expected to follow existing practice, for example, by keeping schools desks in rows rather than using a different seating structure, which was the case for one interviewed teacher.

### ***Trial and error***

The questionnaire respondents could see the importance of “trying out new ideas or taking risks” as part of their learning to be a teacher. In the second questionnaire, this was ranked second after “doing the job or classroom experience”. One interviewee put it as “better to try and find a way of making it better than not to try it at all through being scared to try”. Learning from trial and error and from taking risks is individualised learning that cannot be planned and is happening within a complex environment. The teachers may react immediately to what is happening in their classroom with reflection-in-action or through later reflection (Schön 1983 and 1987). Reflection-in-action was an important trigger for informal learning through trying out new things on the spur of the moment. The provision of opportunities to reflect on practice has been identified as a key factor in the journey from newcomer to mainstream participant (Fuller and Unwin 2003). For some of the study teachers, reflection on their own practice was an integral and significant part of their learning process. There were differences between the teachers about how often they would try out new ideas or take risks which may be explained by their different individual learning dispositions (see below).

### ***Learning from pupils***

Another trigger for learning was the pupils in the teachers' classrooms. Questionnaire respondents were asked whose needs were most important when planning their

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professional development, which elicited responses relating to themselves, their schools and their pupils. For example,

- “the pupils – it is for them you are driven to improve.”
- “Ultimately, my current and future students – what do I need to develop to improve my delivery of teaching and learning, and promote their progress in the classroom.”
- “The young people I learn and teach with.”

The interviewed teachers were incentivised to learn because of their pupils, for example one said that what they had learnt from the pupils was how to give boys confidence in art, another that they were “learning loads of things from working with them. Learning what to do and what not to do!” and another said “working with a maths whizz. It was a learning curve.” Other professionals have referred to their clients, patients and customers in relation to their workplace learning (Cheetham and Chivers 2001).

### ***Individual learning disposition***

Another trigger for learning centres round the individual themselves and their approach to learning. The term “individual learning disposition” is used to explain the differences between people’s attitudes to learning (Shanks et al. 2012). It can be understood both as an antecedent or precursor to learning and as a trigger for learning, in being the reason why the teacher has sought out opportunities to learn. The individual’s learning disposition consists of their attitude to learning, their aspirations and motivation for learning, their openness to learning opportunities and how they react to environmental learning factors (Hodkinson et al. 2008). It may enable or facilitate some learning while obstructing other types of learning.

In the second year of the study, eight of the ten interviewees appeared to have more expansive individual learning dispositions. For example, one was very open to new ideas and trying out new things in the classroom while another talked to others to solve problems. One interviewee was very keen to see everything as a positive learning opportunity; one sought to learn from people outside their own school in a teacher learning community. Other interviewees were very aware of learning all the time and being on the look-out for information that might be useful later on. However, a minority of the interviewed teachers had less expansive individual learning dispositions, for example, they did not seek out extra learning opportunities in the way that the other interviewees did.

### ***Interaction between learning environment and individual learning dispositions***

The interaction of learning environment and the individual’s learning disposition results in a constantly changing situation. A school with more expansive practices may counteract the disadvantages of someone’s restrictive individual learning

disposition as the teacher will be exposed to more learning opportunities and support. Personal factors that have been found to influence teachers' motivation to take part in informal workplace learning include "initiative, self-efficacy, love of learning, interest in the profession, commitment to professional development, a nurturing personality and an outgoing personality" (Lohman 2006, p. 152).

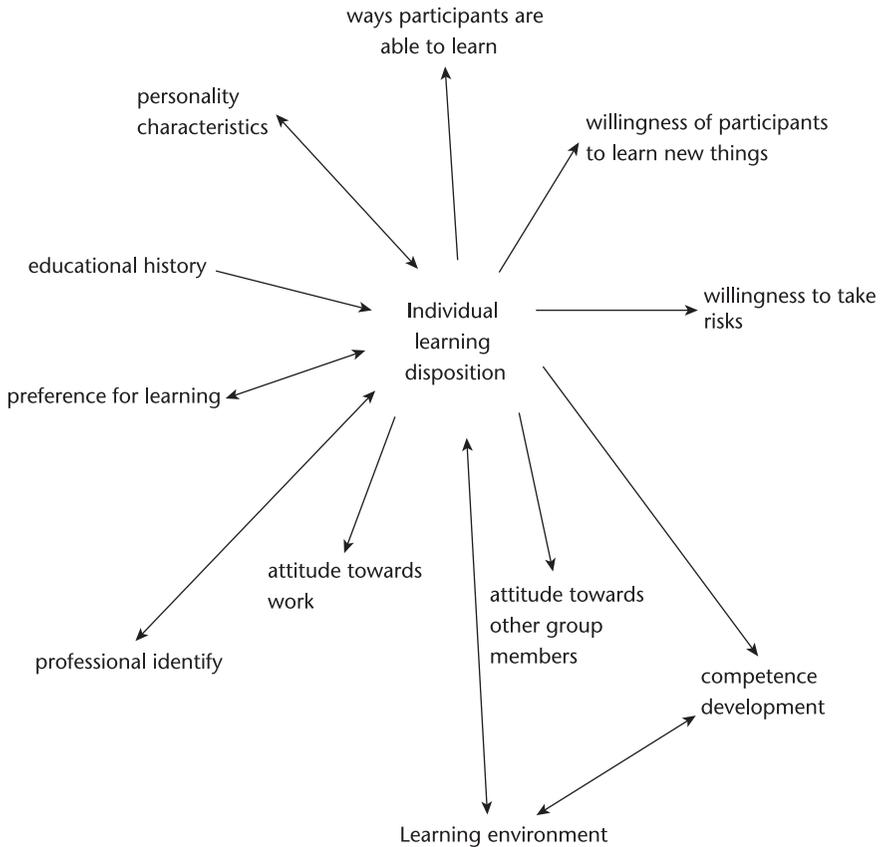
Two difficulties have been identified when considering the level of importance of the individual in learning: overemphasising individual agency, and falling into organisational determinism (Hodkinson et al. 2004). The individual is important when considering workplace learning as it is not enough to only consider the learning/workplace environment. Informal learning will be different for each individual as each teacher will differ. Different people find different experiences formative (Cheetham and Chivers 2001), hence the emphasis on the teachers' individual learning disposition. Each person is unique with their own biography and individual learning disposition and differs according to their gender, race, nationality and class (Flores 2001; Johnson and Birkeland 2003). Within each of the schools, the interviewed teachers approached their learning and responded to learning opportunities in different ways. By considering the experiences of each individual teacher, it is possible to address one of the criticisms made of learning as participation theory, namely that not enough is made of the individual's personal identity changing as they move from novice to full participant (Hager and Hodkinson 2009).

New teacher learning is not a linear process from novice to expert, it is a dynamic process affected by the individual's level of effort and the responsiveness of the workplace (Fox et al. 2011). A person's individual learning disposition is not set in stone, as individuals' attitudes and aspirations towards work are not fixed from the outset of their careers: "Young people's vocational identities evolve during the course of their engagement with the learning opportunities (and barriers) afforded by the workplace" (Fuller and Unwin 2004b, p. 40).

Just as learning environments change over time, people's individual learning dispositions may alter. Dramatic changes in one of the interviewed teachers were traced in the four months between interviews. In the first interview, the teacher said it was necessary to "stamp down on them [the pupils]" as she was anxious about the responsibility of being a teacher and compared her own abilities to the children's, whereas in the second interview she referred to getting to know the pupils from actually speaking to them, including using a game-based learning activity. This teacher said they got help all the time from two other teachers who worked with the same age group of pupils in their primary school.

An individual's learning disposition may enable or facilitate some learning while obstructing other types of learning. It is both an antecedent and a trigger for learning – an antecedent as it relates to the individual's learning history and an important trigger for what learning opportunities they will look for and take part in. It is more than personal attitudes, motivations and interests; it includes a sense of what is possible and how to behave (Hodkinson et al. 2008). Someone's individual learning disposition develops through their life experiences and learning at home, at school, at work, in leisure activities and in their local communities (ibid.).

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**FIGURE 6.3** Active and passive participants (adapted from Gustavsson 2009, p. 249)

Individuals can choose how much they will engage in learning and how this response is affected by their personal life history, their education and their motivation or “learning territory” (Fuller and Unwin 2004a, p. 127). Seibert et al. referred to a self-directed learning orientation (2001, cited in Raemondonck et al. 2014, p. 192). The difference between people can also be understood in terms of how active or passive they are as participants in their learning (Gustavsson 2009). Figure 6.3 shows the different elements that influence an individual’s learning disposition from their willingness to take risks to the ways they are able to enjoy learning.

Figure 6.3 shows the influences on individuals, and now we turn to the consequences of a new teacher’s informal learning.

## Consequences

The new teachers’ informal learning resulted in several benefits such as a more expansive individual learning disposition, greater confidence in their practice as a teacher and collaborations with their colleagues.

### ***Individual learning disposition***

New teachers bring their skills, abilities and attitudes towards learning into their new job. People's past and ongoing experiences, in terms of education, family and work interact with each other and influence their attitudes to learning. An individual worker's dispositions will interact and influence the affordances of the workplace. There is an interdependence between individuals' intentional actions and their workplace practices (Evans et al. 2006; Skår 2010). People not only react to their workplace, they contribute to its construction as well.

Everyone has a different learning history (Eraut 2000) and an individual's motivation to learn may come from contributing to the work team, the work tasks, or the person's own need (Billett 2002b). This view contrasts with Lave and Wenger's (1991) emphasis on relations and practices in the social sphere without emphasis on the individual separately. The learning environment and the individual's learning disposition are both important and inter-reliant:

On the one hand are the affordances of the workplace: its invitational qualities. On the other, is the degree by which individuals elect to participate in the work practice. Hence, there is an interdependence between the social practice and the individual acting in the social practice.

*Billett 2001, p. 20*

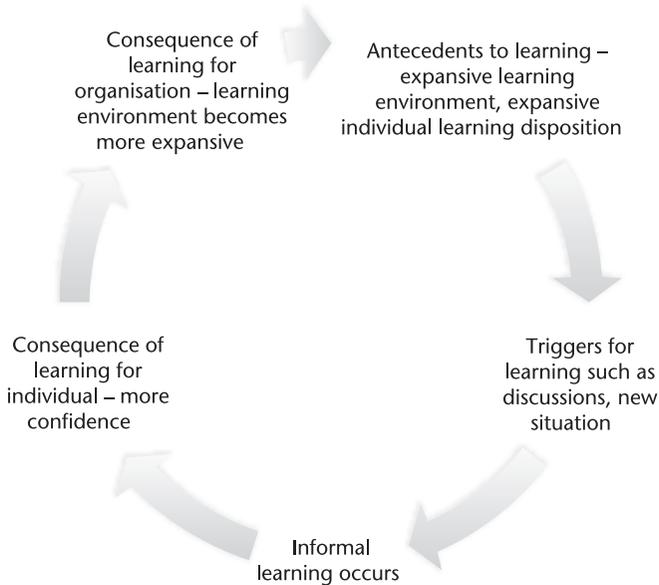
While new teachers may have similar needs they may seek help and support in different ways (Ulvik et al. 2009). New teachers may take on the responsibility of using their own personal networks to gain support or help with a project (Fox et al. 2011). Of course, just as someone may exercise their free will by choosing to follow their colleagues' practice, they may decide not to take up those practices and to learn in a different way (Billett and Somerville 2004). Not all new teachers will be involved in transformational learning, for example, the novice may have a mentor with very different views on work and this has the potential to put the new entrant off that particular career completely (ibid.).

The teachers' individual learning dispositions can be seen as triggers for their own learning, whether they embrace every opportunity or affordance or whether they limit themselves to doing the bare minimum to satisfy requirements laid down by those above or around them. One way to understand what is going on in the induction year is to think of the way antecedents and triggers yield informal learning (see Figure 6.4).

### ***Confidence***

As teachers take part in informal learning their confidence increases, thus encouraging them to try out their ideas in the classroom. With a more expansive learning environment teachers also feel more confident and are happier to take risks, knowing that this is encouraged in their workplace. As observations, collaborations and

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**FIGURE 6.4** Antecedents, triggers and consequences of new teachers' informal learning at work

discussions take place new teachers learn and this also creates a more expansive learning environment.

The new teachers are working – they are reflecting on their actions, either at the time or later; in an expansive learning environment the new teachers are supported, they feel confident, they discuss their teaching with colleagues, they observe their colleagues and through the doing, the reflecting and the discussing they are learning and thus, they feel more confident.

Confidence, challenge and support are all important for new teachers (Eraut et al. 2000). If support is provided at crucial points, then this can lead to an increase in confidence. Confidence relates to being able to perform tasks or a role and also relates to confidence in the support and trust of colleagues. Increased confidence means that the individual can cope with more challenging work which in turn leads to further increases in confidence. Support and confidence are antecedents to learning and challenge can be a trigger for learning, with increased confidence being a consequence of that learning. In the teacher interviews towards the end of the induction year, the interviewees were able to look back on their learning during the induction year and see how their teaching practice had changed and also how their identity had changed as a result of their learning in the workplace. They had more confidence in their abilities and felt more comfortable with the responsibility of being in charge of children's learning. However, in one case, the first year of teaching had not gone well and the teacher took a break from teaching before returning to teaching in a part-time role some months later. The teacher's learning

environment had not provided many expansive features and the teacher's confidence did not grow over the year. This highlights the different experiences and differing learning environments that the new teachers encountered.

### ***Collaboration with colleagues***

For the interviewed teachers the most important learning activities were all related to working with other teachers. This included talking with teachers to solve problems; being observed and receiving feedback; being part of a practice-based working group; observing other teachers; and meetings with other new teachers. For one teacher their involvement in Sports Day had made them realise that they wished to pursue a career in Physical Education. This shows how affordances to learn can widen teachers' horizons beyond their own classroom practice.

In summary, the antecedents to new teachers' learning were classroom experience, relationships with adults and children and some formal professional learning activities. Of particular importance were the new teachers' colleagues, in terms of observing them and discussing work, whether in the capacity of official mentor or not. The new teachers' learning environment and the support and feedback from head teachers were also important. The triggers for their learning were physical proximity to colleagues, their interpersonal relationships in and around school, their observations, collaborations and discussions with colleagues, and their classroom experience, including trying out new ideas and learning from pupils. Important triggers for learning were the new teachers' own individual learning dispositions and their learning environment. The consequences of this professional learning are that the new teachers' individual learning dispositions may develop alongside their confidence and the level of collaboration they take part in with colleagues.

### **Conclusion**

With situated learning theory as a means to understand new teachers' learning, it is important to consider their communities of practice and to what extent they are accepted as novices and helped to move from peripheral participation into acceptance as a full member of the community. The antecedents, triggers and consequences of the new teachers' informal learning cannot be fully understood without keeping in mind the importance of other people in their learning. How the new teacher interacts with other people, adults, children and young people, and how they, in turn, interact with the new teacher play a major role in how and what the new teacher learns.

Teachers are responsible for the formal education of others and this may explain the over-emphasis on formal learning for teachers themselves. Administrators and professional bodies have been slow to recognise the importance of teachers' informal learning in the workplace. A possible explanation for the reticence in considering teachers' informal professional learning is that this may bring into question how children and young people learn, leading to an awkward examination of their own practices in schools and classrooms.

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Factors affecting workplace learning do not operate in isolation from each other, but instead are interwoven, the individual with the social and vice versa (Warin and Muldoon 2009). Workplace learning needs to be understood as something that “both shapes and is shaped by the organisation itself rather than as a separately existing activity” (Fuller and Unwin 2004a, p. 128), providing both antecedents and triggers for learning. If school leaders (as employers) consider how they can provide environments for learning and opportunities to participate in communities of practice, they can maximise the organisation’s learning potential for itself and for the individuals who work there (Guile and Griffiths 2001). The consequences of informal learning at work for new teachers are increased confidence and a willingness to try out new ideas and take risks.

It would be useful for schools with new teachers to assess the extent to which they have expansive or restrictive practices to support teacher learning. If new teachers were more aware of their own individual learning disposition and they could recognise the expansive and restrictive characteristics of their particular school workplace, it could help them to understand and address their professional learning at an earlier stage in their first year of teaching. New teachers and their mentors could discuss the new teachers’ individual learning disposition and how best for them to take up affordances for learning. This “personal learning assessment could be used for performance coaching purposes to cultivate workers who are able to learn and grow continuously, even when adequate environmental resources are constrained” (Lohman 2006, p. 154). This can help them become “autonomous, self-directed learners who are skilled at getting the best out of all learning opportunities” (Cheetham and Chivers 2001, p. 285). School workplaces could invite participation from teachers and structure working conditions and arrangements so that their learning is explicitly supported (Billett 2002b).

This individualisation takes more time and there is also the problem with how to record, authenticate, recognise and value informal learning in the workplace (Skule 2004). A paradox of informal learning is that by recognising it, the experience is changed and may be lost, leading to a difficulty in distinguishing between informal learning that can be recognised and/or fostered and those that should not (Boud et al. 2009). However, it has been argued that rather than worrying about how to record or measure professional learning, it is more important that practitioners and researchers understand the realities of authentic professional learning so that new and useful ways of supporting professionals as they learn can be encouraged and become more widespread (Webster-Wright 2009).

New teachers in Scotland are in a particularly vulnerable position as they are temporary employees who are monitored and assessed by their mentor and head teacher and who rely on a satisfactory reference from their head teacher for their next post (see Shanks 2014). While the antecedents and triggers in relation to a new teacher’s individual learning disposition cannot be immediately changed by a school, it is possible to provide triggers and an expansive learning environment for the new teacher, thus leading to teachers who are more likely to be lifelong learning professionals in the workplace.

## Contributions to knowledge

The contributions to knowledge made by this research are that different fields of research have been brought together and the voices of new teachers have been heard in order to gain insight and understanding from their experiences and thus inform policy makers, administrators and other major stakeholders in education (Fantilli and McDougall 2009). Findings have shown that the emphasis on formal continuing professional development and professional standards leads to the neglect of new teachers' most vital learning.

The study highlights how new teachers learn from their colleagues in the workplace, predominantly through informal interactions about everyday practice. This builds on previous research showing the importance of informal learning and of expansive learning environments for learning in the workplace. New teachers need their own space to practise and learn in, they need opportunities to learn with colleagues and opportunities to learn on their own. While it has been highlighted that there is a shortfall in relation to Lave and Wenger's (1991) account of learning, in that it gives no consideration to the role of formal education institutions in a newcomer's learning process (Fuller and Unwin 2003), this research has shown the reverse is true in relation to teacher induction in Scotland, with little recognition given to informal learning. This informal learning is too vital to be neglected by administrators, ignored by policy makers, or excluded by researchers (McNally 2006). This research shows that even when formal professional learning is emphasised and privileged and the work of professionals is the formal learning of others, namely school pupils, people's most important learning at work occurs informally as they practise their profession, as they observe colleagues, as they discuss their work and as they become more engaged participants in their communities of practice. The notion of individual learning disposition of the person at work and how this interacts with and adapts to the learning environment is an attempt to address the criticism made of situated learning theory, in that the individual learner is not wholly subsumed in the focus on social practices and communities of practice. While the affordances being offered in the workplace are an important source of learning, whether learning will take place will still depend on a participant's individual learning disposition.

This study shows how new teachers learn from trial and error, from their classroom experience, from and with their pupils and colleagues and from some formal learning activities. Factors that are important in their learning are their individual learning dispositions, and the restrictive and expansive practices in their learning environment, including the level of support from their formal and informal mentors, from other colleagues and from their head teacher. Above all, the study found how colleagues affect the learning of new teachers.

## **Appendix 6.1 Coding glossary**

### ***Colleagues and school context***

This code encompasses the interaction between the induction year teacher and their school and colleagues. For example, when an induction year teacher talks about their head teacher, their mentor or other staff. When they discuss the school, peer support, asking for help and advice. When they mention workplace/office politics it is included in this code.

*Sub-codes:* Asking for help and advice; Head teacher; Impact of school context; Mentors; Micro-political literacy; Other staff; Peer support.

### ***Induction year***

This code includes any item related to the induction year arrangements. For example, the organisation of the induction year, work-life balance during this year and the induction year teacher's self-belief.

*Sub-codes:* Issues in induction year; Work-life balance; Self-belief; Induction process.

### ***Learning***

This code encompasses references to learning made by the interviewees. This might be a reference to formal learning, ideas about learning, the impact of learning, informal learning, their learning needs and the spaces and places that learning takes place in. This also includes references to observations and the induction year teacher's attitude to observations. Sub-codes of formal learning and informal learning.

*Sub-codes:* Formal learning (spaces; physical places formal learning); Ideas about learning; Impact of learning (informal learning); Informal learning; Learning needs; Observations (attitude to observations).

### ***Looking back to university course***

This code is used to indicate when someone refers back to their initial teacher education course.

### ***Organisation***

This code encompasses the induction year teachers' views on their organisational skills.

### ***Physical spaces***

This code includes spaces the induction year teachers talk about and places where informal learning takes place and the response to the question “where does most of your learning take place?”

*Sub-codes:* Physical spaces informal learning; Most learning taken place; Spaces

### ***Pupils***

This code encompasses references to the induction year teachers' own pupils in their class/es and pupils in their school.

### ***The job of teaching***

This code includes references to the induction year teachers' reason for teaching, their expectations of the job and their job (in)security at the end of the induction year.

*Sub-codes:* Expectation of the job; Job (in)security; Reason for teaching.

### ***Time***

This code encompasses instances when time is referred to, for example the time it takes to prepare and plan for teaching, the 0.7/0.3 split in teaching time and CPD, the time to commute to school, what the induction year teachers do in their non-teaching time and their feelings about having or not having enough time.

*Sub-code:* Non-teaching time.

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# 3

## SCIENTIFIC BACKGROUND OF HILL

As learning practice is constantly evolving and scientific research continues to investigate many subjects, we started our HILL expedition by performing three steps: first, conducting a comprehensive overview of theories of workplace learning that have been developed over the past decades (Dochy, Gijbels, Van den Bossche, & Segers, 2010); second, analysing the current state of the art in professional training programmes (Dochy & Nickmans, 2005); and third, exploring the changes that were seen in the last ten years of competence-based training programmes (Koenen, Dochy, & Berghmans, 2015). We also reviewed the literature from recent decades on learning, adult learning, professional training and development, transfer of learning, and workplace learning to look for consistent findings. Certainly, review studies provide interesting information. Just to mention a few examples: the pivotal review study on feedback by Kluger and DeNisi (1996) as well as the more recent review on feedback in teams by Gabelica, Van den Bossche, Segers, and Gijbels (2012); the review study by Kyndt, Raes, Lismont, Timmers, Cascallar, and Dochy (2013) on cooperative learning; and the review on team learning by Decuyper, Dochy and Van den Bossche (2010). The results of this review of the literature are presented in this chapter. We aim to underpin the value of each building block, including three sections in the discussion of each building block. First, we start by briefly summarising what the building block is about. Second, we summarise how the building block is conceptualised and framed in academic theory and research. And third, we elaborate on the ‘how to’ question: how can we implement the building block into the learning process?

### **Building block 1: urgency, gap, problem**

Small children learn because they want to explore their surrounding; engineers learn because they dream of building their own designed bridge or tower; sportspeople

learn because they want to perform and win; I learned many things because I felt it would bring me joy and satisfaction.

### **What?**

*If you feel the urgency to know something, you will invest the energy required to learn it.*

The 'sense of urgency' building block refers to the question 'Why do we learn?' So, getting learners to learn is all about triggers. It involves creating a situation where you are so strongly involved with what you do, what you are looking for, what you read, that you lose your sense of time. Your 'state of flow' erases the feeling that you have to make an effort. Can you remember when you last were learning something in such a flow?

I recently learned how to plaster walls. When I started reading a few articles online about how to prepare the walls and the plaster, and then started watching a dozen YouTube movies about different techniques, I really lost track of time. I worked for four hours and it felt like I had only been working for 20 minutes. Afterwards, I went off to practise on a wall and my sense of time again left me for half a day.

Such a sense of urgency can arise from a clear experience where a problem needs to be solved urgently (for example, a nurse who encounters once again a particular logistical problem), a strong argument (e.g. a written argument that a customer sends via e-mail) or the persuasiveness of the problem owner (such as a customer requesting consultancy). Or urgency can arise from a feeling of a strong interest in a phenomenon (for example, a learner or an employee who is interested in supply chain management or a natural phenomenon). So it clearly can arise from different sources: a client's request, a teacher's arguments, a discussion with friends, a simple experience, a story told by an expert, etc. These are the triggers that bring learners to a state of maximum involvement and intrinsic motivation for learning.

It is, however, clear that the feeling of urgency to learn cannot be imposed upon someone.

### **Why?**

The importance of starting from the learners' need, or his/her feeling of urgency, to undertake learning activities is argued by many scholars. Within the traditional transfer of knowledge found in the training literature, it is generally accepted that a training needs analysis is the first step in a cyclical process of a training programme. It implies the identification of the learning needs of the target group. It should be noted that, supported by the results of a review study by Burke and Hutchins (2007), academic researchers urge for more empirical evidence to be

provided on the specific role of needs analysis in realising transfer effects. However, within a different domain of research, more specifically motivational theories, there is ample empirical support for the notion of urgency as a powerful driver of learning. Probably one of the best known motivational theories, empirically tested in different settings, is self-determination theory with pivotal authors such as Ryan and Deci. In accordance with other motivational theories, self-determination theory positions intrinsic motivation as an important condition for impactful learning. The feeling of urgency is a strong intrinsic motivator. In the absence of urgency and without the motivation derived from the direct experience of urgency, learners may not be impelled to engage in learning. The challenge of engaging learners in online learning is a good example. Many companies nowadays have implemented online learning programmes. The problem many of them face is that, although the programme offers a variety of learning opportunities in an accessible way, the activity of the employees in the online learning programme is low. Only a small percentage of the employees participate in the online courses, access the variety of learning objects available (movies, reading material, assignments etc.), participate in the discussion forums, etc. This raises the question: How to engage employees in online learning? One of the strongest tools is making sure that the learner experiences the online learning resources as an easily accessible answer to her needs, the problems she faces and the challenges she experiences. Given time constraints, the employee is looking for the most cost-effective way to help her find an answer to a question or problem she is facing. If the online learning tool meets the employee's need for answers to problems on time and on demand, engagement in online learning activities increases.

### ***Is every challenge a trigger for learning?***

The answer is no. A challenge will only spark learning when there is an optimal balance between what the task demands from the learner (the challenge) and the competences of the learner (Csikszentmihalyi & Beattie, 1979). If dealing with the problem or the challenge is out of reach for the learner because it requires a level of proficiency that is much higher than their current level, there is no chance to become intrinsically motivated to learn.

### ***Is experiencing a challenge, a hiatus or a problem sufficient to intrinsically engage in learning?***

It is a necessary condition, because without motivation real impact does not occur and the learning process does not last. Learning certain issues just-in-time, or experiencing immediately the value of what you learn, or being able to use new insights in a project or in daily activities right away are key triggers that stimulate the learner. Starting from a perceived gap between what the learner can do and what she needs to do later, between what she knows and what she has to solve soon; starting from a specific problem or from a project that has a real problem owner, such

as an organisation or a group, will cause engagement to rocket. It is precisely these aspects that can bring a learner to an additional energy investment in his or her own development and learning. However, more is needed to keep the learner in the flow of learning, to energise learning that lasts.

Self-determination theory stresses that for learners to be and stay intrinsically motivated, we need to create conditions supporting the individual's experience of competence, relatedness and autonomy. Competence refers to the need of human beings to understand how to attain the goals set and to be efficacious in undertaking the requisite actions to reach their goals and fulfil their dreams. The need for relatedness involves human beings striving for secure and satisfying connections with others in their social networks. The need for autonomy implies that human beings want to be in charge of their own actions, and, in the context of Learning and Development (L&D), of what, how and when to undertake learning activities. When we promote a learner's feelings of competence (for example, by giving positive feedback), support the learner in his need to be the CEO of his own learning trajectory (for example, by avoiding words such as 'should' and 'must') and help the learner to build a safe and inspiring network of learners (for example, by coaching teamwork), the learner will be more likely to retain his or her natural curiosity, to be intrinsically motivated for learning.

In addition, in the world of organisations as well as in research, a lot of discussions have been held about the power of rewards systems for motivating employees to participate in L&D programmes. Based on the results of the meta-analysis they conducted, Cerasoli, Nicklin and Ford (2014) advise HR practitioners to carefully consider which behaviour they aim to stimulate or reinforce through external incentives. A very strong incentive narrows down the cognitive focus of the employee. This is highly comparable to what too many summative tests do to college students. For example, suppose that in your company, for each new client contracted, the account manager receives a bonus of 10% immediately after signing the contract. This may be desirable in specific situations, such as the following: 1. where the task is clear-cut (for example, contracting as many clients as possible); 2. where the stakes for both the employee and the employer are high (for example, we are close to the end of the financial year and face a significant decrease in incomes); 3. where productivity is the most important concern of the management team; or 4. where compliance of the employee is crucial for performance or safety. However, directly salient incentives, such as tangible rewards that are promised by the employer and therefore expected by the employee, often disincentivise learning and intrinsic motivation for learning is crowded out. Furthermore, unethical or counterproductive behaviours may emerge. Negative effects of certain types of rewards might also play a role when we aim to mobilise learners in undertaking learning activities. This is especially the case when rewards are offered to people for engaging in a learning task without consideration of any standard of performance. For example, rewarding employees for spending time on the online learning program might stimulate them to log in,

but not to really engage in performing the learning tasks. The same applies to rewarding general practitioners or other medical staff to participate in in-service training programmes by allowing them to increase the fee they charge to clients when they have been attending all of the meetings. It might stimulate them to show up at the meetings; however, it is far from certain if they will really engage in the learning opportunities offered.

Moreover, controlling incentives (such as measuring the time logged in on an online learning program) and reducing but **supporting incentives** (such as giving positive feedback on a discussion item posted by an employee in the discussion forum of an online learning program) enhance intrinsic motivation (Deci, Koestner, & Ryan, 1999).

In addition to rewards, are there other types of incentives to stimulate learners to engage in learning? The findings of the Cameron and Pierce (1994) review suggest that **verbal praise and positive feedback** enhance people's intrinsic motivation. The **quality of the learning task** also acts as a strong incentive in itself. Quality-type tasks, characterised by a challenging degree of complexity for the learner, require more significant personal investment from the learner than quantity-type learning tasks (where there is a high number of similar learning tasks). In the same vein, it is argued that **authenticity** – meaning that the learning tasks clearly match the real-life context in which the respective knowledge, skills and competences will be used – leads to greater intrinsic motivation. Authentic learning environments make it easier for the learner to identify with the learning material, to directly experience the relevance of it and therefore makes learning more meaningful.

'If there is no curiosity, there is no learning; if you are not a curious person, you are not a learner; if you are not curious, you are not a learner and therefore you won't learn,' said Dave Fox when I interviewed him on High Impact Learning. 'You create an environment where you strategise for learners to see how much reward there is in being a curious person' (Fox, 2016).

## Building block 2: learner agency

What is your passion? What do you do in your free time? Horse riding or cycling? Or do you prefer to play chess, explore nature or enjoy paragliding? Assume that you were dreaming for ten years about horse riding and the day that you were due to start your first exploration, your father or your school teacher told you that horse riding was too expensive and too dangerous to learn, and they decided that you would be better off learning to play darts or play volleyball. Would you have been able to show the same engagement, enthusiasm and drive? And would you feel the same urge to make your next choice? Think for a moment about such comparable situations and the following question: If you can make your own choices, follow your own choices, create and conduct your own experiments, would you learn more effectively?

## What?

*The more people can decide for themselves, and the more choices one can make, the more they are truly motivated to learn.*

Despite the popularity of the concept of learner agency, how it is conceptualised and defined has been the subject of many debates among practitioners as well as scholars. Based on the definitions published by different scholars (Martin, 2004; Mercer, 2013; Van Lier, 2008), we define learner agency as the learner's awareness of responsibility for his or her own L&D, and accordingly the proactive engagement in learning activities.

Learner agency has become a popular term in discussions on professional learning, whether in schools or in companies, profit or non-profit. In educational settings, during the past two decades, student-centred learning has gained increased interest. Student-centred learning was a first modest step in the direction of learner agency, a first step in trying to take into account the learner himself. In the same vein, in the business world, employee-led learning entered the strategic reports of organisations. As the 2016 CIPD survey indicates, employee-led, or learner-led, integrated learning is the new normal. Learners choose their own development tracks as a major asset in the organisation's branding. Learning in the flow of work and initiated by work challenges has become increasingly commonplace. This has not occurred by coincidence. Organisations have begun to feel the consequences of demographic trends: too many seniors with not enough young people to replace them. So the new policy is clear: try to keep your seniors and keep them in development tracks; and at the same time, do the extraordinary to attract young potentials by offering them an attractive brand box. Hence, these young people see chances for L&D as a major asset.

Learner agency means that the decision-making authority and the agency over learning is delegated to the learner. As a consequence, learners are to a greater extent responsible for their own learning and there is a higher degree of autonomy in deciding how they act. Learners have to take this responsibility for their own L&D and to try to manage this learning process themselves to become more strongly engaged in the process. In some instances, the choices made by the learner can form his individual learning path. Learner agency also increases when the learner has a feeling of relevance. This means that the outcomes of the learning are clear and their importance is well understood.

Learners taking responsibility for their own L&D or learner agency involves self-regulation (Gao & Zhang, 2011). Being self-regulated first implies being aware of your own strengths and weaknesses. Next, the learner needs to engage in self-management. This includes setting your own goals and making decisions on how to reach them. Also, monitoring and regulating ongoing behaviour through planning is important. Finally, this also includes correcting mistakes by using the appropriate

strategies for the different learning goals (taking into account the different constraints and affordances).

Here's an example of how I experienced learner agency as an ambitious but novice gardener. A couple of years ago, inspired by my father's passion for gardening, I decided to start my own little vegetable garden. Although while playing in the garden I had observed my father as he seeded and harvested for many years, in the process of planning where to locate the vegetable garden, I knew I still had a lot to learn. So, I searched on the internet, bought and downloaded books, and visited friends who had experience with biological gardening. It became a long and not always easy process where I had to learn from my mistakes, year after year.

For each decision, from the location of the garden to seeding and harvesting, I had to take into account so many factors: humidity, sun, quality of the soil, etc. I also had to make choices in terms of my goals. Do I go for a biological garden, a biodynamic garden or do I just want to be an ecologically responsible gardener? Do I want to tend a garden for fun, or do I want to be self-sufficient in providing vegetables for my family? The first year was not a real success: my salad crops were the favourite meal of a family of snails; the seeds of my green beans seemed to be delicious for the wild pigeons; and the broccoli plants did not grow or flourish. There were times when I was frustrated because, despite the effort, the harvest was so small. After my first year, my motivation to be a gardener was dramatically decreased. However, giving up was not on my agenda. Year after year, monitoring carefully what worked in my garden and adapting my techniques to the weather and soil conditions as well as taking into account my limited amount of time, I succeeded in harvesting a quite impressive variety of vegetables.

This example illustrates the core characteristics of a self-regulated learner. A self-regulated learner is intrinsically motivated and goal oriented. He or she monitors, regulates and controls his/her own learning during the different phases of task execution (from planning to action to evaluation), cognitively but also motivationally and emotionally.

## Why?

*Learner agency results in learning gains and improved performance.*

There are many reasons why learner agency has become an urgent need for both individuals and organisations. The ideal of the working professional as entrepreneurial, self-responsible, flexible, creative, and as an active lifelong learner is inadequate if it does not consider the worker's personhood and subjectivity. A worker's commitment to the ideal of being a creative lifelong learner, someone who actively develops work practices with colleagues, needs large and active agency. This should be learned during professional learning programmes.

#### Scientific background of HILL

Professional agency (as defined by Eteläpelto, Vähäsantanen, Hökkä, & Paloniemi, 2013) is performed when professionals exert influence, make choices, and take stances in ways that affect their work and/or their professional identities. Agency is always exercised for certain purposes and is closely related to professionals' work-related identities comprising their professional and ethical commitments, ideals, motivations, interests and goals. Such a professional agency is needed to develop your work and your work communities (e.g. unit, team, department, network), for taking creative initiative, for professional learning and for building work-related identities in work practices. In recent years, various changes in the workplace as well as in education have escalated the demands placed on employees and students to take responsibility for and self-regulate their own learning (Sitzmann & Ely, 2011). A few examples follow:

First: in the workplace, the tasks to be performed and challenges to deal with are becoming progressively more complex and knowledge-centric, requiring employees to continuously update their knowledge and skills. Waiting for the next course to be available is no longer an adequate strategy. The more appropriate strategy today is to look yourself (as an employee) for suitable and on-time resources to deal with the challenges encountered.

Furthermore, in current L&D practices as well as in a growing number of educational programmes, learners are given control over which training courses they participate in and over the content, sequence and study pace of the learning resources. Next, in addition to formal training programmes, informal learning activities such as gaining new insights through discussions with colleagues while collaboratively working on a project, through participating in discussion forums or by checking media such as YouTube, are becoming more prevalent. These informal learning activities require the learner to evaluate and define what she needs to know (goal setting), and how and where to get it. In sum, learning as an employee and as a student is no longer a passive but a proactive, self-responsible process.

Not only within the focus of L&D, but also from a general organisational perspective, employee agency has gained a lot of attention in recent years. Studies reveal that employee agency manifests itself as self-actualisation, action and influence, which have implications for employees' psychological contracts. Employees emerge more and more often as active parties to the psychological contract, consciously modifying and constructing this contract, including their views on L&D.

Learner agency, exercised as self-regulated learning, has become more prevalent in the daily practice of the workplace and educational settings. In scientific research, the domain of learner agency and self-regulation in learning has received a considerable amount of attention, with pivotal authors such as Zimmerman, Pintrich and Boekaerts. The previous section on urgency referred to self-determination theory and explained that human beings have a basic need for autonomy, belongingness, and competence. By creating opportunities for learners to be responsible for their own L&D trajectory, we take the innate need of autonomy into account. When learners are empowered to make their own decisions when learning, they feel intrinsically motivated. It allows learners to fully embrace their own targets, to feel

ownership over what they are doing and to see the time investments they make as a result of their own choices. It links the learning activities they perform with their own interests and curiosity.

Moreover, many studies consistently show that learner agency exercised as self-regulated learning significantly results in learning gains and improved performance. In their 2011 review study, Sitzmann and Ely conclude that current empirical evidence points out that trainees who engage in self-regulatory learning activities learn more than those who do not take responsibility for their learning process.

### ***Individual coaching***

Increasing learner agency is surely interconnected with methods of personal coaching. How do we coach individuals in such a way that their agency grows? Lazonder and Harmsen (2016) showed in their review of 72 studies that support has facilitative overall effects on learning activities, performance success and learning outcomes. Adequate support is not necessarily highly specific support. Findings show that less specific support leads to learning activities and outcomes that are comparable to those resulting from more specific guidance. Providing a context where learners have enough freedom to examine a topic and to perform a task on their own is certainly engaging. This does not mean support is irrelevant however: the type of support matters. Sierens et al. (2009) showed that autonomy-supportive coaching leads to significantly better results than controlling learners. This means that effective individual coaching provides freedom, time and a context to explore and to trigger the learner's engagement.

Coaches have a few elementary roles: ask the right questions at the right moments in order to help the coachee to tackle the problems he encounters. Coaches focus on the issues that the coachee raises; they praise, encourage, and provide positive feedback. Also, they do not interfere with the decisions that coachees take nor their consequences. In terms of L&D, this could be rephrased as focusing on continuous feedback and reflection. Certainly for adult learners, this is a very feasible but also a challenging way to progress.

### ***A self-regulated learner – to be or not to be?***

Sure, there are differences between learners in the extent to which they take responsibility for their own learning (Pintrich, 1999). Self-efficacy, interest and goal orientation predict to a significant extent whether learners engage in self-regulated learning. Research has been consistent in evidencing the importance of self-efficacy: learners who believe they can successfully learn and are confident that they have the competence to be successful are more likely to engage in self-regulated learning behaviour (Van Dinther et al., 2011). In addition, learners who are really interested in the knowledge, skill or competence that they are learning, who strongly believe that mastering this knowledge, skill or competence is important and useful, are more likely to engage in self-regulated

learning. Moreover, the goals that someone aims to achieve influence the investment in self-regulation. When it is mainly about receiving a reward or promotion, increase in salary or good grades, learners may be able to attain this goal without much self-regulation. It might be more worthwhile to do what you are told to do. You surely remember the exam you took at school, knowing beforehand already you would forget most of it soon after the exam. You simply did what was expected. For learning to last, to transfer to new situations, to be able to apply it in your daily job, a shift towards intrinsic motivation is required, where agency plays a real role.



The three methods of training rated most useful by employees are:

- (a) training from peers – 95%;
- (b) coaching – 92%; and
- (c) on-the-job learning – 91%.

(2016 CIPD employee outlook survey)

However, **only 9% of employees said they had actually received such training within the last 12 months.**

It is not only individual characteristics that account for differences in the extent to which learners engage in self-regulated learning. **Context matters!** If we are forced to learn something (e.g. at a specific moment) by a third party, and as learners we are inhibited from taking initiative, we create a cycle of dependence that prevents learners from taking a proactive approach, making choices, working at their own pace, etc. We risk ending up in a ‘waiting room’ modus, where we only execute a minimal effort to achieve what we are ordered to do. Does that ring a bell? Have you seen that happening? I have seen that many times; too many times. I have been a personal victim of falling into the waiting room trap too.

So providing choices is elementary for learning, as is providing a meaningful rationale of how this will add value to you as a learner. As I read Friedman’s book on workplaces from my own ‘learning’ perspective, my attention was drawn to one of his quotes that I see as being perfectly applicable to learning:

Spoon-feeding instructions comes with a cost. Sure, overseeing every detail might speed up productivity on this particular assignment, but that short-term lift is likely to undermine your team’s overall experience of autonomy, leading to long-term declines in their motivation.

*(Friedman, 2016, p. 288)*

It is clear that many programmes, regular training programmes as well as online learning programmes, offer ample opportunities to give learners the freedom to choose not only the content of learning, but also when, how and with whom.

### ***Environment? Which environment?***

In addition to offering choice, what are other relevant characteristics of an environment that not only stimulates someone to be a self-regulated learner but also supports the development of self-regulated learning (Boekaerts & Corno, 2005; Paris & Paris, 2001)?

First, offering tasks with a level of complexity that challenges the learners stimulates them to search for an answer or a solution, to try to really understand what is going on, to put effort and persist even when the first step is not successful: in sum, to self-regulate their learning, cognitively, motivationally and emotionally. These tasks focus the learners' attention on the task rather than the reward and sustain curiosity in the long run, keeping motivation going. This is the reason why teams dealing with complex tasks or problems are experienced as powerful learning opportunities by the team members. The complexity urges them to go beyond routine, to leave their comfort zone, to go into knowledge sharing and building with team members. A team of engineers, blue-collar workers and group dynamics specialists that have to develop a new app for increasing the safety of workers on the workforce will have to think beyond daily routine, brainstorm about possible events and build together the know-how that will dictate the functionalities of such a tool.

Second, learner agency increases when the learners have a feeling of relevance. This means that the outcomes of the learning are clear and their importance is well understood. If a learner knows why it is important to reach certain goals, it keeps him motivated to learn and invest in his development towards these goals. When learners have their own goals clearly in mind, this mechanism works automatically.

I remember the many discussions with my children when they avoided doing their homework. The recurring 'why' question illustrated well the lack of relevance they experienced. The homework discussions mostly ended in rushing to finish the task just before bedtime, combined with a lot of frustration for both the children as well as the parents. A totally different situation appeared when project work was introduced in the programme and the children could define their own project. During a birthday party with their favourite french fries, the children started to discuss the origin of the word 'french fries'. They turned this into a small project which aimed to discover the origin of the concept as well as the origin of the recipe. I have seldom seen so much time spent on classroom work and energy put in searching for as many resources as possible!

Third, monitoring how the process towards goal realisation is going is a key aspect of self-regulated learning. Monitoring is also often called 'internal feedback' or reflection. As a learner, continuous reflection is necessary not only after action to evaluate its outcomes, but also during action, in order to be able to adjust it (Schön, 1983). Reflection-in-action is especially important because it allows adaptation of

the actions in real time. However, it is hard to critically monitor your own blind spots. Therefore, feedback by relevant others is a valuable source of information through which a learner can confirm, add to, overwrite, tune or restructure his or her knowledge and strategies, cognitively, behaviourally as well as motivationally (Butler & Winne, 1995). However, one-third of all feedback interventions has negative effects on performance, so we should stress the fact that feedback has to be given in an effective manner (Kluger & DeNisi, 1996). Negative feedback in particular has potential detrimental effects when addressing the learner's self-concept. It can make the learner disengage with the feedback and reduce his or her self-efficacy. Therefore, if negative feedback is included, it needs to be formulated in terms of behavioural outcomes or the learner's action and not in terms of personality characteristics (Kluger & DeNisi, 1996). The next step is to use the learning goals resulting from the feedback to formulate an individual and group development plan that, in turn, is the basis for the next feedback session. For information on a model to integrate feedback in the workplace, see Besieux (2017).

Fourth, interaction with peers, teachers/trainers, coaches and experts about the learners' goals, their strategies to reach these goals and the results reached, helps the learners to become aware of strengths and weaknesses in how they regulate their learning process and supports them in findings ways to optimise. Moreover, modelling by experts has been shown to be a successful way of supporting learners in the development of self-regulated learning.

Finally, it is worthwhile to note that learner agency best resides in a safe climate: where it is safe to be yourself, safe to learn, safe to make mistakes and safe to acknowledge your own strengths but especially your weaknesses.

It is often argued that learner agency is quite problematic in business training for blue-collar workers, and even for high potentials, given they are often trained in learning settings where the teacher has full responsibility for the learners' learning. However, one should not always see agency as the transferring of full responsibility and steering. Gradually building learner agency might be the key to success, starting with the learner/employee understanding the goals and the relevance of the learning trajectory organised, reflecting on his learning process and outcomes, and eventually having openness and freedom in choosing some content and ways to learn. One step further is stimulating the employees to participate in designing their learning pathway, built on collaboratively discussed goals.

Alongside conditions that trigger and support learner agency, others potentially harm agency. For example, a high level of bureaucracy within an organisation hinders agency because of the formal regulation of learning. This limits the space for one's own initiatives, ideas and practices and therefore reduces autonomy over learning (Jones & Sallis, 2013).

### ***Spark learner agency with the ABC for managers***

Learner agency has to be learned and developed. When acting as a manager, you can facilitate this by using the ABC for people management. Martin Euwema,

a colleague and professor specialising in organisational psychology, advocates that managers need to take the ABC of the manager into account seriously in order to become people managers. ABC stands for Autonomy, Belongingness (& Interrelatedness) and Competence. This stems from self-determination theory, where having autonomy, belonging to a group or organisation, and getting recognition for one's competence are stated as basic human needs. The more employees feel autonomous in planning their development, the more likely they will show persistent engagement to do so. The safer they feel in the team and the more recognition they feel they are receiving for their work, the more likely they will perform well.

Similar basic needs are at stake when we are learning. Getting some autonomy during our learning increases our motivation to engage; the feeling of belonging to a team results in us investing time and energy in what we do; and receiving recognition of our growing competences provides us with the courage to grow further. Research provides clear evidence that recognition leads to stronger self-efficacy, which is seen as one of the primary predictors of future learning (Van Dinther et al., 2011).

A vast amount of research has been conducted in finding out how these needs work in our daily lives. In the field of learning, some research has been conducted, but the practice of learning and instruction can still gain a lot in applying this know-how. Recognition or positive feedback is not yet an integral and daily part of coaching processes.

Recognition feeds our need for competence and this in turn feeds our engagement. Why would that be? If we experience that others value the work we do, we are likely to value our own work more and thus we are prepared to work harder for it.

### ***Learner agency as leverage for learning and development***

Organisations and companies should support learner agency to support L&D (Senge, 1990). But how difficult is that in business?

Learner agency is built by showing them how to see and support L&D relevance, helping them to understand the goal, supporting employees in reflecting upon what

**TABLE 3.1**

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*Learner agency is...*

---

voice and choice  
 getting the power to create action  
 allowing engagement  
 seeing your own strengths and gaps  
 seeing and owning your next steps  
 knowing how to get there  
 effective feedback  
 learner responsibility  
 self-management

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they do, and finally creating openness and freedom in choosing content and ways to learn. A next phase is to stimulate employees to participate and take responsibility in designing their own learning pathway. Some of these aspects build learner agency gradually in order to work towards building a learning climate in the organisation. And surely, learner agency best resides in a safe climate: by seeing your own strengths and your gaps (coached and facilitated by feedback), owning the next steps (taking responsibility, having autonomy) and knowing how to get there (facilitated by feedforward).

### **Building block 3: collaboration and coaching**

Currently, in many organisations, working in teams is more and more integrated. So in our daily life, we do many things in teams or groups: working, dining, sports, travelling, etc. So what about learning in groups?

Some years ago I took part in a large meeting that ended with a dinner for participants. That is where I met Marijke, who told me that her utmost learning experience happened 25 years ago when she did a project with a small group over the course of 20 weeks. The learning experience was so profound that even 25 years later, she was still able to recall the content and the competences that she learned to an extent that was surprisingly detailed.

#### ***What is collaboration about?***

*Learning in well-coached teams brings you into a state of flow.*

Over the past three decades, different forms of learning in groups have become popular instructional procedures in all levels of education and in most course subjects. In the same vein, organisations have become aware of the power of working in teams to enhance inter- and intrateam learning processes such as knowledge sharing and creating new knowledge together (co-creation of knowledge).

To date, in many universities, working in small groups has quite some history. In two of the five universities where I have worked, this has certainly been the case. At the University of Leuven we celebrate almost 50 years of project-based learning, which Professors Baert and Leirman started as an experiment in the late 1960s. Since it was founded in the 1970s, Maastricht University has been known for its problem-based learning approach where students work in small groups on authentic problems as the starting point for their learning process. In project-based learning as well as problem-based learning, the process of sharing and co-creating knowledge is at the heart of the teamwork. We have met many Leuven University graduates who have noted that what they remember from their training programme are those parts that they conducted with a small team. Many talk about the 'stickyness' of working

together in projects or solving problems for real organisations. Even after 10 to 15 years they still know exactly what they did in the project and in the project team, how they coped with the problems they encountered and how much they learned about their field of study by cooperatively tackling the problem. The testimonial of a Maastricht University graduate discusses her experiences with the problem-based learning approach as follows:

Being active in class seemed a lot easier in theory than it turned out to be in practice. But eventually I started to be more active in the tutorials. Even if I wasn't sure my contribution was going to be valuable, I'd speak up anyway. I'm no longer as shy and reserved as I once was; instead I've become more open and self-confident.

*(Lisanly Vanblarcum, Curaçao, Master in Fiscal Economics<sup>1</sup>)*

Teamwork is also implemented in organisations where innovation is a top priority, such as Spotify, Zappos, Google or Apple. Learning in groups is expected to boost knowledge sharing and co-creation of new knowledge to increase the overall capacity of the organisation to deal with the complexity of challenges and problems. The Service Science Factory is a good example of how to use team learning to boost innovation. The Service Science Factory helps businesses to identify and make tangible the challenges they face and the potential innovations to tackle them. In close collaboration with clients, they execute service innovation projects in which a new or improved service concept is developed by a team of academics, professionals and students with complementary relevant expertise, and coached by experienced project leaders. (If you want to know more about the Service Science Factory approach, go to [www.servicesciencefactory.com/](http://www.servicesciencefactory.com/))

The key concepts in the field of group learning are collaborative and cooperative learning for educational settings and team learning for organisational settings.

The concepts of collaborative and cooperative learning are sometimes used as synonyms although clearly distinguished as different concepts by others. According to Bruffee (1995), cooperative learning is related to learning foundational knowledge (such as reading, grammar, history) and collaborative learning is related to non-foundational knowledge (such as critical argumentation and reasoning or construction of new knowledge). According to Panitz (1996), collaboration refers to a philosophy of interaction and personal lifestyle whereas cooperation is a way of organising learning through interaction in order to facilitate the acquisition of the learning goals. According to Dochy et al. (2014), in 'cooperative learning' settings, the learners split the work in order to work on the sub-tasks individually and bring all pieces together into the final output. In 'collaborative learning', ideas, knowledge, competences and information are shared to accomplish a task. Therefore, we prefer the term '*collaborative learning*': it stresses the interaction instead of the division of work in a small group (although many authors see collaborative and cooperative learning as synonyms).

TABLE 3.2

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*Collaboration is...*


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positive interdependence  
 peer interaction  
 accountable members  
 interpersonal skills  
 building knowledge (together)

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Johnson, Johnson, and Stanne (2000) define *cooperative learning* in terms of five components. First, cooperative learning implies *positive interdependence*, which means that students perceive that the contribution of all group members is needed to reach the goal. Second, *peer interaction* is a core element. Although Johnson et al. explicitly mention this interaction to be face to face, current cooperative learning settings are in many cases hybrid or online. Third, the group can only achieve its goals if participants act as *accountable members*. Fourth, *interpersonal skills* (such as dealing with conflict) are needed to make cooperation effective. Cooperative learning practices give learners the opportunities to practise these skills. Fifth, cooperative learning implies different *socio-cognitive processes* such as construction of knowledge and co-construction of knowledge.

Collaborative learning can be organised in different ways such as peer learning and peer coaching. It is also one of the core elements of the instructional approach in project-based learning and problem-based learning. Each of these ways of organising collaborative learning has received considerable attention in the literature.

In his 2005 review, Topping defines peer learning as follows:

Peer learning can be defined as the acquisition of knowledge and skill through active helping and supporting among status equals or matched companions. It involves people from similar social groupings who are not professional teachers helping each other to learn and learning themselves by so doing.

(Topping, 2005, p. 631).

Peer coaching is defined as the process in which two colleagues engage in a mutually supportive relationship in order to enhance professional development. Peer coaching is implemented in schools as well as professional settings. The review studies by Ackland (1991) and the more recent one by Lu (2010) describe the different ways in which peer coaching is organised as well as the effects resulting from different studies. The characteristics and outcomes of problem-based learning have been reported in different review studies such as Dochy, Segers, Van den Bossche, and Gijbels (2003), Hmelo-Silver (2004) and Koh, Khoo, Wong, and Koh (2008). Helle, Tynjälä, and Olkinuora (2006) have published an overview of the literature on project-based learning.

## Team learning

*Team learning is the true motor in creating a learning organisation and a potential basis for continuous organisational growth and change.*

The term 'team learning' was introduced at the beginning of the 1990s with Senge's bestseller *The Fifth Discipline* (1990). Senge argued that team learning, rather than individual learning, is the true motor driving the creation of a learning organisation and a potential basis for continuous organisational growth and change. Team learning was further entangled by Decuyper, Dochy, and Van den Bossche (2010) who introduced the interdisciplinary approach, leading to the identification of eight team learning processes: sharing, co-construction and constructive conflict; team reflexivity, team activity and boundary-crossing; storage and retrieval. At the heart of team learning, we put the processes of sharing, co-construction and constructive conflict. Sharing refers to the process of communicating knowledge, insights, competences, beliefs, opinions or creative thoughts among team members. Co-construction takes the team one step further than sharing: they complement, confront and integrate each other's insights, competences, beliefs, opinions and creative thoughts. Constructive conflict refers to uncovering and integrating the diversity in identity, opinion, viewpoints etc. within the team through a process of negotiation or dialogue. For these basic team learning processes to result in improvement, facilitating processes are needed. Team reflexivity refers to the extent to which team members overtly and collaboratively reflect upon and discuss the team's objectives, strategies (e.g. decision-making) and processes (e.g. communication), and adapt them to current or anticipated circumstances. In addition, teams learn by collaboratively undertaking action which helps them to check their assumptions, their initially built shared understandings of a specific phenomenon. Finally, crossing the boundary of the team helps to open up minds again. Information, insights and critical reflections from different stakeholders such as clients or other teams help the team to fine-tune, deepen or broaden their thinking process. In this way, the processes of team reflexivity, team activity and boundary-crossing help teams to learn in the 'right' direction and therefore influence the efficiency and effectiveness of the team learning process (Dochy et al., 2014).

Storage and retrieval is about saving the newly developed insights in the software (collective memory) and/or the hardware (e.g. database or report) of the team, so that it can be retrieved and re-used in any later phase.

Team learning processes do not take place in a vacuum but are influenced by different interpersonal factors that emerge during the team process. We call these 'emergent states'. Teams learn and work in contexts that are shaped by these emergent states. I recently worked on an interdisciplinary project that aimed at developing new approaches to e-learning. Members with different backgrounds, experiences and stakes were involved. From the first minutes of the first meeting

onwards, you could feel some vibration in the air: team members liked each other, they were happy to be in our team, they felt well, they strongly believed that this team would perform really well, the team was even able to cross any borders consisting of our restricted beliefs. And these beliefs did grow further in every meeting; they became stronger time after time when we were working together. This context pushed us further than we considered possible. This is how emergent states can work (or can hinder performance in some cases).

### *'Emergent states' that play a key role*

We identified four emergent states that play a role: psychological safety, group potency and group efficacy, and team cohesion. Psychological safety is one example of an interpersonal belief that emerges at the team level and influences the extent to which the team engages in the aforementioned team learning processes. Edmondson (1999, p. 354) defines psychological safety as:

a shared belief that the team is safe for interpersonal risk taking ... the shared sense of confidence that the team accepts someone for speaking up, even when his ideas or premature or controversial to other team members of current ways of thinking.

Not daring to speak up, because of being afraid of being rejected by other team members, is a very strong motive for team members not to share knowledge and not to participate in co-creation processes in the team. In addition, if you do not believe that this team might be successful, you will not put effort into any team learning process. This refers to the concepts of group potency and group efficacy. Group potency is the general belief that the team can be effective; group efficacy is the concrete shared belief that the team can do it, that it can be successful in finishing the task in hand. Team members that have a social and emotional bond are likely to put more energy and effort into the team process. Social cohesion refers to social and emotional bonds in the team, team members liking each other and caring for each other. Task cohesion implies that the team members are committed as a team to reach the team goal.

Our research, and that of many other researchers, time after time has added evidence to the key role of these 'emergent states' – a state that slowly builds itself as soon as the team gathers; the more the team works together, the further these states develop, or weaken. You might feel very safe in your team as soon as you meet, since you feel there is an emotional bond, a clique with the other members. After some work, there might be a weakening of this emotional bond since you might experience that your ideas are not appreciated or otherwise an increase if your ideas are exposed as excellent.

### ***Why collaboration?***

Research on learning in formal learning settings in the past decades has shown that *collaborative/cooperative learning* evokes clear positive effects in many ways. The different

review studies (Bowen, 2000; Johnson and Johnson, 2009; Kyndt et al., 2013) are consistent in evidencing that students who work in collaborative learning settings outperform students in individualistic learning settings. More specifically, they outperform students in individualistic settings in cognitive and moral reasoning, time-on-task, long-term retention, intrinsic motivation and expectations for success, creative thinking, and transfer of learning. Moreover, students in collaborative learning settings showed more positive attitudes towards learning, the subject area and the training programme than their peers in individualistic settings. Positive outcomes are also reported at the relational level: in collaborative learning settings students showed more mutual liking and respect as well as providing more task-oriented and personal social support than their peers in individualistic settings. This seems to positively influence their social behaviour in the period after the collaborative learning. Also in terms of psychological health, Johnson and Johnson (2009) report positive findings:

cooperativeness is positively related to emotional maturity, well-adjusted social relations, strong personal identity, ability to cope with adversity, social competences, basic trust and optimism about people, self-confidence, independence and autonomy, higher self-esteem, and increased perspective taking skills ... commitment to one's own and others' success and well-being, commitment to the common good, and the view that facilitating and promoting the success of others is a natural way of life.

(Johnson & Johnson, 2009, p. 372)

Our meta-analysis reported to what extent collaborative learning is effective for different study domains, age groups and cultures. The findings indicate that positive effects are larger for courses in maths and sciences than for social sciences. Also, youngsters up to 12 years and adults (18 years and older) profit more from collaborative learning in comparison to 12- to 18-year-olds.

With respect to collaborative learning in *problem-based learning (PBL) settings*, the results of review studies are comparable. The review by Dochy et al. (2003) was the first review searching for studies on PBL beyond the domain of medical education. The meta-analysis found that PBL has statistically and practically significant positive effects on students' knowledge application. Learners in a PBL environment show a slightly smaller knowledge base but in the long run remember more of the acquired knowledge, because they can rely on a more structured knowledge base (Dochy et al., 2003). A meta-analysis by Walker and Leary (2009) across 82 studies and 201 outcomes that crossed disciplines also favoured PBL compared to other approaches, as did several other reviews.

Studies reporting on *project-based learning* show that 'real assignment' work was found to be motivating. Learners reported that they had learned more or different issues compared to other courses, but also that the workload was high, partly because they did not have all the information they needed to solve the task right from the start.

Learners in project teams experienced a variety of positive outcomes: students learned much from the discussions within the project team; they learned from the peer assessment; they improved their communication skills and skills in analysing problems, and improved in developing, carrying out and monitoring plans; they learned to function in a team and to guide a team; they learned to apply theory in practice, to work independently and to monitor their own learning activities. Studies indicated that the intrinsic study motivation of students increased substantially during the project-based learning, and learners who were originally ranked lowest in self-regulation profited most in terms of intrinsic study motivation. Such learning prepares them well for their future work (Dochy et al., 2014).

During the past two decades, research on *team learning* has extended significantly. Many studies (e.g. Boon, Raes, Kyndt, & Dochy, 2013; Mathieu, Maynard, Rapp, & Gilson, 2008; Van der Haar, Li, Segers, Jehn, & Van den Bossche, 2015) have been evidencing in a persistent way the positive impact of team learning processes on task performance, the quality of intrateam relations, efficiency and innovativeness. Moreover, Van den Bossche, Gijssels, Segers, and Kirschner (2006) as well as Boon et al. (2013) and Veestraeten, Kyndt, and Dochy (2014) found that merely gathering a number of people is not sufficient to create team learning behaviours, but that psychological safety, group potency, task cohesion, and interdependence were found to play important roles enabling team learning to take place.

### ***How do you give feedback?***

In addition to studies focusing on team learning processes, their outcomes and antecedents, research has been conducted to understand how team learning can be supported and enhanced. The review study of Gabelica et al. (2012) showed that, overall, giving feedback to the team does not only increase performance but also motivation and interest to work in the team and on the task, collaboration in the team as well as collective belief that the team is effective, in addition to increasing team cohesion and the expectation of positive outcomes.

However, positive effects are mainly dependent on how the feedback is organised. Accurate, timely, regular, non-threatening, shared, directly given and equally distributed feedback is effective. Positive feedback is generally more effective as regards increasing performance and improving the team process. Finally, feedback on the way in which the team is working on its tasks (process feedback) is more effective in driving team processes, while feedback on the results of the team process (performance feedback) triggers performance.

### ***Team coaching***

*A jump towards coaching: Stop, look back, think, and plan forward.*

In addition to feedback, different authors (Gabelica, Van den Bossche, De Maeyer, Segers, & Gijsselaers, 2014; Konradt, Otte, Schippers, & Steenfatt, 2016) have stressed the importance of guided team reflexivity for enhancing team learning and in turn team performance. They argue that the learning potential of team feedback may not be realised unless teams actively process this feedback through the process of team reflexivity guided by a coach. This means stepping back from their team activity, reflecting on the past by taking into account the feedback received and deciding upon the next steps to take. The study by Gabelica et al. (2014) shows that combining team performance feedback and guided reflexivity leads to improved performance, even in the first phase of the team activity.

This brings us to the importance of coaching in collaborative and team learning settings.

### *Team coaching in collaborative settings*

Coaching in collaborative settings refers to direct interaction with a team, with the intention of helping the team members to make 'coordinated and task-appropriate use of their collective resources in accomplishing the team's work' (Hackman & Wageman, 2005, p. 269).

Research (for example Stevens, Slavin, & Farnish, 1991) and our own experience in different settings have shown that for collaborative learners to remain focused on a task and on how they collaboratively process the task, support is needed. In project-based learning (starting from a larger project proposal, usually by an external party) as well as problem-based learning (starting from smaller problem descriptions), the role of the teacher (sometimes labelled as 'facilitator') is described as coaching, helping the group of learners to take the different steps in their collaborative learning process. The coach monitors and scaffolds not only the cognitive process of dealing with the task, but also the process of dealing with group processes. More concretely, the tutor's task is to stimulate and challenge students to critically question their thinking in order to further extend, modify or deepen their understanding; to monitor and stimulate so that all learners are actively involved in the group discussions; to monitor and provide feedback on the learning progress of the tutorial group as well as the individual learners; and to stimulate reflection in the group on their learning progress as well as interaction.

In organisational research, team coaching has received considerable attention. Team coaching has been defined as serving different purposes. First, it may have a motivational function, aiming to stimulate team members to act as a team, to avoid free-riding or 'social loafing' and to stimulate team cohesion (a shared commitment to the team and its task). Second, coaching may have a consultative function by addressing the performance strategy the team is using. This implies stimulating the team to critically reflect on the alignment of strategies and procedures used with the task requirements. Finally, coaching might have an educational purpose by monitoring and stimulating the contribution of each team member in order to make optimal use of the different expertise available and by stimulating team

members to critically question and question each other's contributions (constructive conflict) in order to reach a team product that meets high-quality standards.

Hackman and Wageman (2005) argue that motivational coaching is especially effective during the start phase of the working team while consultative coaching is helpful when teams are at the midpoint of their performance period. We claim that educational coaching is important at all points in time. From the start onwards, valuing and using the unique expertise of each team member is essential in order to effectively start the work as well as to effectively progress.

In addition to the functions mentioned by Hackman and Wageman (2005), Edmondson (1999) has shown the importance of team coaching in terms of helping to create an environment in which team members feel safe to speak up, to not agree and to discuss divergent ideas. This belief of psychological safety enables team members to share knowledge, to discuss differences in views or perspectives, and to collaboratively create knowledge, which in turn fosters effective team performance.

In our own university programme, we implemented team-coaching to support project teams. More specifically, we used the principle of guided reflexivity. At the beginning of the project period, each project team is asked to formulate the five golden principles it believes are necessary for successful team collaboration. After two weeks each team member is asked to reflect individually on the golden principles: To what extent is the team working according to these 'principles'? Are all principles relevant? What critical events happened that might have caused negative tension in the team? How did you deal with them as a team? What positive flow did you experience as a team? What evoked this? To what extent do you feel your team reflects on the team cooperation during the project work? The individual reflections are put together anonymously in a team report that is sent to all team members and is inputted for a team reflection during an open office hour with the coach. The following questions are addressed: Are the five principles still relevant? Are any adjustments needed? As a result, the team can decide to reformulate the golden principles. The same procedure is repeated some weeks later: each team member receives an invitation for the individual reflection, and a collective team reflection (again focused on the five principles) is guided by the coach. After the closure of the project period, the students are invited for the final individual reflection. The team summary of the team results on the relevance of the golden principles is again shared and discussed during a team meeting with the coach.

Next to team coaching, in organisational management as well as learning science literature, the phenomenon of peer coaching has been subject to considerable interest. Peer coaching was first mentioned as a dimension of staff development for teachers (Joyce & Showers, 1980) and over the years it has been studied as well as applied in various fields such as counselling, nursing, medical education and professional development programmes for doctors, patient education.

In the management literature, it has been advocated as 'a powerful tool ... [with] the potential to possess some remarkable properties: It can be high-impact, just-in-time, self-renewing, low-cost, and easily learned' (Parker, Hall, & Kram, 2008, p. 488). Peer coaching refers to the engagement of peers who are in many cases at

**TABLE 3.3**


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*Team coaching focuses on...*

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strengths of peers  
 dialogue on outcomes  
 reflection  
 self-evaluation  
 dialogue for inquiry and feedback

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a similar level of knowledge ‘in an equal non-competitive relationship that involves observation of the task, feedback to improve task performance and support in the implementation of changes’ (Schwellnus & Carnahan, 2014, p. 39). In the management literature (Parker et al., 2008), it is stressed that a coaching process is about horizontal dialogue, focused on understanding each other’s worldview and collaboratively reflecting on mental models, beliefs and assumptions. The dialogue is about planning and initiating learning opportunities and supporting each other in reaching the goals ahead.

Although various approaches to coaching exist, they have some characteristics in common. First, the focus is always on the *strengths of the peers* involved in the coaching process and on how to support the development of talents or competences. Second, at the start of the coaching, there is a *dialogue* between peers on the goals or preferred outcomes of the coaching process. Third, *reflection or self-evaluation* is part of the coaching process. Fourth, the *dialogue* between peers serves two purposes: *inquiry and feedback*. While the former aims to share information and insights about the coaching process, the latter refers to a dialogue where three questions are core: where am I moving towards? Where am I now? What are the next steps to take?

Recently, we explored 57 studies on team coaching (Barendsen & Dochy, 2017) and learned that facilitating the formulation of team goals is broadly seen as a leadership behaviour and responsibility, not primarily a coaching behaviour. This means that leaders and teams together formulate the goals they should aim at; a coach can play a role in stimulating shared commitment to these goals.

The study also revealed the most important and other relevant team coaching behaviours (Barendsen & Dochy, 2017): stimulating communication and shared commitment to the team goals, and the provision of encouragement and feedback were considered to be the most important for successful team coaching interventions. Also, the importance of team empowerment and encouraging team reflection was confirmed in our empirical study. The latter was rather perceived as a coaching behaviour that should be undertaken with teams that are further developed in their performance processes (more mature). Some coaching behaviours are considered to be closely interrelated; specifically, providing encouragement and feedback and enhancing interpersonal relationships were perceived as highly connected. Feedback was mentioned as requiring a level of trust, vulnerability and openness

**TABLE 3.4***Effective team coaching interventions...*


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stimulate team communication	<ul style="list-style-type: none"> <li>➤ Create an open, safe, and trusting atmosphere to share ideas and learn from each other;</li> <li>➤ Provide feedback on occurring team interaction processes and support the team to enhance the quality of their interactions.</li> </ul>
build shared commitment	<ul style="list-style-type: none"> <li>➤ Set clear expectations concerning team outputs;</li> <li>➤ Encourage collaborative efforts;</li> <li>➤ Stimulate team consensus on procedures and team goals.</li> </ul>
provide encouragement and feedback	<ul style="list-style-type: none"> <li>➤ Provide insight into the team's way of working and identify areas of improvement;</li> <li>➤ Encourage desirable performance behaviours;</li> <li>➤ Give recognition and praise.</li> </ul>
enhance interpersonal relations	<ul style="list-style-type: none"> <li>➤ Intensify interpersonal relationships;</li> <li>➤ Address conflicts and equip team members with conflict management skills for the future.</li> </ul>
empower the team	<ul style="list-style-type: none"> <li>➤ Empower by delegating tasks and dividing responsibilities among team members;</li> <li>➤ Give team members the opportunity to experiment and work out problems on their own, instead of immediately providing solutions;</li> <li>➤ Stimulate and encourage teams to coach themselves.</li> </ul>

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among team members and can in turn improve the interpersonal relationships within the team. In more concrete terms, these team-coaching behaviours focus on the aspects outlined in Table 3.4.

Overall, these coaching behaviours seem to work in 'situated coaching', meaning that behaviours can be more or less suitable depending on the team context and progression.

### *Success factors*

What are the key success factors of peer coaching? Based on their review, Schwellnus and Carnahan (2014) distinguish eight success factors. First, mutual trust between peers is imperative and requires authenticity, for each person to be honest and open with him-/herself and their peers. Second, peer coaching needs to be voluntary, where both coach and coachee perceive mutual benefits of engaging in the coaching process. Third, although it is argued that feedback is an element of the coaching dialogue, coaching is effective when this feedback has a developmental and not an evaluative purpose. Fourth, feedback and reflection go hand in hand. Fifth, coaching that focuses on the strengths of the individual is more powerful than coaching

that aims to define and work on the coachee's weaknesses. Sixth, effective coaching implies clear goals and working towards these goals. Seventh, coaching is dialogue so a coaching relationship is in nature cooperative. Eighth, whether the coach is a more experienced individual or a peer has no influence on the success of the coaching.

The benefits of peer coaching have been described in various fields of research and practice. Peer coaching results in an increase in competences, in being open to divergent views and in engaging in critical reflective dialogue, as well as giving each other affective or emotional support, which in turn made the subjects feel more comfortable and self-confident. Peer coaching has also been described as an effective tool in proactive career management. The study of Parker et al. (2008) indicated the following impacts: being capable of dealing with change; contribution to learners' professional growth; support for working on and reaching their personal and professional goals, including soft skills; an increase in self-confidence; a more accurate self-image; development of soft skills; empowerment; and an improvement in the skill of giving feedback.

Team coaching certainly indirectly contributes to team effectiveness and both directly and indirectly contributes to team innovativeness (Barendsen & Dochy, 2017). Moreover, it can lead to an increase in perceived efficiency and the team climate, and can help teams overcome several pitfalls common to working in teams. Compared to individual coaching, team coaching can have an increased impact on the level of change and development within organisations due to its systemic approach. It is, however, important to take into account the group dynamics, the developmental level of the team and the team's commitment during coaching processes.

## **Building block 4: hybrid learning**

When television was introduced to the public, many thought that learning would change drastically. In schools, students were sitting in large halls to watch 'school television'. But it soon became boring, and evidence showed that television – just as the telephone, radio and computer – is a tool that supports learning rather than changing its core. This was very different when computers became connected to the internet. They were then more than a simple tool; there was a serious change in the availability and accessibility of information and so it brought more possibilities for variation (time, place, content). That fact also changed the essence of learning.

### ***What is hybrid learning about?***

*Variation between online learning and offline face-to-face learning keeps the process going.*

**TABLE 3.5***Blended learning combines...*


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different media and tools in an e-learning environment  
 different didactic methods or approaches, such as instruction, video, group assignments, etc.  
 traditional learning and web-based online approaches  
 different modules into one programme  
 different modes of assessment

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For many years, experts have understood that increasing variation in learning is one of the crucial factors for creating impact. As a consequence, they have promoted ‘blended learning’. A major problem with blended learning is that it contains almost any form of blending: one can call using two different methods in one training programme ‘blended learning’ and one can also call the splitting up of learning content into two consecutive modules ‘blended learning’. Also, using different media or blending modes of assessment or integrating the use of several social media platforms is seen as blended learning. It undoubtedly adds to increasing variation, but also adds to a terminological lack of clarity and it does not really promote the stronger sides of e-learning.

Looking then at what constitutes blended learning, one can conclude that currently all learning is blended since it is hard – if not impossible – to find a learning environment that does not meet any of the four modes above. Therefore, we argue in favour of the use of the term ‘hybrid learning’ when referring to a well-thought-out mix of online and offline learning methods.

*All learning is blended learning; not all learning is hybrid.  
 Hybrid learning is a well-thought-out mix of online and offline learning methods.*

‘Online’ means:

- using types of e-learning where teams of learners or learners and coach are present online at the same time such as live chat (text), video conferencing, web conferencing (learner is self-directed – synchronous (real time)) or at consecutive times (asynchronous) such as using discussion boards and other chat software;
- using the internet to find information, such as scrutinising a ‘course library’, searching and watching YouTube videos, searching databases, searching information on the web.

‘Offline’ refers to activities such as:

- working in face-to-face meetings;
- studying printed materials;
- writing a report;
- etcetera.

Hybrid learning is in the first place a more efficient use of available time: by preparing face-to-face meetings online, the meetings are more interactive and are constantly active, enabling a focus on knowledge sharing and collaborative sense-making.

### ***Why hybrid learning?***

*MOOCs: we all talk about it; few do it; fewer persist.*

Since e-learning only and using LMSs without learner marketing, offline meetings and support do not result in the desired impact, it is clear that hybridity is the only way forward.

The fact that e-learning, online learning, MOOCs (Massive Online Open Courses), etc. do not work as generally expected is mainly due to dropout.

Try to do the test yourself:

- subscribe to a MOOC and test yourself for how long you persist;
- test your colleagues or clients at your next training session, lecture or workshop: ask them who had subscribed to a form of e-learning course or MOOC and then ask how many of them finished the course. A few at best; usually no one!

This is in line with results from science, indicating huge dropout numbers: up to 95%.

Seaton, Bergner, Chuang, Mitros, and Pritchard (2014), for example, investigated 230 million student interactions and found that only 7% of the participants finished the course and that this 7% accounted for 60% of total time spent on the course. 76% of the participants merely browsed some materials, accounting for 8% of the time spent online. For MOOCs, the situation is not any better: out of 1 million students, only 4% completed the course (Cusumano, 2014). This is in line with other comparable findings.

*E-learning on its own simply does not work at all.*

What then does research show? Several studies and meta-analyses have shown mixed results about e-learning. Neutral or positive findings are only reported for some specific groups of people: for highly educated persons, with high levels of self-efficacy and with a clear learning goal orientation, e-learning seems to be as effective as classroom training.

Nevertheless, e-learning is not really successful at enhancing interaction (including peer interaction), at updating to recent know-how, and in its effectiveness of

delivery (Carolus & Dochy, 2017). Frequently reported drawbacks are: poor interactivity, lack of feedback from the trainer and poorly structured synchronous sessions. And one should certainly ask: What does it matter if we know that only 5–10% of participants persist?

Looking at the current state of the art, there are arguments to state that online learning is probably not effective for any social skill. Moreover, online instruction can only be cost-effective if learners are also geographically very dispersed (Means, Toyama, Murphy, Bakia, & Jones, 2009).

### ***Hybrid learning can be highly effective***

Where, then, is the solution?

Studies comparing different training designs with the same group of learners on the one hand (such as Thai, De Wever, & Valcke, 2015) and reviews of research that analysed the effects of different variables in e-learning (such as Means et al., 2009) are both pointing in the same direction: hybrid learning.

The meta-analysis by Means et al. (2009) could not reveal whether some of the advantages of online learning conditions over face-to-face conditions were due to the online condition: *only and precisely hybridity (mixing online with face-to-face conditions) and the expansion of time spent on task had statistically significant effects*. Even the inclusion of media such as online quizzes did not increase effectiveness.

Hybridity can be underpinned by diverse types of evidence: Instructor involvement is proven to be a strong mediating variable; virtual teams that start with face-to-face meetings seem to outperform other virtual teams; hybrid trajectories are more effective than purely e-learning (Iverson, Colky, & Cyboran, 2005; Means et al., 2009; Sitzmann, Kraiger, Stewart, & Wisher, 2006; Zhao, Huang, & Lu, 2005).

### ***Is there clear evidence of the effectiveness of hybridity?***

First, over the past decades, at least 17 reviews have been published about the effects of combining online with offline learning, basically providing evidence that hybrid learning outperforms traditional offline face-to-face learning (e.g. Bernard, Borokhovski, Schmid, Tamim, & Abrami, 2014; Liu et al., 2016; Means et al, 2009).

The meta-analysis by Liu et al. (2016) shows that implementing hybrid learning in health professions results in a large and consistent positive effect on knowledge acquisition compared to a non-blended learning group. This means that hybrid learning settings are more effective than traditional face-to-face learning and pure e-learning settings. The authors of this review study explain the positive effects of hybrid learning as follows. First, compared with traditional learning, in hybrid learning settings learners have the possibility of reviewing online materials as often as necessary and at their own pace. This is likely to enhance learning performance. Second, in hybrid learning environments there are different triggers that interact with peer learners, which reduces feelings of isolation and at the same time helps the learner to stay on track and not to lose interest in the subject matter.

The review by Means et al. (2009) evidenced that in hybrid learning environments, K-12 learners performed on average higher than those in pure face-to-face instructional settings. In addition, spending more time on-task in the online condition increases the positive impact of hybrid learning. With respect to the use of tools such as online quizzes or other media, the studies reviewed do not support the assumption that they significantly enhance learning. For example, providing online quizzes does not seem to be more effective than assigning homework. Finally, giving learners control of their interactions with media and prompting learner reflection is important for effective online learning. Studies indicate that when students engage in online learning activities, this is more effective when learner activity and learner reflection are triggered.

### ***Webinars should stimulate hybrid learning***

Today, many educational institutions as well as L&D programmes in organisations make use of webinars. In this respect, research results demonstrate that web-based recorded short lectures are most beneficial when implemented in a hybrid context (where both traditional face-to-face meetings and fully online modes of learning are used) (Day, 2008; Day & Foley, 2006; Howlett et al., 2011; Lim & Morris, 2009; Owston, York, & Murtha, 2013; Taradi, Taradi, Radic, & Pokrajac, 2005). These studies use the term ‘blended’ to mean ‘hybrid’ (Garrison & Kanuka, 2004; Graham, 2006; Montrieux, Vangestel, Raes, Matthys, & Schellens, 2014). Face-to-face meetings combined with asynchronous communication tools (such as discussion forums) help the learner to discuss the information visited online and the knowledge developed with others as a way to adapt, fine-tune and deepen his/her own understanding. Hybrid learning, with the possibility of frequent face-to-face interactions, makes more deep and meaningful understanding possible.

In sum, while computers and software do not lead to more effective learning as a matter of fact, they provide many possibilities to make learning more attractive as well as being effective when thoughtfully combined with face-to-face interactions.

Second, using online learning opportunities makes engaging in learning activities more independent of time and place. Indeed, there are several logistic benefits in using hybrid learning. For example, the possibility of flexible scheduling increases engagement of the learner as he can undertake learning activities when needed and when feasible.

Third, hybrid learning, combining synchronous (online and offline) and asynchronous communication, results in increased interaction between learners and between learners and coaches and more open communication. This in turn results in higher levels of satisfaction, motivation and well-being of the trainees. The importance of interaction opportunities in blended learning settings is confirmed by a study by Lim, Morris, and Kupritz (2007). The results of this study show that, due to interaction opportunities in the hybrid environment, the learners reached a high level of understanding.

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Fourth, the results of research studies show that when hybrid learning is implemented, there is a decrease in dropout rates. For example, Dziuban, Hartman, Juge, Moskal, and Sorg (2005) conducted longitudinal studies to measure course withdrawal rates in blended compared to online courses at the University of Central Florida. The results indicate that dropout rates on hybrid courses are lower than those in fully online courses. The authors argue that lower withdrawal rates can be explained by the support structure within the classroom. The face-to-face interactions reinforce the relationship-building between the teacher and the students, and offer the opportunity to make more explicit the expectations of the learning activities undertaken in the online learning environment.

Fifth, hybrid learning is an effective way of dealing with the problem of transferring what has been learned during a training programme to daily workplace practice. Research (e.g. Lee, 2008) has shown facilitating and hindering factors of online and offline learning to impact transfer of training: demonstration and activation through working online have a positive impact, while application is a facilitating factor when working offline. Moreover, hybridity can be crucial to transfer of training since it increases the impact of learning. Our own research demonstrated that a predictor of transfer of utmost importance is precisely the learning impact (Govaerts, 2017).

Given the aforementioned benefits of hybrid learning, one of the most important questions that training developers can ask themselves is: What is a good blend and how do you make one? Good hybridity is a mix of online and face-to-face methods and learning activities, in which the learner constantly and actively works with the learning content. The learner can do this individually or in interaction with the other trainees and the trainer. However, perfect hybridity does not exist. The optimal ratio between online and face-to-face learning is situation and context specific. Moreover, no one single medium has the best result for training and transfer. Instead, it is more the way in which media are used and the variation of media that is important.

At the organisational level, Dochy, Berghmans, Koenen, and Segers (2015) state that hybrid learning involves a fundamental reconceptualisation and reorganisation of learning and training, built on context-specific needs and characteristics. Furthermore, it is important for the organisation to make a good fit between the diverse HILL components and to integrate them. In this way, the organisation can create an ideal challenge for the trainees.

Certainly in the current era of learning from moving pictures, learning could be much better adapted to the new habits of the current generations. In this respect, hybrid learning is a response to the new needs of young people in schools as well as young employees. It aims to create a mix between online and offline learning and a wide variation in learning/training methodologies that can be used synchronously and asynchronously. Variation in instructional modalities, delivery media, instructional methods and web-based technologies contribute to hybrid learning since this variation is used to balance online and offline learning time. Due to this variation,

the learner can create his or her own personal and unique learning path that ensures that learning becomes more interesting and effective.

*The more variation in the methods used online and offline, the higher the motivation, engagement and impact.*

Learners have needs; needs of feeling autonomous and happy. If we scrutinise literature on happiness, it is clear that there are some basic rules for increasing the time in which we feel happy.

First, increasing the frequency of enjoyable activities is more important than the quantity of happiness obtained. In recent years, we have spaced out weekend parties into smaller after-work parties; we space out long holidays into smaller weekend trips and short city trips.

*In learning, small and frequent encouragement works better than giving one final score.*

Second, variation in enjoyable activities avoids habituation. If you drink only top wines with great complexity and an outrageous bouquet, your feeling of consuming something really great and exceptional will fade away quickly. Wine lovers that drink both simple and complex wines do challenge themselves time after time to search for the ultimate sensory orgasm and to enjoy it, reflect on it, etc. For learning, varying encouragement and motivation approaches also work in a similar way, such as alternating oral encouragement with enjoyable activities such as a drink with the team, watching a weekly YouTube video of the week (selected by a rotating team member), a team-building outdoor activity, or a monthly fun hour organised by a team, etc.

Third, unexpected pleasures deliver a bigger thrill, as Friedman (2016) argued. Assume that you have a four-day city trip with your eight best friends. One (rotating) person organises this yearly. No one gets any information on where to go, how to go, what to wear, etc. One day beforehand you receive an e-mail telling you what your suitcase should contain, where the meeting point is and what the dress code is: *Make sure you have summer and winter clothes with you, all in black; meet tomorrow at 6.00 at the Knightsstreet 1 and be dressed as a Gothic.* The next day, eight Gothics were transported to the airport for a surprise visit to the wonderful centre of Copenhagen. Do you think this works? I experienced it – surprises do work very well. For learning, varying enjoyment and encouragement also works: 'variation is the key of learning' (Prof. F. Marton, 1999).

Fourth, as demonstrated above, experiences enhance the feeling of happiness better and feel more rewarding than objects. A wine-tasting class is in most cases

more rewarding than a plaque. Telling each other your experiences of progress, or what you are most proud of having accomplished since the last class, are useful experiences to share. Providing development opportunities that your workers can choose is more rewarding than a yearly flat fee that is taxed at high rates.

Recently, I was guiding a workshop for learning experts/coaches. I told them that I had recently learned to lime walls. I asked them to guess how I learned it. Almost immediately 95% of them said 'YouTube movies', which was correct. I also asked them how frequently they used YouTube in the learning activities they organise. While the answers were disappointing, at that time, two learners following a professional learning programme just peeped through the door of the workshop room. I waved at them and made signs that they were welcome to come inside to participate. They voluntarily entered the room, asking what was happening. After I explained that they had just entered a workshop for their trainers, I asked these trainees how many YouTube movies they watched daily. They answered, 'at least 10 and sometimes up to 20 or 30 per day'. When I asked them how many YouTube videos were used in their training programmes, they replied, 'none'. If we know that learning from video works well, that it adds variation, and that it brings the learning activities closer to your daily preferred activities, there is some food for thought. Why don't we use this more? Using YouTube and other videos is a way to add variation that is certainly adapted to the mindset of our millennials.

## **Building block 5: action and knowledge sharing**

Consuming knowledge is not just like consuming food. In your favourite restaurant, nice dishes are served for you and you can relax and enjoy them.

Learning is different. Although information might be brought to you as a learner, turning this information into knowledge requires an active process in which the learner evaluates the new information by reflecting on it, using it to test its validity and discussing it with others. This is an essential step to connect the new information to what the learner already knows, to give meaning to the new information. Only then will it turn into personal knowledge, ready to use.

Stressing the importance of active learning, challenging and supporting students to do things and think about what they are doing, is not new. Already in the 1960s, Dewey argued for 'learning by doing'. Learners sitting back in their seats and consuming knowledge, skills and attitudes (KSAs) is ineffective. Since then, the plea for active learning has never disappeared. In the 1980s, experiential learning and action learning (Kolb, 1984; Revans, 1982) became popular. In the 1990s, 'constructivism' became a dominant paradigm in psychology and the learning sciences, and defined learning as involving the active construction of meaning by the learner. In more recent discussions on how to take into account the learning preferences of millennials, active learning has been put on the agenda of educators with urgency. It is argued that adopting instructional approaches based on the principle of active learning is critical in order to reach millennial students. Roehl,

Reddy, and Shannon (2013) describe these students as having been reared on fast-evolving technologies and as not accepting instructional approaches characterised by dissemination of information through lectures. They argue in favour of the flipped classroom as an example of an active learning pedagogy. In the flipped classroom model, students access information resources and work on new information at home, while classroom time is devoted to students working together on the information each of them brings in order to help each other in giving meaning to the new information. This implies a process of knowledge sharing. In sum, it is the combination of active learning and knowledge sharing that leads to growing insights.

### ***What is active learning?***

*When doing things and sharing know-how, you 'feel' that learning is happening.*

Active learning is generally defined as any instructional method that requires students to engage in meaningful learning activities and reflect on what they are doing (Prince, 2004). Active learning is often defined by contrasting it to passively receiving information from an external source such as an instructor.

Two core aspects of active learning are learner agency (our first building block) and inductive learning processes (Bell & Kozlowski, 2008). First, as described earlier, agency refers to students taking responsibility for their learning process and controlling the learning decisions they take (which learning goals to go for, how to work on learning goals, monitoring progress, deciding on new learning paths to follow, etc.). In sum: internal regulation of the learning. Second, active learning involves inductive processes in which learners explore and experiment with a task in order to infer general concepts, procedures, rules and strategies that lead to effective performance. Key words are: exploring, experimenting, testing, (re-)formulating hypotheses, evaluating hypotheses, making errors and learning from them, planning, reflecting and monitoring. Examples of active learning approaches are: problem-based learning, case-based learning, cooperative/collaborative learning/teamwork; think-pair-share or peer instruction; conceptual change strategies; inquiry-based learning; discovery learning; and technology-enhanced learning (Michael, 2006). In these instructional approaches, active learning and knowledge sharing are two sides of the same coin. Learning is a process of linking practice to concepts through different iterations, and is created and further deepened through discussions and/or collaboration.

An interesting example is the Rich Environments for Active Learning (REALs) instructional system, which is promoted as an approach to engage learners in active learning via collaboratively building and reshaping knowledge through authentic experiences and interactions. Analysis, synthesis and solving of authentic problems, experimentation, and examination of topics from multiple perspectives are

core activities, combined with knowledge sharing and building through collaborative learning in communities. The problem tasks that students deal with are authentic, which means they are realistic, meaningful, relevant, complex and information rich. Learner agency is stimulated and supported (Grabinger, Dunlap, & Duffield, 1997).

Another good example is the iSpot mobile app ([www.ispotnature.org/](http://www.ispotnature.org/)) for crowd learning:

iSpot is a website aimed at helping anyone identify anything in nature... Users post observations of nature to the site, by uploading photos of wildlife, logging where and when they saw it, and their guess at identification. iSpot aids identification by looking up scientific names from common names and checking the spelling with the dictionary of species. Other iSpot users – experts or beginners – can then ‘agree’ the identification if correct or provide an alternative identification if incorrect. A simple yet sophisticated reputation system gives feedback about expertise of users.

*([www.open.ac.uk/iet/main/research-innovation/research-projects/ispot](http://www.open.ac.uk/iet/main/research-innovation/research-projects/ispot))*

iSpot is based on the principles of participatory active learning via social networking. Other interesting examples of crowd learning can also be found in other fields.

In the field of architecture, the ‘Dynamic Architectural Memory On-line’ platform for student and professional designers is an interesting example of how to encourage the exchange of ideas to improve building projects (Heylighen & Neuckermans, 2000).

*Lessons from gaming: provide opportunities to grow, to be more competent and to regularly receive recognition for this.*

Is gaming also action? Yes, it is. Games offer immediate feedback on performance and a sense of accomplishment when we succeed. If we break down gaming into a series of tasks at consecutive levels, we see that each of these tasks provides an opportunity to grow our competence and to receive recognition for this. In learning programmes, we should ask the following questions: Does every assignment provide the opportunity to grow, to be more competent and receive recognition for this? This can provide the energy to engage more and more. And growing engagement needs to be done continuously, not at long-term intervals.

### ***Why active learning?***

Nobel Prize winner 2001, Carl Wieman (Stanford University) states that he collected over 1,000 scientific studies with students from diverse disciplines and diverse

team sizes, all providing indications that such active learning principles consistently produce better learning results, less failure and advantages for all students, especially for students at risk. Wieman is certainly not the only one arguing against instructional approaches favouring passive learning, such as lectures. Based on a review of studies on expertise development, Elvira, Imants, Dankbaar, and Segers (2016) examined how to design a learning environment that supports the development from novice to professional expert. They argue in favour of two main design principles. First, give students access to a variety of authentic experiences combined with coaching including feedback and reflection to make explicit what is learned from these experiences. Second, support the explicit elicitation of knowledge via experiences through dialogue, discussion, and so on.

Over the years, many research studies have been addressing the effects of instructional or training interventions that are based on the active learning approach versus passive learning approaches. Let us summarise some of the main findings.

First, learners who engage in active learning outperform passive learners. This was confirmed in a meta-analysis by Freeman et al. (2014) including 225 studies and presenting comparatively the data on examination scores or failure rates of students experiencing traditional lecturing versus active learning in undergraduate science, technology, engineering, and mathematics courses. These results showed an improvement of average examination scores by about 6% in active learning settings while students in traditional lecturing settings were 1.5 times more likely to fail than the active learning students. This finding was consistent across the different courses.

In this respect, Deslauriers et al.'s study (2011) is interesting as it evidences the impact of the flipped classroom approach. They investigated two comparable groups of 250 learners in university physics classes, one group lectured by a strongly appreciated and very experienced lecturer, and the other groups working with a rather unexperienced teacher, trained in principles of active learning that are closely related to the HILL approach. The latter means that this group used a pre-class reading assignment (four pages), pre-class quiz (short online quiz), in-class clicker questions, and more importantly student-student discussions, small-group active learning assignments and continuous feedback during meetings. After three meetings of the same duration for all groups, using the same goals, the same tests were administered to both groups directly after the third lecture/meeting. The active groups (mean score 74%) outperformed the lecture group (mean score 41%).

We should note that the type of examination or assessment used affects the extent to which active learners outperform passive learners. For example, in their study, McKeachie, Pintrich, Lin, and Smith (1986) found no differences between lectures and discussion methods for the memorisation of lower-level factual content. This is in line with our earlier study about the effects of problem-based learning (see the review by Dochy et al., 2003). However, several studies found that lectures were less effective for the long-term retention of knowledge, the application of knowledge to new contexts, the development of higher-order

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thinking, attitude change and motivation (see also Pascarella & Terenzini, 1991 and McKeachie et al., 1986).

Second, learners who are stimulated to explore and experiment, as opposed to being spoon-fed instruction, are better able to use their newly developed insights to deal with and work on new tasks, the so-called transfer of learning (Bell & Kozlowski, 2008).

Third, active learning implies making errors and learning from them. Ample research has confirmed the impact of having the opportunity to make errors as a learner and of being supported in how to turn the error into a learning experience (Bell & Kozlowski, 2008). It is a key success factor in developing into a so-called adaptive expert, a professional who combines occupational expertise with a high level of flexibility to deal with the new challenges he or she meets.

Fourth, learners who frequently engage in active learning experience how they continuously gain knowledge and insights. This experience of growing and developing is personally rewarding and motivates them to take the next steps, to walk the extra mile, to persist when hurdles have to be taken. Braxton, Milem, and Sullivan (2000) have evidenced that supporting active learning influences the learner's persistence in engaging in learning, growing and developing. Moreover, active learning with sharing knowledge as a crucial lever brings learners together, stimulates them to become part of a learning community and subsequently to stay in the programme (retention decision).

### ***Then, when can we still lecture?***

Mulryan-Kyne (2010) and others have shown situations where 'lecturing' is still appropriate and state that critics on lectures come from 'inappropriate use' and certainly the 'overuse' of them.

Lecturing is only appropriate:

- (1) When information is not available in an accessible way (Does this still happen? Information is mostly accessible; although we are not sure it is relevant and reliable, but that is exactly what we have to teach people)
- (2) When it is necessary to introduce an assignment
- (3) When you want to show and explain alternative views as preparation for discussion or assignments
- (4) When 'extra' explanation is asked for, preferably just-in-time.

*Speech is bronze; sharing is silver; constructive conflicts are gold.*

Employees prefer to learn from peers; students learn from peers – sometimes more than from experts.

When I discussed the criteria for evaluation with my students, I was scared that they would turn up with nonsense criteria. They never did. The criteria they proposed were often close to the ones on my list of rubrics. When I discussed an additional criterium on my list, after some closer explanation learners usually agreed fully. When they had additional criteria resulting from their brainstorming, I felt quite ashamed that I had not come up with such obvious criteria. Usually, it seems as if we cannot phrase such criteria any more due to too much expertise. For example, some steps in problem-solving become so obvious to experts that they do not make them explicit any more when asked how they solve such a problem. Ericsson's (2016) research on expertise and deliberate practice confirms this.

Sharing between workers, learners, students and employees is still an underestimated act that stimulates learning. And sharing is, of course, a necessary condition to arrive at construction of knowledge, co-construction and constructive conflict.

Sharing of information is of great importance to teams as it positively influences team performance (Boon, Vangrieken, & Dochy, 2016). When sharing of information develops into the collaborative building of new knowledge, we speak of co-construction. Learners that discuss information, build on it, reason on it, improve, adapt and combine it, can eventually create new knowledge, ideas, arguments, etc. (Boon et al., 2016).

*Constructive conflict takes learners out of their comfort zone.*

During the sharing of information and of personal understanding and opinions about it, cognitive conflict or controversy can arise when learners express different understandings. Constructive conflict can, by taking the team out of its comfort zone, lead to discussion, exploring different views, deeper understanding, error analysis, insight, and even drastic transformations.

There is no doubt that having constructive conflict in teams (or dyads) is the driver of team learning. Constructive conflict (also called constructive controversy by Johnson & Johnson, 2009), stimulates deepening knowledge and insight. Many times this finding has been the core message of research on learning in teams that we and our colleagues conducted (e.g. the research by Edmondson, Van den Bossche, Raes, Boon, Van der Haar, and others).

Cognitive conflict can be constructive, motivating people to seek new knowledge, to learn about the perspectives of others. Constructive controversy involves deliberative discussions that can emerge in creative problem-solving. Johnson and Johnson (2009) entangled the basic process behind constructive controversy. When learners are confronted with a problem, they search for information (today usually in a 'bitty' manner) and form a preliminary solution or hypothesis. When confronted with peers' differing hypotheses, theories and findings, they become

**TABLE 3.6***Constructive controversy leads to...*


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greater mastery and retention of the subject matter  
 higher-quality problem-solving  
 greater creativity in thinking  
 greater motivation to learn more about the topic  
 more productive exchange of expertise among group members  
 greater task involvement  
 more positive relationships among group members  
 more accurate perspective taking  
 higher self-efficacy  
 greater joy in learning

---

uncertain of that initial solution. This trigger motivates learners to search for more information and better arguments or more convincing evidence. This effort yields creative solutions and creates joy and engagement, sometimes leading to a state of 'flow'. Hence, participants also learn to criticise ideas not people, and to take on board another's perspective. Working with constructive conflict leads to more effective sharing of expertise, and in the long run, learners undergo a lasting change of attitude. Moreover, learners develop a stronger sense of mutual friendship and support and are more able to cope with stress and competition. Johnson and Johnson summarised the benefits of constructive controversy (see Table 3.6).

In sum, the 'sharing through action' HILL building block refers to learners collaboratively building knowledge and developing understanding through active involvement. This implies that learning takes place just-in-time, when there is a task to do or a problem to solve. Involving learners in action creates opportunities to make mistakes, get immediate feedback and learn from it. Active learning in a hybrid learning environment gives room for engagement in learning by doing it at a time and place most convenient to the learner.

### **Building block 6: flexibility – formal and informal learning**

How many great things did you learn outside the walls of a school or training room? Surely many. I learned many things – varying from riding a bike to laying bricks and using apps and software in everyday life – unplanned, without structured guidance, without clearly stated goals, and not at any planned time or location.

I remember that my father explained to me how he learned his competence as an entrepreneur, including competences in accounting, marketing, and managing his teams of workers at the workplace. My grandfather started an industry in glass and mirror production after World War II. My father, after studying in Brussels, was dropped in the firm as CEO and learned day after day, mostly unplanned, without stated goals, triggered by everyday challenges.

## ***What is flexibility with a mix of formal and informal learning?***

*When your own learning track is flexible, not overloaded, and providing both spaced informal moments and formal training; you will actually start to like learning.*

Flexible learning implies that employees have the opportunity to grow and develop by participating in formal training programmes as well as by learning how to deal with new questions, challenges and problems as part of everyday work, mostly referred to as informal learning.

Formal learning is learning that is planned. It is a method of learning that is often used in the workplace and in corporate settings. There are different forms of formal learning to distinguish, such as web-based learning, learning through a structured lesson, or learning planned outside the workplace. When formal learning takes place in the workplace, it is usually positive for the organisation since participation in the training programmes is significantly and positively related to the individual's job performance (Morin & Renaud, 2004). However, there is ample evidence that, in order to create impactful training programmes, careful design is necessary. The building blocks described in this book describe which aspects to take into account when designing a formal training programme. Moreover, one must remember that formal learning in different work situations is usually not good enough when one takes all the changes and challenges in the workplace into account (Svensson, Ellström, & Åberg, 2004). Therefore, it is not only important for formal learning to take place, but also informal learning.

In recent years, many discussions have suggested that informal learning is a kind of 'hidden potential' for people to learn. Many experts agree on the large value of informal learning at work or 'everyday learning'. We feel that learning during your everyday activities is indeed valuable, but it is not necessarily cheaper than other forms of learning. The reason for this may be clear: informal learning can only appear when it sufficiently facilitated by the creation of favourable conditions for learning. These favourable conditions do usually not come by themselves, but cost effort, time and money.

## ***How does informal learning in organisations work?***

Employees learn at work through problems, errors, questions, changes, critical incidents, challenges, and so on in the work itself; these are often called triggers and add to future performance improvement. Such triggers can be different challenges to approach content in a better, more profound or different way (see the following examples from Baert).

Baert (2017) gives the following examples of such triggers: rapid changes in the technologically driven environment, collaborative and innovative work structures, flatter organisations, strong relationships with clients who increasingly seek input

into design of products and services, and more flexible partnerships with suppliers for rapid, lean, just-in-time production and delivery.

These triggers have been slowly influencing organisations' human resource management (HRM) systems. Based on a literature review, Soderquist, Papalexandris, Ioannou, and Prastacos (2010) argue that current 'HRM processes need to be centred on the flexible and dynamic deployment of employees' competences, rather than on task-related and pre-defined sets of qualifications, as traditionally has been the case' (p. 326).

Today, the key question refers to the competences that superior performers possess in order to successfully execute a range of activities (e.g. in projects, inter-functional teams, or problem-solving task forces). In this context, competences differ from KSAs (Knowledge, Skills, Abilities, and Other characteristics) in that they shift the level of analysis from the job and its associated tasks, to the person and what he or she is capable of.

*(Soderquist et al., 2010, pp. 326–327).*

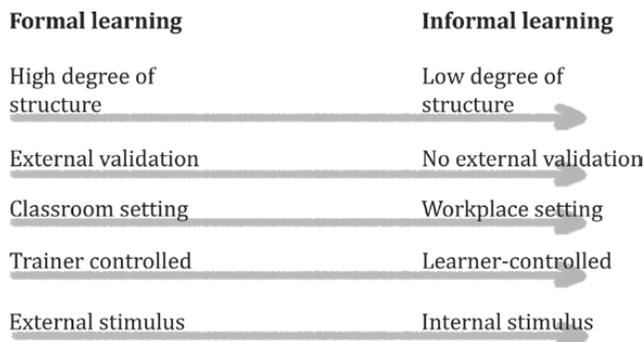
The transition from job-based HRM systems to competence-based HRM systems has been reinforcing the re-conceptualisation of L&D in organisations. It is argued that L&D practices should encompass a wider variety of learning opportunities for employees than traditional training and development programmes (e.g. Manuti, Pastore, Scardigno, Giancaspro, & Morciano, 2015). It has put the combination of formal training programmes and opportunities to learn as part of everyday work, informal learning, on the agenda.

It is clear that everyday problems and challenges are strong triggers for learning and that having opportunities to engage in informal learning activities will satisfy the urgent need and curiosity better than subscribing to a formal training programme.

But what is informal learning precisely about and how is it different from formal learning?

The core idea of informal learning is that people learn from their experiences when they face a novel challenge. Given that their current understanding is not sufficient to deal with the challenge in an effective way, they have to look for alternative ways of interpreting and analysing the situation. In turn, they require novel responses. A critical reflection on the results of using these novel responses in work practice leads to new insights that can be used when addressing novel problems in the future (Watkins & Marsick, 1992). Figure 3.1 compares the characteristics of formal and informal learning on five continua.

The first continuum refers to the degree of structure in terms of planning and organisation of the learning content, support by others, time, and objectives. Informal learning activities are characterised by a lower degree of structure than formal learning activities (Kyndt & Baert, 2013). Informal learning implies that the learner engages in learning content he or she needs in order to solve an issue at hand (e.g. a problem or question he or she faces).



**FIGURE 3.1** Formal and informal learning defined on five continua

The second continuum reflects the difference between formal and informal learning in terms of validation (Noe, Tews, & Marand, 2013). While formal training programmes lead to a certificate, this is not the case for informal learning activities. Over the past few years, validation of informal learning has become a key concern in EU lifelong learning policies. The acknowledgement that learning takes place in a variety of settings – including outside of classrooms – has led to a plea for making visible ‘the entire scope of knowledge and experience held by an individual, irrespective of the context where the learning originally took place’ (Colardyn & Bjornavold, 2004, p. 69). However, by organising a validation process, part of the informal learning process, more precisely the assessment of the outcomes of the informal learning activities, becomes formalised.

The third continuum refers to the physical place where learning takes place. While informal learning takes place in the workplace, integrated into daily work life, formal learning takes place in face-to-face or virtual classrooms.

The fourth continuum represents the locus of control of learning, with more learner control in informal than in formal learning activities. That is, much more than in formal learning, in informal learning the when, what, how, and why to learn primarily depend on the learner’s choice and motivation (Noe et al., 2013).

The fifth continuum refers to the stimulus for learning, which differs significantly between formal and informal learning. While in formal learning the stimulus for learning is mainly external – that is, set by an instructor or a curriculum – in informal learning, learning is primarily triggered by an internal stimulus that signals dissatisfaction with the current ways of acting or thinking (Marsick & Watkins, 2001; Noe et al., 2013).

By describing the key features of formal and informal learning on these five continua, we acknowledge that many learning activities can be described as partly formal and partly informal. An example is described by Tynjälä (2008), who refers to Poell’s (2006) model of learning projects. In learning projects, participants intend to learn and improve their work at the same time. The learning projects are organised by a group of employees and originate from a work-related problem. Employees

participate in a set of activities which are centred on the work-related problem and take place in different kinds of learning situations, that can be both on-the-job and off-the-job, self-organised and facilitator-/instructor-directed, action-based and reflection-based, group-focused and individual-oriented, externally and internally inspired, as well as pre-structured and open-ended.

Although formal and informal learning are described as different ends of continua, they can be complementary. That is, formal training programmes can be accompanied by informal learning activities (e.g. discussions during breaks) and informal learning activities may lead to the need to participate in formal training programmes (e.g. when feedback-seeking leads to the identification of gaps in skills which may be most efficiently addressed by participating in formal skills training).

In addition to the different continua helping to describe work-related learning activities as being more or less formal or informal, different authors have identified different types of informal learning which result from different characteristics of the learning activities and the setting at hand.

First, with respect to the intention to learn, Eraut (2004) distinguishes between deliberate, reactive, and implicit informal learning activities based on the level of consciousness and goal-directedness of learning. Implicit learning is a totally unconscious learning process in which the learner does not recognise either that he or she has been learning or what has been learned. While informal learning is hardly ever fully implicit, it is also quite likely that explicit forms of informal learning have some implicit aspects. For example, by writing this HILL book and rechecking the literature resources, I have deepened my own understanding of the building blocks, although this happens quite unconsciously. Reactive learning refers to learning activities that are near-spontaneous such as reflection on past experiences, noting facts, asking questions, and observing the effects of actions. It involves a more conscious and intentional effort to learn. For example, when a new product or service is explained to a client, the client's questions trigger the developer to reflect on different aspects of the product or service in order to look for optimisations. The developer learns by reflecting on and dealing with the client's questions. Deliberate informal learning means that there is a clear work-based goal that leads to learning activities. Learning in the sense of individual professional development is a probable by-product of these activities. Deliberate learning involves activities that are part of daily work such as discussing and reviewing past actions and experiences, engaging in decision-making, and problem-solving.

Second, a distinction is made between individual informal learning activities and informal learning in social interaction (e.g. Kyndt & Baert, 2013; Mulder, 2013). According to Noe et al. (2013), individual informal learning includes learning from oneself and learning from non-interpersonal sources while informal learning in social interaction includes learning from others. Learning from oneself refers to reflection and experimenting with new ways of thinking and acting. Learning from non-interpersonal sources implies retrieving information from written material (e.g. via the internet). And learning from others involves interaction with peers,

supervisors and relevant others in the learner's network by seeking information, help or feedback, or by exchanging ideas and discussing the problems at hand.

### ***How to foster informal learning: the role of the organisation***

Informal learning is regulated by the learner and under his or her responsibility and control. Does this imply that the organisation has no role and does not need to invest in informal learning? No, on the contrary, the organisation plays a crucial role in creating the conditions that foster informal learning. These conditions concern the extent to which certain activities are part of the culture and mindset in the organisation, such as acting upon professional discussions, feedback, collaborative conversation, being observed and receiving feedback, proactively seeking information and seeking help (Baert, 2017).

I remember my visit to a large IT multinational. On the agenda was the discussion of how to enhance knowledge exchange in the R&D department in order to increase time-to-the-market. Before we started the meeting, I walked with an L&D officer to the coffee corner to get a cup of coffee. She told me that the company had decided to remove all coffee corners as they perceived the chats in the coffee corner as a waste of time.

What are the stimulating conditions to create when you want to foster informal learning?

Many scholars have been talking about instilling a learning climate as the umbrella concept for conditions that foster informal learning (Emonds, Dochy, & Segers, 2017). What are the core dimensions of a learning climate?



**FIGURE 3.2** A climate for learning – components (Emonds et al., 2017)

First, opportunities to learn: Are you giving your workers opportunities to develop and grow? Are there ways to access and share information and are you giving them time and space to connect to others and collaborate?

Second, support: Is there explicit recognition, rewarding and approval of learning behaviour by supervisors as well as colleagues; is learning facilitated? These questions refer to task-related support. In addition, support is needed on the socio-emotional level. Is there a climate of trust and warmth among colleagues and supervisors? Is there psychological safety when you're talking about learning? Do people trust their coworkers/managers enough to firmly state their opinions without repercussion? Is there room for making mistakes, sharing them as a first step to reflect on them and learn from them? Is there room for critical questions?

Third, space for learning: Is there a space for learning within your company? What structures are there in place in your company when it comes to learning? Are there any constraints that people will be facing? Are you giving your people time to learn and is there explicit awareness of time constraints?

Fourth, individual responsibility: Are you allowing and trusting people to take responsibility in decision-making processes? Is there a role clarity that can support them in making decisions about their learning? Is there minimal regulatory guidance and control and maximal dialogue and initiative?

Fifth, exchange of knowledge: We separated this dimension from the dimension of 'opportunities' since you can create opportunities within your company, but that doesn't mean that there is actually exchange of knowledge taking place at those times. When we talk about exchange of knowledge, we talk about the attitudes towards dialogue and conflict. How do people talk to each other? Are they seeing learning opportunities in failure? What is their dialogue like when it concerns learning? Are they having constructive or deconstructive conflict, relational conflict or task-related conflict?

Finally, the sixth dimension is also the most important one and could even be described as the basis of all the others: learning leadership. Are your leaders facilitating learning behaviour and supporting it in their daily life? Are your learning leaders promoting innovation and risk-taking? Are the results of innovation and risk-taking shared and discussed? Are the leaders an example of learning while working, for example by sharing critical experiences and proactively seeking feedback themselves? Do they create time for analysis and reflection? Do they provide constructive feedback on a regular basis? Do they promote teamwork? Do they appreciate and support efforts to learn? Do they provide feedback and rewards for proficiency? Do they stimulate and reward learner agency? (Kyndt, Govaerts, Smet, & Dochy, 2017)

**Parallel and even inherent to building a learning climate, some job and work arrangements are important levers for employees to engage in informal learning.**

First, think about how to organise work so that employees do not end up in only routinised activities in which there are no triggers to learn. Involving employees in task forces, project groups, and so on opens up for them a world of problems

never experienced or thought about before: of making errors if the problem is quite wicked and/or relevant prior experiences are lacking; of critical incidents, challenges, and so on. For employees, this means that they encounter challenging tasks as well as, or as a consequence of, work and job variety (Kyndt et al., 2017).

Second, and related to the condition of challenging tasks, empirical evidence suggests that experiencing a heavy workload enhances informal learning. However, there are two points of attention. First, when the workload becomes too high, a lack of time will hinder employees from engaging in learning. Second, a heavy workload, combined with a feeling of not being under control with respect to tasks and timing, will result in less investment in learning (Kyndt et al., 2017).

Third, create structural opportunities for communication, interaction and cooperation within your own organisation. This implies making information from inside and outside the organisation accessible, fostering communication between all units of the organisation, and making explicit time and space for social contact among employees (Kyndt et al., 2017). Concrete examples of how to make this happen are: organise regular meetings where units can consult with each other; use trade union meetings as learning opportunities for the participants; share internal job openings, stimulate job rotation and organise common breaks (Baert, 2017); plan how to onboard new employees; think about the architecture of the workplace in terms of proximity and therefore easy accessibility of colleagues, rooms for teams to meet and so on (Kyndt et al., 2017).

Fourth, enhance participation in internal and external networks. Possibilities are: organise teamwork; implement intervision; organise debriefings to reflect upon and learn from projects and activities; share rooms to confer; plan meetings with external colleagues and visits to other organisations; invite guest speakers; organise communities of practice with external partners (Baert, 2017). Organising teamwork is, of course, one of the most obvious ways to give employees the opportunity to develop a network in and from which he or she can learn. Further information on the conditions that need to be in place for teamwork to act as a place where learning with and from each other is inherent to the work can be found under the building block 'collaboration'. Just to mention two points. First, diversity and complementarity in teams trigger team members to open their eyes and mind more to the expertise of others than is the case in homogeneous teams. Second, given that the responsibility for process and product is high in self-directed teams, the urgency to build upon each other, so as to learn from and with each other, is strong.

Fifth, create opportunities for feedback and reflection, for example: by using PDPs (personal development plans); implementing a buddy system or godfather/godmother system; introducing coaches and/or mentors; introducing internships so that new ideas flow into the organisation which trigger employees to reflect; introducing career consultation (Baert, 2017).

Sixth, increase the access to information and databases or systems by providing a newsletter; access to databases; promoting an idea box; providing access to a quality manual (Baert, 2017).

Also on the strategic level, conditions can be created to foster engagement in workplace learning (formal as well as informal). In this respect, the concept of Strategic Human Resource Management/Human Resource Development (SHRM/D) is often used. The importance of linking L&D practices and policies with the strategy to foster flexibility and, therefore, pave the way for organisational change is widely recognised, bringing HR departments to the forefront of organisational transformation (Truss & Gratton, 1994). In this respect, the concept of Strategic HRM (SHRM) has been put forward. SHRM is the practice of aligning and integrating HRM policies and practices with the overall business strategy, so that the organisation's human capital can most effectively contribute to its strategic business objectives (Cascio, 2015). SHRM implies not only linking HR practices with the organisational strategy but also linking the practices themselves to ensure that they are promoting the same goals (Truss & Gratton, 1994). This also applies to Human Resource Development (HRD): the role of L&D needs to be strategic, indicating the necessity for L&D policies and practices to be aligned with the business strategy by assessing the current capabilities, what is needed and what will be needed in the future (Panda, Karve, & Mohapatra, 2014). Alignment is a process of interaction between the key players in the organisation at different levels. It is based on the existence of clear communication and mutual understanding of the vision and the strategy at all levels of the organisation. Communicating and sharing strategic information, however, can be extremely challenging considering the number of employees required to carry it from and to different levels of an organisation. In addition to alignment, engaging in workplace learning, in terms of formal as well as informal learning, becomes important in the eyes of the employee and becomes an inherent element of daily work only when the organisation recognises and rewards investment in learning.

I remember an organisation where it was decided to change the form of the yearly performance appraisal interviews, by literally giving more space for describing the needs and activities for further development than for reporting on past performance and achievements. The aim was to recognise the importance of learning. A few years later, it was decided that the section on Professional Development only needed to be filled in by employees with a tenured term. The signal was clear: L&D is of no value for fixed-term employees.

### ***Why a well-thought-out mix of formal and informal learning?***

In general, it is argued that learning at work may be of benefit to both the organisation and to the career of the employee (Baert, 2017; Kyndt et al., 2017). Svensson et al. (2004) claim that the integration of formal and informal learning is necessary for better employee competences and organisational productivity.

### ***Is there any evidence for this claim?***

Previous research has consistently evidenced that the learning gains of formal training programmes are usually weaker than we think. Of course, what's in a word? Training is a must and if we include HILL building blocks, impact will rise.

Many review studies on transfer of training, examining whether participating in a training programme leads to the use of the newly acquired knowledge, skills and attitudes during daily work, yielded disappointing results. Most formal training programmes seemed not to be designed in such a way that transfer is enhanced. This is precisely one of the reasons why we have decided to develop the HILL model.

Therefore, during the past decade, we have been conducting several studies aiming to unravel the unique contribution of formal and informal learning to employees' professional development.

Our study (Gerken, Beusaert, & Segers, 2016), conducted in a university setting, questioned the extent to which the formal and informal learning of faculty staff was related to the employees' employability. Formal learning referred to participating in formally organised L&D activities (training programmes, workshops, lectures). Informal learning was described as engaging in three proactive social informal learning behaviours, namely help-seeking, feedback-seeking, and information-seeking. Employability was measured in terms of three competences: occupational expertise, flexibility (reacting to changes and challenges) and anticipation of changes and challenges (Van der Heijde & Van der Heijden, 2006).

The results indicated that social informal learning relates to employability. More specifically, seeking feedback and more concretely acting upon the feedback generated from colleagues, as well as external information-seeking, supported faculty staff to anticipate future changes and act upon them. In addition, seeking help from others helps them to be flexible when meeting challenges in their daily work and to react to them in an effective way. On the contrary, our data did not show any influence of engaging in formal learning on faculty staff's employability.

Another study (Froehlich, Beusaert, & Segers, 2017) was conducted in three different organisations: a university (including faculty staff as well as administrative staff), a Chamber of Commerce and an IT company. The findings show that formal and informal learning have a differential effect on employability. More specifically, engaging in formal learning affects the extent to which employees anticipate challenges and changes ahead and react accordingly. With respect to informal learning, we see a stronger as well as a broader impact on employability. Employees who engage in information- and help-seeking indicate a higher level of expertise in their occupations, being more able to passively (flexibility) as well as proactively (anticipation) deal with challenges and changes ahead. In sum, information- and help-seeking contribute in many ways to employees' employability. Feedback-seeking serves a more unique purpose: it helps to anticipate changes ahead.

In sum, the finding that formal learning is only supportive at being able to anticipate challenges and changes ahead might indicate that formal learning activities are especially well suited to learning about new domains. Informal learning, supporting occupational expertise, flexibility and anticipation, may subsequently be efficient for further developing competences.

These results show the value added by formal and informal learning, although there are differences between organisations. As far as we know, there is not yet evidence on the exact ideal distribution of formal and informal learning activities.

## Building block 7: Assessment as Learning

*If you get frequent feedback and assessment that is either used as a start or as a way of monitoring what you do; your drive to learn will thrive.*

Assessment is the act of collecting and interpreting information about the learner's learning process and performance. The learner gets to know whether and how they have made progress, how far they are in the developmental trajectory towards their goals and their needs in terms of the next steps to take. In addition to the powerful role of assessment in informing the learner on steps to take in the L&D trajectory, assessment also, often implicitly, steers the learner's learning behaviour. There is ample evidence that learners interpret assessment practices as signals of what is important according to the teacher or supervisor. Learners tend to adjust their learning behaviour to the method of evaluation used or the content being assessed.

This is the reason why if we aim for High Impact Learning we should consider very carefully how to use assessment: alignment of the assessment practices with the learning and support process is of crucial importance.

A few years ago, we interviewed middle managers and employees in a large multinational company using portfolio assessment. We were interested in the purpose for which the portfolio assessment was being used. The HR department as well as the middle managers communicated that the purpose of the portfolio assessment was developmental, supporting the employees in exploring strengths and weaknesses in their competences as input for deciding on next steps to take in the developmental trajectory. Employees, however, were explicitly expressing their opinion that the portfolio assessment served multiple purposes. The information from the portfolio (strengths and weaknesses) was not only used for discussing next steps in the L&D trajectory but was also then used as input for high-stake decisions such as promotion, salary, and so on. As a consequence, employees were not very eager to reflect on their professional development in an open and honest way. They admitted to the interviewer that they played the game, given that you were never sure when and how your reflection would be used 'against' you.

This example shows the powerful role that assessment practices play and consequently the importance of a carefully designed assessment practice. If the HILL model describes what impactful learning looks like, how should we design assessment in order to serve as a lever for the six other building blocks to really create high impact? Sure, we have seen programmes that include splendid actions to increase urgency for the learners and many options to allow higher learner agency. But in some of these programmes none of these efforts work out since learners only pay attention to one single incentive: getting a sufficient score on the weekly or monthly test.

The 'Assessment as Learning' principles are helpful in designing HILL-proof assessment practices. The Assessment as Learning framework builds further on the

Assessment for Learning approach that has been described in many articles and books by scholars from all over the world (R. Stiggins, M. James, M. Birenbaum, etc.). Therefore, in the next paragraphs, we will integrate the core elements of the Assessment for Learning into the framework of Assessment as Learning.

### ***What is Assessment as Learning about?***

In many publications, scholars have defined the characteristics of Assessment for Learning. Assessment for Learning is described as the process of collecting information about the learners' learning process and outcomes from a wide variety of assessment practices; this information is used by the learners to steer, plan and redirect their learning process and by teachers to adapt the support or scaffolds they offer the learner in order to optimally meet the learners' needs (Wiliam, 2011). It implies seeking out, analysing and reflecting on information from students themselves, teachers and the learners' peers as it is expressed in dialogue, learner responses to tasks and questions, and observations. Therefore, assessment is part of everyday learning and teaching in everyday classrooms and workplaces. It happens in real time during the learning process, as an integral aspect of it. It is a part of the learning process and is not separated in an additional test or examination period. It serves primarily as a feedforward moment. It is meant to enhance the learning process, informing the learner how to proceed, and not to judge performance and take high-stake go/no-go decisions (such as not being allowed to participate in another learning programme or course; not being selected for a new role, task or position).

This means that feedback and reflection based upon information collected in real time are the core processes in an Assessment for Learning approach. The primary goal of assessment is enhancing learning itself, with a focus directly on the learner's developing capabilities, while these are in the process of being developed. In the Assessment for Learning framework, the responsibility of the learner in the assessment process is significant. The learner is involved in formulating the learning goals, in planning the learning trajectory, monitoring progress through reflection and feedback, and deciding upon the next steps to take in the learning process. Teachers and peers co-monitor and offer scaffolds in this assessments process. In short, learner agency is central.

More recently, triggered by misinterpretations of the Assessment for Learning framework and fuelled by constructivist learning theories and activity theory for workplace learning (see below), the Assessment for Learning framework has been further developed into the Assessment as Learning framework (Dochy & James, 2017).

In terms of misinterpretations, we refer to the practices of learners taking too many formative tests, and who usually see such tests as being summative. Also, assessment tools of many kinds have been used too much in a sense that they create stress moments, much more so than learning moments or opportunities. A further development in an Assessment as Learning framework will increase impact.

Scientific background of HILL

In addition to the aforementioned elements of the Assessment for Learning framework, implementing the Assessment as Learning framework implies:

- (1) Contextualising assessment or searching for, collecting and interpreting information on the learning process and outcomes of the learner while he or she is working on a variety of the competences aimed for and relevant tasks. For example, if we aim to ascertain the learner's progress in communicating bad news, a test asking the learner what and how she would communicate in a certain case offers less valid information than observing the learner while he or she is communicating bad news in different contexts. Another example is informing a patient on a diagnosis you derived from information from different sources. Assessment information collected during the learning process indicates what a learner has learned while performing certain tasks.
- (2) When learning is social in nature, implying that developing and fine-tuning knowledge, skills and competences asks for relevant others to mirror, to question and to discuss, the community also plays a significant role in supporting learners to assess their progress and to decide on next steps. The learner's community is a more powerful support in an Assessment as Learning approach than external assessors.
- (3) Closely related to the former characteristic of Assessment as Learning, the social nature of learning implies that assessment is not only about individual progress in L&D. When learning is a process of collaborative sense-making and developing new insights, assessment of how the group or team dealt with learning is as important as the learning of the individual.
- (4) Problem-solving is at the heart of the learning process. Therefore, assessment that informs the learner's learning process addresses how the learner deals with problem-solving tasks.
- (5) When learning is about being responsible and self-regulating in using resources or tools (intellectual, human, material) to formulate problems, work productively and evaluate their efforts, assessment that addresses learner agency is informative for the learner.

These five characteristics imply that relevant assessment information can be captured and reported through various forms of recording, including narrative accounts and audio and visual media. The portfolio also has an important role to play here. Moreover, assessment with a more holistic and qualitative character, instead of being solely atomised and quantified as in many measurement approaches, serves the purpose of Assessment as Learning.

James (2012) provides some examples from schools that do practice 3G (third generation) assessments. From such examples and the writings on 3G assessment, we learn that Assessment as Learning should be further developed in the following critical directions for the future:

- (1) Authentic assessment based on ongoing performances or 'exit' exhibitions are promoted.

- (2) Learners are asked to work across disciplines by creating 'real' learning activities (learner-as-worker).
- (3) Learners or instructors both can devise a task, providing they use and understand the principles that underlie its construction. Helping learners to acquire this meta-level understanding is a valued goal.
- (4) Learners are challenged to practise using accumulated knowledge and to apply it to new situations.
- (5) Learners engage in effective communication in oral, written and graphic forms.
- (6) Learners are required to be reflective, persistent and well organised.
- (7) A focus on learning is described as the destination for the learners' journey and precise learning objectives are not tightly pre-specified.

Project-based programmes are good examples of how to make Assessment as Learning happen. For example, when learning takes place while executing an authentic project with a client or an external commissioning company, during the project period students receive continuous feedback on how they are progressing through discussion with their teammates and with the client. This immediate feedback is the most important resource to steer the different steps to take in the project. Milestones like project scoping notes and mid-term reports are the input for evaluation, answering the following questions: Where are we heading to (objectives)? How far are we now in executing the project and how are we doing currently? What are the next steps to take? Final reports and other project deliverables are the evidence of the learning outcomes of the team and an important step for reflecting on what has been learned that might fuel future learning and future project teamwork. An additional final test does not offer any additional relevant information for the learner.

Another example that offers opportunities to implement assessment as learning is portfolio assessment. When learners create their own portfolio in order to collect evidence on their learning process and the mastery of several competences, it is the individual reflection on the evidence collected, as well as the feedback dialogue with peers or a coach, that makes the portfolio not only an assessment tool but foremost a powerful learning tool.

In all of these examples, exercising 'agency' in the use of your resources or tools is a key issue in the assessment.

In organisations, PDPs and/or portfolios are widely used to support the employee in the development of competences. This assessment practice offers the opportunity to stimulate the employee in taking responsibility for showing real-time evidence of his or her competences, asking for feedback from relevant others as well as reflecting on the evidence themselves, to plan their L&D trajectory according to their own needs and preferences.

In addition, to a growing extent, work in organisations is organised in teams. These teams offer an important environment to learn from and with each other. At one of the largest petrochemical industries in the Netherlands, we have had the opportunity to support the operational teams and their supervisors to turn the end-of-shift team meeting into a powerful learning and assessment moment. Together

with the company, we developed a list of relevant questions to reflect upon with respect to safety behaviour during work. Using these questions as a guide to reflect on as a team and to ask for feedback from team members has proved to be a powerful lever for learning and consequently for working as a team in a safer way.

### **Why Assessment as Learning?**

Our observations in schools and organisations as well as the research results of scholars in many countries have shown the continuing dominance of a test culture in schools and organisations, and its effects.

Overall, many school programmes are overloaded with tests: summative tests, but also so-called formative tests that state ‘finally all results of the formative tests will be added up to a final score’. This makes all of these tests summative.

Since too much testing leads to severe disadvantages for many learners, we have to seriously question how many, and what type of, assessments it is wise to take.

Also, and perhaps most importantly, Prof. Wynne Harlen stated clearly a long time ago that, in any programme, too much summative testing squeezes out any form of formative assessment (Harlen & James, 1997).

Given this dominant test-taking culture in our schools, during the past two decades, many researchers, including ourselves, have promoted Assessment for Learning (AfL) as a means to increase learning impact, emphasising the importance of using assessment information, collected during the learning process, for reflection and feedback in order to support the learner in taking the next steps in the learning process. Despite the arguments for reorienting assessment practices towards implementing assessment as a tool for learning, Assessment for Learning has been interpreted in many cases as implementing more ‘formative’ tests, in some cases ending up with twice as many tests being administered. Both research and practice warn, and sometimes show clear evidence, that formative assessments are seen by students as summative assessments, or are evidently used as partial scores to be added up into

**TABLE 3.7**

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*Too much testing leads to...*

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*shallow learning*: superficial learning that leads to forgetting quickly afterwards and avoidance of deep-level learning

*shadow learning*: learners take other extra classes taught by ‘shadow teachers’

*test training*: learners believe that skill in taking tests helps them

*stress and demotivation*

*teaching to the test*: instructors tend to focus unconsciously on those issues that will be tested

*narrowing down of the programme*: as a consequence of the former

increasing the *burden of testing*: learners try to prepare themselves for tests by raising the level of preparation in ‘revision classes’ and test prep programmes

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one final summative score. As a consequence, these are not formative assessments, as claimed, but simply a series of consecutive summative assessments. This turns the experience of learning into a stressful hurdle race. Also, in organisations, assessment mainly has the connotation of taking high-stake decisions.

Assessment – for example, by using assessment centres – is used to decide upon the career of the employee. In training programmes, assessment is organised as end-of-programme tests to decide on certification. Also, performance appraisal interviews are in many cases performance oriented and rarely learning or development oriented. Even when it is communicated that both of the latter purposes are being pursued, employees still often experience the interview as something that is high-stake and adapt their behaviour according to the consequences expected (promotion, salary rise, etc). If the information shared and discussed during performance appraisal interviews is experienced as the main input for promotions and other high-stake decisions, it might be wise not to openly reflect on developmental needs or to choose strategically which developmental needs to place in the picture.

Therefore, for most training programmes, it is wiser not to use the term ‘formative assessments’, since most of these seem to be in fact summative. Currently, we advise programmes, providers or institutes to speak solely about ‘assessments’ being summative on the one hand, and ‘feedback’ on the other hand.

Feedback can be provided in two ways:

- (1) Feedback is given by experts or peers continuously when learners are working during meetings, sometimes individually, but mostly in teams. Experts or peers coach the teams by providing feedback during the meetings when moving from team to team. They provide positive feedback, critical questions, suggestions, encouragement, recognition and critical feedback, mostly through open questions, etc.
- (2) Feedback can also be provided by peers that are teammates or others. Expansive learning theory would argue that in some cases ‘more expert others’ or peers could be equally effective. Research shows that feedback by peers can be as valuable as that given by experts depending upon the content and situation. A learning climate in which peers provide positive feedback and question our work can be stimulating for any learner, provided that it is given in a constructive spirit.

### *Constructive feedback always gives learners the incentive to acquire expertise*

A last remark I want to make here about Assessment as Learning concerns our habits of giving feedback. Most of us tend to see feedback as signalling what can be done better. We learn a lot from mistakes, but a safe climate is needed for us to explore reasons for our mistakes and ways of doing things better. In order to keep

Scientific background of HILL

learners motivated, and to strive for a learning climate that is safe, providing constructive feedback is a condition *sine qua non*.

I recommend that coaches provide feedback in a way that the learner always receives a majority of constructive task-oriented feedback over negative task-feedback. This is much harder to do than it might sound. Certainly, for less talented learners in a specific area, finding positive remarks and encouragement might be a hard task. Imagine one of your most problematic learners who did not master a specific issue really quickly. Although you might have thought that he was probably stupid, try to imagine what type of constructive feedback you could give to such a person:

- Your introduction was well written!
- The structure of your report was clear!
- The layout of the piece was really attractive!
- I read some bright ideas!
- I did like the variation in figures that you used as illustrations!  
And...
- Nevertheless, I think you could better question your problem solution again. Are you convinced it is correct? Why?
- And I am not sure whether your summary reflects the key issues of your argumentation. Do you think this can be done better?

Always providing some constructive feedback, i.e. identifying strengths before highlighting weaknesses, gives learners the incentive to continue on the road to acquiring expertise.

*If a dominant test culture is not the way to go, what then is the direction we should be heading in?*

Some years ago, I went horseback riding on the moors just outside Exeter, UK, with Professor Mary James. Mary is a world expert on assessment. When galloping through Dartmoor National Park, we had an exciting talk about the future of assessment. As you can guess, the immediate result was that I kept on thinking about assessment in the future. More concretely, an immediate result was that, on Mary's recommendation (formative feedback), I put rubber mats on the floors of my horse stables in order to save hours of daily cleaning. In the mid-term I kept on playing with the idea of 'developmental assessment' that I had discussed with Mary James.

Assessment as Learning builds upon constructivist theories and activity theories of learning by scholars from both Europe and the US: linguists such as Noam Chomsky, computer scientists such as Herbert Simon, and cognitive scientists such as Jerome Bruner (who in his later writings moved towards socio-cultural activity theories; see Bruner, 1996). More recently, neuroscientists have joined these ranks (James, 2006).

Just a few words on the core message of these theories on learning as a stepping stone towards the foundations of the Assessment as Learning approach.

Constructivist theories argue that learning requires the active engagement of learners. The focus is on how learners cognitively construct meaning by organising structures, concepts and principles in individual (when learning individually) or team mental models or shared mental models (when learning as a team) (Decuyper et al., 2010). Prior knowledge here is seen as a springboard for future learning and a powerful determinant of learning (Robert Glaser in Dochy, 1992). Problem-solving is used as an environment for knowledge construction, using processing strategies, and to organise knowledge in expert structures. Monitoring, regulating and controlling the learner's own learning during the different phases of task execution (from planning to action to evaluation), cognitively, motivationally and emotionally, are the self-regulatory processes needed to develop the competences aimed for and to travel the road towards professional expertise.

Activity theories of learning go back to Dewey and Russian psychologists such as Leontiev and Vygotsky, who describe human development and learning as a transaction between the individual and the environment. These scholars have certainly influenced more recent scholars such as Bruner and Engeström. The latter is known principally for reconfiguring Russian activity theory as an explanation of how learning happens in the workplace.

In activity theory, learning is by definition a collaborative activity in which learners develop their thinking together. Working in groups, teamwork of cooperative learning is not a choice, since learning involves cooperation and what is learned is not necessarily the property of an individual but shared within the social group, hence the concept of 'distributed or shared cognition' (James, 2006).

Constructivist theory has had a large influence on practices of learning and instruction, with many schools as well as L&D programmes implementing problem-based learning approaches, project learning, case-based learning, and so on. The more advanced activity theory, or as I earlier called it, the 'expansive learning theory' or the 'theory of inter-organisational learning' (Dochy, Gijbels, Segers, & Van den Bossche, 2010), has not yet had such a strong translation into learning and instruction practices.

We agree with Mary James that such a theory implies that the instructor needs to create an environment in which learners can be stimulated to think and act in authentic tasks (like apprentices) beyond their current level of competence (but in what Vygotsky calls their zone of proximal development). James was one of the first scientists who tried to bring what is called '3G learning theory' into practice (James, 2006).

### ***3G learning theory***

From this third generation (3G) theoretical point of view, accessing and using appropriate tools is key to expansive learning. Appropriateness of tools means the following: It is important to support activities that a learner can complete while coached by others but not alone so that the 'more expert other', in some cases an instructor but often a peer, can 'scaffold' the learning. According to James (2012),

tasks need to be collaborative and learners need to be involved both in the generation of problems and of solutions. Learners and coaches jointly solve problems and everyone develops their competences.

Framing assessment from an activity theoretical point of view only started very recently and builds further upon the framework of Assessment for Learning, described above. As James argued, learning can result from active participation in authentic (real-world) activities or projects. What does 3G assessment look like? According to James (2006):

the focus here is on how well people exercise ‘agency’ in their use of the resources or tools (intellectual, human, material) available to them to formulate problems, work productively and evaluate their efforts. Learning outcomes can be captured and reported through various forms of recording, including audio- and visual media.

*(James, 2006, p. 58)*

Within this frame, portfolios can be interesting tools, and when building learning identities is central to learning then certainly students’ own self-assessments must be central. This is strongly supported by John Hattie’s famous research on what elements do really affect learning and education: he found only one element to have a tremendous impact on learning, with an effect size over 1.4, and that is the use of self-report grades.

Likewise, what we called ‘Assessment as Learning’ advocates the use of data that are collected during the learning process as information to evaluate the learning. Well-known examples are project outcomes or products and portfolios (see also our earlier work *Alternatives in Assessment* (Birenbaum & Dochy, 1996) and *Optimizing New Modes of Assessment* (Segers, Dochy, & Cascallar, 2003)).

*3G assessment does not necessarily intertwine with IT or computerised assessment. Actually, mostly it doesn’t at all.*

James tried further to operationalise 3G assessment with the following pointers styled ‘third generation assessment’:

- If learning cannot be separated from the actions in which it is embodied, then assessment too must be ‘situated’.
- Assessment alongside learning implies that it needs to be done by the community rather than by external assessors.
- Assessment of group learning is as important as the learning of the individual.
- ‘In vivo’ studies of complex problem-solving may be the most appropriate form for assessments to take.

- The focus should be on how well people exercise ‘agency’ in their use of the resources or tools (intellectual, human, material) to formulate problems, work productively and evaluate their efforts.
- Learning outcomes can be captured and reported through various forms of recording, including narrative accounts and audio and visual media.
- Evaluation needs to be more holistic and qualitative, not atomised and quantified as in measurement approaches.

(James, 2012, p. 195)

### ***Empirical evidence on the impact of Assessment as Learning***

In school settings, our own studies have been building further on the early work of researchers such as Black and Wiliam (1998) and Kingston and Nash (2011).

The studies of Baas (2017) and colleagues showed that implementing Assessment for Learning in primary school practices predicts students’ strategy use. Specifically, the results reveal that monitoring activities that inform students on their progress and their strengths and weaknesses predict students’ strategy use in the forethought phase. Students engage more in task orientation and planning activities. Promoting student learning by providing scaffolds that aid students in taking the next step in their learning predicts students’ strategy use during the phases of task execution and self-reflection. Assessment for Learning practices positively predict the use of surface learning strategies, deep-level learning strategies and process evaluation. While it is generally assumed that the use of deep-level learning strategies results in higher-quality learning than the use of surface learning strategies, the enhanced use of both deep-level and surface learning strategies is a first step for young students towards developing their repertoire of learning strategies and coming to understand when to apply certain learning strategies. In sum, the findings underpin the notion that Assessment for Learning is a powerful tool to enhance students’ cognitive and meta-cognitive strategy use.

The studies of Pat-El (2012) and colleagues addressed students’ as well as teachers’ perceptions of the extent to which Assessment for Learning is implemented in secondary schools. The results show that students’ and teachers’ perceptions of the level to which Assessment for Learning is practised in classrooms are largely incongruent. Teachers perceive far more practice of Assessment for Learning than students. Moreover, these incongruencies have a strong negative impact on students’ motivation. In classrooms where there is a congruence between teachers and students in how they experience Assessment as Learning being present, students show more feelings of personal competence and autonomy to learn in their own way.

The studies of Gabelica et al. (2012) addressed Assessment for Learning practices at the team level. In a series of experimental studies with university students, they underpinned the importance of team feedback and reflexivity for enhancing team performance.

Beusaert (2012) and his co-researchers conducted a systematic literature review which yielded inconclusive results concerning the relation between the use of PDPs by employees and engaging in learning activities. Inspired by these results, they conducted a survey study. The results of Beusaert's study on the use of PDPs by pharmacy assistants showed differentiated results. It was found that users of a PDP undertook more learning activities (in the past) than non-users. However, pharmacy assistants who used a PDP did not plan more learning activities. They did not plan to undertake further training more often than non-PDP users. This finding might indicate that PDPs are especially used as feedback tools and not as feedforward tools. In other words, it is expected that the tools are often used for looking back, to discuss learning activities that have been undertaken. They do not serve as a tool to look forward and to support employees in the planning of future learning activities.

Follow-up studies indicated that although PDPs are valid tools for performance appraisal, their power lies in supporting employees in their professional development. More concretely, the results of the studies indicate that the use of a PDP stimulates employees to reflect on the extent to which they possess the competences necessary for their job and on the learning activities undertaken to enhance the level of proficiency of the job competences. Furthermore, PDPs lead to a diagnosis of the gaps in job competences and stimulates employees to plan further learning activities.

These results imply that in order to make employees undertake learning activities and improve their performance by using a PDP, introducing and using the PDP as a tool for L&D is the most effective method. Finally, Beusaert and his colleagues investigated whether the level of implementation of a PDP influences its effects. The results of their study revealed that if the employee reflects on the PDP and learns from it and if the supervisor is perceived as motivating, the employee is far more likely to undertake more learning activities, show more expertise-growth and flexibility towards changing circumstances, and perform better. In sum, reasons for the effectiveness of the PDP as an 'Assessment as Learning' tool can be found in the way the assessment process is set up and organised and/or in the presence of various supporting process conditions (learning and reflection and a motivating supervisor).

## Note

- 1 [www.maastrichtuniversity.nl/education/why-um/problem-based-learning](http://www.maastrichtuniversity.nl/education/why-um/problem-based-learning)

## Chapter 7

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# A technology shift and its challenges to professional conduct

## Mediated vision in endodontics<sup>1</sup>

*Åsa Mäkitalo and Claes Reit*

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### Introduction

To become a professional dentist one needs to develop medical knowing and skills by working with the relevant materials and instruments and by enacting them in relevant circumstances guided by instructors with specific expertise. Professional discourse usually guides such practices when categorizing and distinguishing features of importance for the profession to recognize. As Goodwin (1994, 1997) has shown in his empirical cases of archeologists and geochemists, professional vision is accomplished through such interaction, shaping both action and perception by highlighting and articulating specific features of the relevant social and material environment. In the area of dentistry, students are oriented to spatial relationships, particular manners of moving the body and manoeuvring the instruments, when instructed how to perform treatments through careful, skilled and fine-tuned actions. They are also guided to distinguish and recognize auditory and tactile experiences in the immediate context of pursuing specific procedures (Weddle and Hollan 2010). Learning for the purpose of entering this professional field accordingly implies understanding and articulating what one can see and feel, how one can proceed during a treatment, and how to manage one's body so as to align with the design of the instruments in action.

According to Weddle and Hollan (2010) the imagery and metaphors used during students' training in dentistry suggest that, to participants, the boundary between body and tool is blurred. This observation resonates with a sociocultural account of learning where the notion of appropriation has been used to describe a process where the relevant tools<sup>2</sup> used in performing a particular action are increasingly mastered by, while gradually also becoming transparent to, the learner. Artefacts can be incorporated in action to the extent that they function as extensions of the body (see Bateson's example of a blind man's stick 1972:458–459). For a silversmith, for instance, loupes<sup>3</sup> extend vision beyond the naked eye, the engraving ball provides stability and the burin affords sharpness, force and precision when making an engraving by hand on a silver plate. When the coordination of body and tool is smooth, mind and means seem to merge in interaction with the environment. The reverse, however, is also possible. Our dependence on artefacts also

involves processes that ‘abolish and make unnecessary several natural processes, whose work is accomplished by the tool’ (Vygotsky 1981:139). While the latter might seem to suggest a view that entirely separates body from tool, this is not the case. Understood as a form of division of labour (or, in the parlance of actor network theory, as a form of delegation) this kind of relation between body and tool is instead characterized by other forms of interdependencies that allow some distancing from ongoing work. In both cases, the tools are co-constitutive of human activity as it unfolds in practice. Just *how* they are entangled in situated action is an empirical question that has implications for what it means to know and learn something within a specific professional domain. Taking these premises as a point of departure makes it relevant to explore learning and development of expertise within the field of dentistry at times when important shifts in technologies take place, since they challenge established professional conduct. From being competently attuned to one set of tools in professional action, one has to act smoothly with a set of new tools. Such *re*-mediation<sup>4</sup> of work implies that learning in the sense of appropriation is required among dentists, and that what constitutes professional expertise may need to be reconsidered and reformulated to some extent.

Drawing on a sociocultural and dialogical perspective this chapter will illuminate how a technology shift challenged professional dentists. The particular shift that provides the focus for our analysis is the introduction of the surgical microscope into endodontic practice.<sup>5</sup> A focus group discussion among professional dentists is analysed to explore the technology shift as an embodied experience of working. We examine how such experience takes shape through discourse when professionals share their individual accounts with each other.

## Visual technologies in endodontic practice

The interior of a patients’ tooth and in particular the preparation and treatment of the root canals used to be quite hard not only to visually share, but also to see. The dentist engaged in endodontic therapies still has to largely rely on tactile experience, even though guided by a set of tools. From using visual aids in the form of two-dimensional dental radiography, bright light, mirror and loupes, an important shift took place in the 1990s as the surgical microscope was introduced in this field.<sup>6</sup> As a tool for optical magnification, it mediates vision by increasing the size of an image on the retina offering a stereoscopic three-dimensional enlarged image (see Machtou 2010). In other areas of medicine, this visual technology is known to have created an entirely new work environment in which to pursue surgical procedures (Kim and Baek 2004).

In the field of endodontics the microscope has been claimed to increase the possibilities of ‘identifying fracture lines, locating minuscule canal orifices, and confidently determining anatomic variations in teeth and supporting structures’ (Bahcall 2008:876). In professional practice, such visible details are initially mapped and carefully considered, as they indicate what treatment is relevant to

a particular case and how one can proceed. The mapping accordingly constitutes an indispensable part of the relevant contextual ecology for professional judgement and accountability along with other material-semiotic resources (such as x-rays and medical records). The technologies used, however, are also intertwined with the [second part](#) of endodontic treatment, in an intricate manner, since not only professional vision but also the coordination of hand and gaze are dependent on how the tool mediates particular affordances and constraints for action. Expertise accordingly needs to be understood in terms of how dentists' earlier experiences merge or coalesce with the particular material-semiotic means and constraints available when pursuing a procedure. As Bahcall (2008:870) for instance notes: 'the hand can perform remarkably intricate micromanipulations as long as the eye can see a magnified field and it can be interpreted by the mind'. The question to explore further is how the concrete shift to using the microscope challenges established conduct, and what this implies in terms of learning among already skilled professional dentists engaged in endodontic practice.

## **Technology shifts and professional learning**

From a sociocultural and dialogical perspective, professional knowing and learning are conceptualized as emergent properties of engaging in social activity (Säljö 2009). Learning is conceived as emerging in situations where there is a gap between action and expectation that require alternative routes of proceeding with ongoing work (Mäkitalo 2012). When established professional ways of pursuing work are challenged *in situ*, gaps-bridging, meaning making and coordination of actions and perspectives are necessary to be able to 'go on' in ways that sufficiently maintain the integrity and quality of work. Professional vision in dentistry has, it is claimed, changed dramatically with the advent of the microscope. However, the embodied experience, the dexterity and precision needed when undertaking a procedure, and the delicacy of decision-making during the process have still not been articulated and systematically shared among professionals. In this study, the following questions were addressed with regard to this technology shift and the appropriation of the new tool:

1. How was the shift made sense of and established discursively among professional dentists?
2. How was the shift articulated as a challenge to embodied professional expertise?
3. How was professional conduct accounted for in the re-mediated work context?

## **Re-actualizing the advent of the surgical microscope: an empirical case**

This explorative study analyses a locally arranged focus-group discussion<sup>7</sup> with six specialist dentists led by a professor at their university clinic. The dentists at this clinic are responsible for endodontic treatment of patients as well as for providing

specialist education in their professional domain. The focus-group discussion was arranged to share the professionals' experiences of the shift, and how long they had used the microscope varied within the group. This kind of professional knowledge sharing had not been arranged earlier and it was regarded as important in order to be able to communicate what kind of challenges this technology implies in this professional field. The discussion was accordingly arranged so as to grasp the significance of the technology shift to achieve a more advanced and articulated development of competences in this field. The purpose at the special clinic was to articulate, discuss and document how their professional expertise was challenged and what new competences and skills they needed to develop as a consequence of the introduction of the technology. To harness such experiences was considered important in order to establish and articulate relevant and professionally grounded knowledge in their field.

The focus-group discussion was video recorded and the first author was given access and opportunity to analyse the material in more detail. As a communicative activity this focus-group discussion can be characterized as a rather 'informal, though topically focused, multiparty conversation' (Marková *et al.* 2007). This means that the moderator who acted as discussion facilitator did not intervene much in the discussion. He invited the group to discuss some questions and sometimes passed the initiative to the next speaker by using their first name or just through a pointing gesture. Such interventions were especially salient in the video material when the discussion seemed to have to come to a temporary standstill. The facilitator accordingly occupied a fairly withdrawn position and was careful when and how to moderate the discussion.

From the analytical perspective taken in this study, discussions like these are not understood as an arena for participants to simply display or express earlier experiences. Rather, such narration 'repackages experiential content into a form digestible not only to the experiencer, but also to an audience to whom the narrative is told and with whom, in the telling, new experiences are shared' (Murphy 2011:244). Such discussions are accordingly understood as opportunities for the participants to temporarily revisit the past, to remind themselves and each other of the technology shift by re-actualizing, noticing and verbalizing particular features of past events. Through such processes individual contributions in the form of narrated experiences, are interactionally and discursively co-constructed. This means that there is a potential to develop, establish and refine what may be considered as shared professional accounts. A dialogically informed analysis of such data has to consider the ways in which discourse is co-constructed through talk by the way questions are initiated and responses are delivered, how topics are established and how formulations are recycled and modified (Marková *et al.* 2007). Various discursive devices maybe used in the collective meaning-making process such as analogies, metaphors and metonymies. Also rhetorical discursive work (Billig 1996), such as contrasting, comparing and categorizing experiences, is often salient, and in such work the use of prototypical or deviant examples are drawn on to suggest or modify characterizations of earlier actions and experiences (Edwards 1997; Middleton and Brown 2005).

In the following sections, the results of the analysis will be presented. The first part will be more elaborate in terms of displaying how the discussion was initiated and how some of the recurrent themes were established through participants' co-construction. By presenting a longer excerpt it also provides some insight into the dynamics of this particular discourse event and how it was moderated. The second two parts of the result section will be presented without displaying utterances in their immediate dialogical context. As Markovà *et al.* (2007:205) note, topics are 'not arranged in a linear progression but emerge from past themes and project themselves into future ones'. So to convey some of the richness of the material, despite limits of space, excerpts that recycle initial themes and also contribute to the co-construction of shared experience by highlighting, articulating and specifying some aspect, will be presented.

### **Sharing first impressions**

The very first question, initiated by the moderator (Eric), has some rhetorically interesting features. It seems to be crafted to reframe the discussion and recast the situation that the dentists are currently engaged in. By discursively putting the respondents in a particular embodied position, the question formulation allows and invites them to revisit an earlier event and reactualize their first impressions of gazing through the microscope.

#### *Excerpt 1. Initial meaning potentials of the shift*

- 1 *Eric* if you think about the first impression you got when using it yourself for the very first time (.) how did you experience it uh shortly (.) we can start with paul when you looked down with your eyes there that first time what was your impression?
- 2 *Paul* It was the *light* especially as it was uh (.) you discovered pretty soon that it was difficult to work in high magnification (Eric: mm) but uh just that you got the light to where you wanted it was – it was so concentrated at the small area you were interested to see so that was it first and foremost
- 3 *Eric* Mmm what does Roy say?
- 4 *Roy* Yeah it was a *revelation* ((others giggle)) it was much easier to see while I was surprised how it actually looked in there (.) so definitely a step forward (Eric: mm)
- 5 *Eric* ((Pointing gesture to Lauren))
- 6 *Lauren* Uh I may well latch on there it was in a way *an entirely new world* that opened up cause earlier, you had more like felt what you did and then you looked to see if what I had done was what I thought I had done (.) ehm but that you could look *precisely* down there (.) I thought was very special (.) and then you didn't quite work in the same way as you do *now* since it took a while to get these frames of reference (.) and what we got in ((mentions a small town)) was only

*how to set up* the microscope so we had no guidance of what to see (.) so there you in a way had to come up with your own picture of the reality you *then* thought was correct

7 *Eric*

Mm mm then Amy

8 *Amy*

Ee I started using the microscope here about a year ago and it was (.) first, it was very nerve-racking, I thought it would be *great fun* but (Eric: mm) I actually thought it was very (.) *hard to see* anything in the beginning to get some sharpness and you get a little dizzy in the beginning as well so the expectations were probably a bit higher than what I got out of it but after a period, it was, as you say it was a very nice revelation

((A few lines omitted))

9 *Eric*

Mm good (.) Annie

10 *Annie*

I'll have to agree with this it was like a new world (.) and before when I worked with loupes one thought one had good vision but after starting with a microscope I almost never use loupes or – you end up being like dependent (.) it's difficult to be without it, I sort of use the microscope when putting on the rubber dam now ((laughs)) I use it *all* the time almost (.) no but you end up using it more and more and so I think you feel as if you see much worse without it now than you did before (.) then you thought that you had pretty good vision without a microscope, but you don't think that any no longer (.) at least I don't

11 *Eric*

Mm Brian what about you?

12 *Brian*

As I remember it I probably thought it was quite difficult in the beginning to be honest and so I agree that you saw things you hadn't seen before and you realized the clear benefits if you were looking for canals and things we're often doing here

The responses to Eric's invitation are guided by metaphors and analogies which are rich in terms of meaning potentials and, as such, easily shared with others. Through Paul's first response 'it was the light' (2), which has several meaning potentials in this context of narrating experiences, the uptakes of other participants in the group in the form of the associated metaphor of 'a revelation' (4) and the analogy to 'an entirely new world' (6 and 10) are quickly established. As the response from Roy (4) is delivered with a hint of self-distance and humour, the joint giggle which immediately follows seem to be a significant marker of some at least partially shared professional experience. As we shall see in the following, the metaphors and analogies established in the very beginning of the discussion are very rich in meaning potentials. They serve as productive discursive means by inviting the introduction of a set of relevant themes which are later explored and specified during the discussion. So, even though 'the light' might have been understood by Paul simply in terms of a technical feature of the microscope that

enables enhanced vision, the connotations which are immediately recognized by the others when responding to it as a metaphor eventually seem to say something more substantial about what the technology shift means to these professionals.

While there seems to be a strong shared sense of enhanced vision provided by the light and the magnification as specific features of the technology, appropriation is also described in terms of how work is now pursued from new premises. On the one hand the dependence on the new tool is brought to the fore as well as a noticeable shift in one's own standard of what is considered 'good vision' (10). However, there are also first experiences formulated in terms of hardly being able to see anything (8) which are also established at this early stage in the discussion. These accounts relate to difficulties of knowing how to adjust the technology and how to attune to it, to optimize visual acuity.

Another interesting chain of association brought about from the very first response in this discussion is 'the light' as something which could be manoeuvred 'to get it to where you wanted it' (2). This response is also productive in teasing out professional experiences of discovering what is considered a new environment or work context. By sharing the experience of being 'surprised how it actually looked in there' (4) a chain of associations are made possible and here in the beginning of the discussion it is picked up through the analogy of 'an entirely new world' (6) in which 'you saw things you had never seen before' (12). Having articulated this through discourse it becomes publicly noted and shared in the sense that it can be picked up and returned to later in their discussion. The technology shift is here also made sense of as a challenge of orientating oneself in the new environment, since what you saw required new 'frames of reference' (6). Such references were accordingly not described as readily available but had to be established. As Lauren explains, you had to come up with 'your own picture of the reality you then thought was correct' (6).

In the following excerpts, we will further explore these themes by attending to instances when they reappear as part of professionals' accounts later in the discussion. In these excerpts, the themes are recycled and some are further specified through individual accounts of the experiences of the shift. We will focus on how the professionals describe their experience of working with the microscope, and the gaps that emerged that seemed to significantly challenge their professional conduct.

### ***Making sense of the shift through contrasting experiences***

A prominent discursive feature of the discussions among the professionals was the use of contrasts when sharing experiences of the shift. Such contrasting work makes salient distinctions that are important in rendering experiences comprehensible (Edwards 1997; Middleton and Brown 2005). The contrasts were most prominently established by means of distinctions of time, before and after the technology shift, highlighting the importance of that particular shift in their respective accounts of earlier events. Excerpt 2a–c illustrates some ways in which this distinction was productive.

*Excerpt 2. From tactile to visual guidance*

- 2a *Lauren* Earlier, you had more like felt what you did and then you looked to see that what I had done was what I thought I had done
- 2b *Brian* I remember that before it was pretty much a guessing game (.) then you had that experience but it was very much more to feel and try /.../ the difference is that now now you can see what to try and feel, that was not the case before (.) then you sort of tried to feel like everywhere until you found something to go on
- 2c *Lauren* I don't really have that sensibility today /.../ maybe when you feel with the probe but then what you see is still the guiding principle 'cause I don't sit and feel my way about (.) I rely very much on visual impression

The distinction between time before and after the technology shift is frequently used in the narrations of personal experiences to highlight and formulate relevant changes retrospectively. Through participants' contributions, patterns of common experiences are established as a result of being in dialogue with the others, in responding to and acknowledging others' experience and by recycling earlier formulations. The above excerpts illustrate that the professionals understand the shift as a change in sense modality and approach: from having 'to feel' in order to orient oneself in the root canals of the patient, to relying upon one's vision as the prime orienting device. It is interesting to note that professional action in the form of searching for root canal orifices is described retrospectively in terms of fumbling, feeling and trying your way about. After the shift, professional conduct in terms of feeling and trying are still highlighted as being at the core of professional action, but now such action is guided by vision. The visual support provided by the artifact seem to also bring additional experiences of the shift to the forefront of the discussion, such as that of diminished feelings of insecurity as well as increased dependence on the microscope when performing endodontic treatments (as was initially noted by Annie in Excerpt 1, 10).

***Challenges to professional conduct and the attunement of re-mediated action***

As contrasting experiences like these are elaborated among the professionals, the gaps and challenges to professional conduct that emerged when working with the microscope are also brought forward in their discussion. When looking through the discussion, there seem to be several gaps to bridge before attunement with the technology can be achieved. In the following, the challenge to professional conduct initially, formulated as 'difficulties to see', were salient as three related topical trajectories. While all the following examples (Excerpts 3–5) are oriented to gaps that are articulated as emerging when they started using the specific technology in action, in this set of excerpts the professionals further specify what can analytically be distinguished as emerging gaps: a) in perceptual orientation, b) in physical coordination and c) in managing technical features when interacting with the microscope.

*Excerpt 3. Perceptual re-orientation in the visual field*

- 3a *Paul* You discovered pretty soon that it was difficult to work in high magnification
- 3b *Brian* To like get what was mesial and distal and palatal and buccal (.) in what direction you were looking (.) I thought that was quite difficult in the beginning as I remember it
- 3c *Paul* You lose you lose the big picture (.) you have to have to see the whole crown when searching for canals for example
- 3d *Lauren* You couldn't work quite in the same way as you do now eh it took quite a while before you got these frames of reference

In relation to the professionals' articulated first impressions, the experiences accounted for at this stage in their discussion, were clearly not described simply in terms of enhanced vision. When accounting for the concrete experience of actually working with the microscope, the details provided make salient some distinctive features and premises of *achieving* enhanced vision. Such vision is, in the professionals' accounts, heavily dependent upon how they succeed in interpreting a visual field that is magnified and in which they are to operate. This difficulty seems to be one of perceptual re-orientation in what is conceived as an entirely different environment. The appropriation of the tool as a visual mediating means, however, is not described as confined to this kind of perceptual re-orientation. Rather, the way such challenges 'go beyond the skin' are also made salient in their accounts.

*Excerpt 4. Physical coordination of hand with vision*

- 4a *Lauren* It's a bit difficult to know how to do this before the brain learns to flip the images (.) you want to go to the right, but whatever I do the arm goes in the other direction (.) I can still get this at times if I start thinking about it then it's chaos and you might just as well quit and start from scratch and try to just disconnect from how to do it and to switch on automation
- 4b *Brian* It's a bit tricky, 'cause your movements are a little big / ... / before you learn as I did that you can start in low magnification and then, if you need a little more, go up so you don't start too big too large 'cause then it's very easy to see something just waving in front of you without having a clue of what's happening
- 4c *Lauren* But on the other hand you dare, once you get the left and right in order when you're working, you dare to go on a little faster

The experiences of re-orienting perceptually is accordingly further articulated in terms of extended embodied action which includes physical coordination (in this case it is articulated as a gap in the coordination of hand and gaze). As Bahcall remarked 'the hand can perform remarkably intricate micromanipulations as long as the eye can see a magnified field and it can be interpreted by the mind' (Bahcall

2008:870). We can now begin to understand what kind of appropriation process is required when shifting to this tool. It seems to include the entire embodied realm of professional action. At the very early stage in the discussion only Amy made salient her experiences of hardship and as being still in a stage of transition when it came to the adjustment and precision work needed to achieve visual acuity. The kind of micromanipulations that are made possible through this visual technology are, according to these professionals, not only dependent on sharpness of vision. The kind of appropriation accounted for seems to be an attunement with the mediating tool that is both extensive and very specific in character:

*Excerpt 5. Managing technical features when interacting with the microscope*

- 5a *Amy* It was very difficult how you would manage to sit and how to set and adjust it, and I found it was- I don't even know if I'm doing it right
- 5b *Paul* It's mostly in the eight-times magnification you work then, so if you search for canals and want to look at something special down the canal you might go up a little bit then
- 5c *Brian* It was hard just like Amy says to find that which gave you a good really sharp picture (.) before you learned some tricks that you could fix with the focus a little bit and adjust it really well it was hard to get a really good picture
- 5d *Roy* I find it ((the depth of field)) very rarely to be a problem maybe when patients are moving (.) most are very alert so you position them and then you will sit and adjust the focus it's so easy to just move it up and down

As we have seen in this last set of excerpts not only are the body and brain described as in need of adjustment to merge with the technology in action. As already noted the microscope as a physical artefact also needs some fixing and adjusting to match with personal requirements and ways of working. Here tricks of the trade are shared such as how to adjust magnification while performing certain actions. As a mediating device the microscope, however, is also used in interaction with a patient and needs to be adjusted, not only for the sake of good vision per se, but also in relation to the patient's movements.

***On new affordances and potential for knowledge development***

The tricks of the trade that were shared and discussed in Excerpt 5 were related to a set of further concerns. One such concern was ergonomics – how one needs to position one's own as well as the patient's body – and what it could imply in terms of one's well-being compared to earlier modes of working. In addition, reduced possibilities of checking on how the patient is doing and being able to interact

during endodontic procedures were raised as concerns. The potential of engaging the assistant nurse to be more proactive in collaboration with the dentist was briefly mentioned as a potential area of development to maintain the quality in these areas of professional conduct. Towards the end of their discussion the moderator asked the group to reflect on the advantages of the microscope and how its current impact on endodontic practice can be understood from their experience. Below only some of the quite elaborate uptakes of this question are summarized by the participants.

#### *Excerpt 6 Summing up advantages*

- 6a *Eric* What are the the biggest advantages with it then (the microscope) 'cause it's obvious it has had a tremendous impact in the area of endodontic practice
- 6b *Annie* Safer a safer treatment for the patient and more control of what you do
- 6c *Lauren* Much better precision
- 6d *Paul* It's a great satisfaction to see what you are doing
- 6e *Lauren* It would never be possible to go back and feel that you are doing a good job when you know what you can look for (.) these extra canals and different canal forms that you cannot see unless you look down
- 6f *Paul* But we also see quite many fracture lines and we don't know what that means eh for example (.) we get information that we really don't know how to deal with

The question posed is productive as the participants start summing up some of the most prominent features of working in the re-mediated visual environment that has been elaborated throughout their discussion. While feelings of increased security, control and precision and of 'doing a good job' are very salient in the professionals' accounts, we can also note that Paul returns to one of the first impressions that were established at the beginning of their discussion – that of discovering fractures to an extent that might call for re-interpretation. This issue is carefully re-introduced and hence brought back into professional consideration without further discussion. It seems to merely function as a reminder of a concern yet to be dealt with. The experience of discovering unidentifiable things could be challenging in terms of professional judgement. These concerns about not knowing how to interpret new information provided through the use of the microscope incorporate potential for future development of medical treatments and knowledge in endodontic practice.

## **Conclusions**

Through our analysis of the professionals' accounts we have recognized the process of appropriation as a new tool, the surgical microscope, was increasingly mastered by and gradually transparent to the learner. We have also learned something more

substantial and particular about what such a process involves. At a general level we notice that the appropriation of the artefact did not establish a division of labour between tool and body that distanced the professional from the work to be performed. Instead this appropriation process seems to imply that mind and means need to merge in interaction with the new environment. The discussion among professionals made salient a context of professional action that was re-mediated and described a different coordination with the environment – perceptually, cognitively, technically and physically. The most salient experience of the shift, was not the tactile, kinaesthetic or proprioceptive experiences that the professionals described, nor was it *what* they were able to see. Instead, we argue, the shift seemed to constitute a visual re-location into a new spatial environment which radically altered the experiential context. While the dentist takes the opportunity to describe how to explore and work in this re-mediated environment, pursuing the task deeper into the root canals, other important details and contexts for action seem to be backgrounded. The established practice of interacting more intimately face-to-face with a patient during a procedure, closely following cues and reactions, for instance, is mentioned only to a minor extent. The way that mind and tool merge in interaction with the environment accordingly seem to create a form of distance from the patient. With the surgical microscope the dentist is instead able to visually experience the tooth ‘from within’ and from this spatial position other potentials of mapping ‘the terrain’ and deciding on relevant treatments become salient. If visually shared among professionals, a space-related body of professional knowing may accordingly develop over time. We, however, note that their accounts of tactile expertise on the other hand risk becoming too reduced in significance. This established expertise of mapping and exploring is not only backgrounded in the professionals’ accounts but even downgraded, and in some cases even described as trivial.

With technology shifts, new conditions for professional conduct emerge which will have implications for how expertise is enacted and understood. As has already been pointed out, the professional experience of setting a new standard for oneself of what counts as good vision after the technology shift potentially incorporates new considerations in terms of what counts as professional expertise and what requirements of professional conduct the future might bring. *In situ* such expertise is challenged in response to the features and affordances of the technology-in-use, but significant shifts will most likely also shape the normative expectations of what constitutes expertise within the specific domain. One aspect that is important to consider is whether professional accountability concerning patient safety, more explicit forms of decision-making and options for treatment, precision and efficiency, ergonomics and other important issues will possibly, on a longer term basis, be regulated on the basis of what is established as the expected standard among professionals.

## Notes

- 1 This research has been funded by LinCS, a national centre of excellence for research in the area of learning, interaction and mediated communication, and by the University of

- Gothenburg LETStudio in collaboration with the Department of Odontology at Sahlgrenska Academy.
- 2 The notion of tools and material-semiotic means are used interchangeably and refer to language or any other cultural artefacts that co-constitute human activity. A sociocultural perspective resists the common distinction between ‘the material’ and ‘the semiotic’.
  - 3 This refers to a small magnification device commonly used by engravers, jewellers, watchmakers and dentists.
  - 4 In a sociocultural perspective re-mediation means a shift in the way that mediating devices regulate coordination with the environment. Such shifts imply a qualitative re-organization of action and perception in culturally established activities.
  - 5 Endodontic means ‘within the tooth’ and refer to treatments of the root canals, the dental pulp and its supporting structure.
  - 6 According to Kim and Baek (2004) it was introduced in otolaryngology around 1950, and to neurosurgery in the 1960s.
  - 7 Unlike many other focus-group arrangements, these discussions were not arranged in order to retrieve different opinions and ideas on a particular matter from different perspectives.

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# 4

## CROWD WORK AND COLLECTIVE LEARNING

*Jeffrey V. Nickerson*

When large numbers of otherwise unconnected people are assembled for the purpose of performing a task, they are performing *crowd work*. Crowd work is disruptive and this disruption may have both positive and negative consequences for the development of professional skills. Since crowd work is young, its processes are still malleable: there is opportunity to design the organisations and processes that will facilitate individual and collective learning.

How is crowd work different? Traditional workplaces foster long-term relationships between workers and employers. Within these long-term relationships, there is ample time for workers to be trained. By contrast, when crowds are assembled to do work, the relationship between employers and employees may only last as long as it takes to accomplish an individual task. While there is precedence for brief employment relationships in temporary work, day labour and piecework (Callaghan & Hartmann, 1991), crowd work allows substantially shorter engagements: many tasks hosted by sites such as Amazon's Mechanical Turk ([www.mturk.com/mturk/welcome](http://www.mturk.com/mturk/welcome)) can be completed in minutes (Ipeirotis 2010).

Then, professional learning in crowd work appears incongruous. It seems obvious that crowd workers must bring already developed skills to such short work engagements. However, even though individual engagements may only last minutes, full-time crowd workers perform many thousands of tasks during a year and they wish to work on tasks they are good at. Moreover, employers wish to hire the best-trained workers they can. So there is a place for improved ways of building skills: employers need to find workers with certain kinds of expertise and workers want to acquire specialised expertise that will lead to more satisfying and better paying jobs.

How are tasks performed? In the prototypical example of crowd work, an employer makes a request through a *crowd work platform*, a system that manages

the work process. Workers come to the website to look at a list of tasks and decide which task to perform next. Once the task is completed the workers move on to other tasks, sometimes from the same employer, sometimes from other employers (Kittur, Nickerson, Bernstein, Gerber, Shaw, Zimmerman *et al.*, 2013; Malone, Laubacher & Dellarocas, 2010; Quinn & Bederson, 2011).

Many tasks are repetitive, but demand human cognitive skills. For example, workers are asked to label images, or transcribe recordings. In one analysis of crowd work on Mechanical Turk, four of the ten largest employers were posting tasks related to either categorisation of content, or the transcription of audio (Ipeirotis, 2010). Four employers were asking for either content modification (summaries of existing content) or content generation (creation of reviews, blogs and articles) and the other two were crowd service resellers, who provided quality control for employers.

Transcription and categorisation tasks are *convergent tasks*, meaning that the employer seeks a single solution. Content generation, by contrast, is accomplished through *divergent tasks*, as employers expect to see many different outputs. Later sections will describe the kinds of learning that are possible with respect to these two types of tasks and report on the current state of market experimentation and academic research.

## History

The term *crowd work* (Kittur *et al.*, 2013) is related to *crowdsourcing* (Howe, 2008). *Crowdsourcing* is a combination of the terms *wisdom of the crowd* and *outsourcing*. It is defined as a process in which strangers are assembled to accomplish a task. Usually crowdsourcing involves breaking problems down into very small pieces and then assembling the outputs. This kind of breakdown into micro-tasks echoes the work of Taylor, the founder of scientific management. Taylor (1911) advocated a separation between the design of tasks and the performance of tasks. By breaking down tasks into small units, he showed how work could be reorganised to increase worker productivity. Taylor's ideas, however, led to excessive optimisation that put factory workers at physical risk and gradually gave way to more enlightened work practices (Littler, 1978).

Distressingly, current crowd work seems to be at the early stages of recapitulating factory employment practices. The machine-like nature of crowd work has led to another term to describe the same phenomenon: *human computation* (von Ahn, 2009). From this perspective, tasks are split up into sub-processes, as if to be accomplished by computational nodes on a network. But instead they are routed to nodes that perform human cognition: that is, they are routed to people. The results are aggregated by computers. Thus, humans provide services to the computer. The concept of human computation is not entirely new: in the 1930s, tasks that today are accomplished by computers, for example, calculating log tables, were accomplished by large rooms of people, each

performing a particular arithmetic operation that, when combined, produced the desired result (Grier, 2005). Such calculations are today performed by computers. But perceptual tasks that are still best accomplished by humans – for example, transcribing audiotapes – are crowdsourced.

For some of these tasks, no special expertise is needed. One set of workers will make errors in one direction and another set will make errors in the opposite direction. The modal answer (or the average or the median) is likely to be correct. Galton (1907) showed groups do a good job of estimating, most likely because of the cancellation of errors. Other research has found similar results in a variety of different contexts (Gurnee, 1937; Wagner & Back, 2008). This phenomenon is sometimes referred to as the wisdom of the crowd (Surowiecki, 2005) and the mechanisms through which it works are the subject of current research in economics (Page, 2012).

If this phenomenon were universal, no training or special skill would be necessary: the results of the crowd could be aggregated and errors would cancel out. Yet for many tasks, especially divergent tasks, it is obvious that expertise is needed. For example, when Innocentive ([www.innocentive.com](http://www.innocentive.com)) asks the crowd to design a new solvent according to a specification, an understanding of chemical structures is presupposed. In addition, more than one design may fulfil the specification, so there may be no modal answer. Even with respect to convergent tasks, training will have an effect on the time it takes to perform work. For example, if asked to identify hate speech, novices might not understand the different criteria for classification and might need to answer a set of very specific questions, but, after performing many such tasks, the same workers, now more expert, should be able to recognise the phenomenon directly (Ipeirotis, 2012). Thus, expertise and its development is an important aspect of any crowd work practice, the next topic to be addressed.

## Crowd Work Practices

Crowd work today is an activity that is electronically mediated, usually through a website – more generally, a crowd work platform. The platform forms an exchange: employers post tasks and workers select tasks that they are willing to perform. The platforms fall into three main categories.

The first type of platform provides a general-purpose clearing-house for micro-tasks. Amazon's Mechanical Turk is the largest of these platforms (Ipeirotis, 2010; Ross, Irani, Silberman, Zaldivar & Tomlinson, 2010). The site aggregates tasks; workers select from a long list of tasks being offered. Amazon receive payment from employers through credit cards and Amazon manages the dispersal of micropayments to workers. Amazon maintains the anonymity of workers with respect to the employers and allows employers to also preserve anonymity. But Amazon provides no special training; responsibility falls to the employer to provide it or not. Similarly, Amazon does not perform quality control on specific tasks.

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However, the Mechanical Turk platform provides some overall reputational history, recording the number of times that employers refuse to pay a particular worker, presumably because of quality issues, thus encouraging workers to perform well in order to keep their reputations strong.

On the second type of platform, payment is in the form of a contest reward. For example, Innocentive provides a platform for such contests: companies sponsor contests through the site (Brabham, 2008; Lakhani & Lonstein, 2011). Innocentive offers three tiers of contests, with awards ranging from about \$2,000 for the lowest tier to above \$100,000 for the top tier. Innocentive invites workers to form teams and compete; the competitions often last months. Many of the contests on Innocentive are related to chemistry, a specialisation of the site. Innocentive probably attracts workers with appropriate background experience, but it is also possible that teams, once constituted, find that they need additional expertise and train themselves. Innocentive's model is competitive: each team competes against other teams and cannot see the other teams' work. Topcoder ([www.topcoder.com](http://www.topcoder.com)) has a similar model for tasks related to programming. There is an alternative contest model: Matlab sponsors contests in which participants can build on the entries of others (Gulley, 2001). The last real improvement before the deadline receives the prize. Thus, there is a kind of open and collective learning that takes place: everything is visible and so all workers can learn from each other.

A third type of platform matches skilled workers to employers: an example of this type is oDesk ([www.odesk.com](http://www.odesk.com)) (Caraway, 2010). Engagements hosted through oDesk are typically on the order of a few days, as opposed to the few minutes of Mechanical Turk or the few months of Innocentive. Employers using oDesk see resumes and select workers on the basis of past work and on certification tests that oDesk administers. Workers on oDesk are usually paid by the hour. Because employers are unsure how to monitor such hourly work, oDesk provides a way to watch the workers as they engage in tasks: screenshots of the workers' computers are sent to the employer, providing a form of supervisory control similar to patrolling an office.

In sum, the market for *paid crowd work* can be segmented based on the method of payment: by piece, by contest award, or by hourly wage. By contrast, *unpaid crowd work* relies on volunteer effort. A large subset of this work is referred to as *Citizen Science* (Wiggins & Crowston, 2011). For example, GalaxyZoo ([www.galaxyzoo.org](http://www.galaxyzoo.org)) calls on volunteers to help classify objects from radio-telescope images (Raddick, Bracey, Gay, Lintott, Murray, Schawinski *et al.*, 2009). The tasks are short-term, much like those on Mechanical Turk, but the labour is unpaid. Participants are first trained in how to recognise galaxies and then are provided images to classify. An application called Foldit (<http://foldit/portal>) also appeals to those interested in volunteering time toward scientific discovery (Cooper, Khatib, Treuille, Barbero, Lee, Beenen *et al.*, 2010). Foldit is designed to be played as a game: participants attempt to find new ways of folding proteins. Just as in arcade style games, there are different levels. Once a simple level has been cleared,

participants are given more challenging problems and eventually receive challenges for which scientists are actively seeking solutions. However, not all unpaid crowd work is related to science. For example, a site called DuoLingo ([www.duolingo.com](http://www.duolingo.com)) (von Ahn, 2013) provides a method through which those seeking to learn a language may engage in translation exercises and receive feedback from native language speakers (Garcia, 2013). The site serves two purposes: to teach language and to translate Wikipedia content into many different languages.

Game-related sites such as DuoLingo and Foldit provide training explicitly and they attract crowds because the sites are fun to use and the tasks are appealing: learning a language because it is a practical need for many and folding proteins because it presents a visually interesting puzzle. However, many of the tasks that employers offer the crowd are not inherently as interesting. Employers are faced with the problem of determining the skills of existing workers and, if the skills are lacking, training those skills. Workers are often not clear on which skills are important to learn and how to learn them. While many industries have standard tests that can be used to evaluate worker skill levels, the crowd work industry does not yet have such standards (Ipeirotis & Horton, 2011). More generally, there are gaps in the current crowd work industry related to training (Kittur *et al.*, 2013). What can be done to increase the amount of learning that takes place in this emerging industry?

## Individual and Collective Learning

Learning will be considered on three levels: the individual, the organisation and the industry as a whole. At the individual level, it is possible that crowd workers will train themselves. In particular, entry-level workers learn that without experience employers are less likely to hire them and may realise that crowd work provides a way to acquire early job experiences (Pallais, 2011). Qualification tests can be taken on sites such as oDesk and these tests may increase the chances for employment. Moreover, there are an increasing number of online resources for building skills – for example, online tutorial sites such as Codecademy.com for software development and massive open online courses such as powersearchingwithgoogle.com for search skills. These can be used to build resumes that may increase employability and wages.

But employers may need to provide their own, more specialised training. For example, an employer may wish the crowd to assess the categorisation of its products on a website and for this, some information on products and categories may need to be conveyed. Since workers are only engaged with the employers for short amounts of time on each task, employer-sponsored training should ideally be brief, otherwise the cost of training may drive up the overall task-cost too far. Training performed by the platform companies such as oDesk can be lengthier, because tests may be used as qualification criteria for the better-paying jobs. In either case, for simple close-ended tasks, workers are trained in a straightforward manner. Workers are briefly given training examples and provided feedback on

correct and incorrect answers. These tests lead to several outcomes. Workers performing poorly will either be screened out of future work, or encouraged to repeat the training. For most workers, the examples may help clarify the meaning of task instructions. Workers are sensitive to the distribution of the training sets: more uniform distributions result in better quality results later (Le, Edmonds, Hester & Biewald, 2010), perhaps because workers become overly sensitive to the base rates of test data. Thus, such tests need to be carefully designed and calibrated.

The problem of test calibration can be avoided by using crowd work supervisors, who can answer questions and monitor the quality of workers, providing feedback where necessary (Kulkarni, Gutheim, Narula, Rolnitzky, Parikh & Hartmann, 2012). This kind of supervision is like supervision in traditional workplaces: managers, who are skilled at the tasks, can help new employees become better, can diagnose error patterns and can recognise deceptive behaviour if it occurs. Training in such situations is likely to be more informal, with less and less frequent interventions as workers become proficient.

A third technique is more formal: computers monitor the work and provide online tutoring (Nallapati, Peerreddy & Singhal, 2012). This trains workers and improves the results. The monitoring of the work often has an additional purpose: teaching the computer. That is, classifications performed by people provide labels that machine learning algorithms use in order to increase accuracy (Callison-Burch & Dredze, 2010; Gingold, Shamir & Cohen-Or, 2012; Sorkin & Forsyth, 2008). In other words, computers help people learn and people help computers learn. Looking down the road, if people help computers learn to classify content, eventually the tasks may become fully automated.

While it may seem inevitable that convergent tasks, such as categorisation, will yield to automation, divergent tasks, such as idea generation, are qualitatively different and are arguably harder for computers to perform. Because there are often no right answers, it is also harder to evaluate and train workers engaged in such tasks. Training for open-ended questions in crowd work, as in any form of creative work, relies on feedback (see Oldham, Greg & Cummings, 1996). Is such feedback effective? An experiment was performed on a content generation task: workers were asked to generate consumer reviews of products they owned. Crowd workers were placed in three training conditions: with no feedback, with self-assessment and with expert assessment (Dow, Kulkarni, Klemmer & Hartmann, 2012). Quality of the work output improved with both self-assessment and expert assessment. With respect to learning, the self-assessors produced better work as time went on.

In all cases, the assessment processes led to higher drop-out rates among the workers, that is, more workers chose not to perform the task. So the effectiveness of the process is probably related to both selection (only motivated workers engage) and learning (these motivated workers build skills over time). From the perspective of an employer, both factors are important: tests that screen out those who are unmotivated or unskilled increase overall quality and allow training efforts to be

focused on those most likely to benefit. The study suggests a two-pronged approach to training the crowd for open-ended tasks: providing workers with frequent self-assessment by other crowd workers and less frequent evaluation by experts, as a way to help these workers learn.

Content-generation tasks present other issues for employers. Whereas convergent tasks funnel the activities of many people into one output, divergent tasks produce many outputs and these outputs need to be evaluated by other people. Companies who solicit ideas are often deluged by recommendations and faced with the time-consuming process of evaluating these recommendations (Jouret, 2009; Westerski, Iglesias & Nagle, 2011). This is a learning problem at the level of the organisation. That is, the company engaged in open innovation is attempting to learn from the suggestions of the crowd. Organisational learning consists of a kind of search: companies explore looking for new ideas and balance costly exploration with exploitation, in which successful ideas are incrementally modified to build knowledge (March, 1991; Dodgson, 1993). Exploration can be hard for organisations to accomplish internally, because processes inside an organisation may bias towards exploiting current success (Clow, this volume). And so companies sometimes turn to the crowd.

How can crowd-based exploration be managed? Workflows can be designed that mimic biological evolution. Such evolutionary workflows, performed by computers, have been used to solve a variety of design optimisation problems (Goldberg, 1989; Holland, 1975). Humans can, in theory, use such structures as an organisational principle (Kosorukoff, 2001), but a large amount of effort is needed. Crowds can supply such effort. For example, crowd members can generate designs and other crowd members can evaluate these designs. Then pairs of designs can be chosen and given to other crowd members, who combine them. Generation by generation, the designs can improve through a process that includes selection, modification and recombination. Modification and recombination generate variety and selection culls the unsuccessful experiments (Yu & Nickerson, 2013). Through such a process the organisation can learn. The organisation acquires the ideas and remembers them (Lasecki, White, Murray & Bigham, 2012).

This evolutionary metaphor can also operate at the industry level. That is, the overall conjunction of employers, workers and platform companies can also learn. This industry-level learning is sometimes called population-level learning (Miner & Robinson, 1994), because companies in an industry can be seen as members of a population: companies are formed, they grow, they merge with other companies and they dissolve. Overall, the industry should prosper, as workers take ideas from company to company, these ideas are combined and better ideas flourish. The crowd industry, however, is different from many other industries, in that employees are extremely mobile: they can work for multiple companies in a single day. This dynamism may lead to a faster form of industry evolution.

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This dynamism argues for standardisation, so that skills and experiences become portable across platforms and employers and so that successful processes are collectively learned (Capello, 1999; Ipeirotis & Horton, 2011; Kittur *et al.*, 2013). Such standardisation should reduce search costs for both workers and employers. Moreover, clearer standards should increase the quality of overall work and create market forces that will allow for a wider range of wages, which currently form a low and narrow band.

## Final Thoughts

While, currently, most crowd work is performed by individuals, there are a growing number of tasks that are being performed by groups (Ipeirotis, 2012). For example, the better-compensated crowd tasks, such as the contests sponsored by Innocentive, are usually accomplished by teams. Crowd work is an open form of work in that its participants are not constrained by geography, commuting, or time zone and it tends to rely on independent workers. But the social aspects of work may be reintroduced as employers and workers engage in industry-wide learning. In particular, issues related to distributed work (Bietz, this volume) may impact crowd work. Interactions between workers and between workers and employers, may increase (Sloep, this volume). How might this occur? Crowd workers may co-locate, as illustrated by the recent emergence in San Francisco of crowd workplaces, physical locations where crowd workers gather (Hardy, 2011). This in turn will present new opportunities for instruction and peer learning that involve not only mediated, but also face-to-face interactions.

From a societal standpoint, there are many important ethical issues in the proliferation of crowd work (Silberman, Irani & Ross, 2010; Zittrain, 2008). On the one hand, sourcing to crowds makes it possible for employers to merely select for particular skills and avoid responsibility for training, for providing a living wage, for worker satisfaction, for benefits. On the other hand, crowd infrastructure makes it possible for many talented individuals, regardless of location or socio-economic status, to become noticed, participate in work and gain reputation. What ought we to do? We should design forms of crowd work that encourage people to learn, that create ladders of opportunity based on skill.

## Acknowledgments

This material is based upon work supported by the National Science Foundation under grants IIS-0855995 and IIS-0968561.

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