Toward a Model of Workforce Training and Development

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Abstract: In the modern, ever-changing world, both employers and employees are struggling in keeping their competitive advantage. Previous studies have recognised that both formal instruction and informal learning are needed to gain and maintain competence. The famous 70-20-10 model states that only 10 per cent of learning occurs during the formal instruction. The challenge for the organisations is how the formal instruction can and should be provided to employees. In this paper, we constructed a model of Workforce Training and Development (WOTRA), based on the current learning theories, modes, methods, and models. WOTRA can be used by both employers and employees to choose an adequate mix of learning modes and methods to achieve their learning goals.

1 INTRODUCTION

In the modern world, where the speed of change is higher than ever, employers are struggling in keeping their employees' skills current. Similarly, the employees are concerned about how to gain and maintain the right competence to remain compelling in the labour market. The answer to both concerns is workforce training and development (T&D).

There are three recognised ways to provide T&D: *formal* and *non-formal* instruction, and *informal* learning (Commission of the European Communities, 2001). The formal instruction, also known as traditional instruction, refers to learning typically occurring during instruction provided by an education or training institution. Formal instruction is structured and often aims to certification or a degree. Non-formal instruction is similar to formal instruction learning, except that it is not provided by an education or training institution, and it does not lead to a certificate or a degree. Learning in both formal and non-formal instruction is conscious, i.e., intentional. Informal learning, on the other hand, is not structured: it means learning from daily life activities related to work and leisure. As such, it is not instruction *per se*, and the learning is not conscious as it "happens" without intention.

Traditionally, education institutions have provided education that satisfies the needs of the labour market. Currently, there is a gap between formal instruction and the labour market: education institutions are not able to provide skilled employees (World Economic Forum, 2017). To narrow this gap, employers have been forced to rely on non-formal instruction and informal learning.

Informal learning alone, however, is not sufficient to develop and maintain competence. Besides the practical knowledge gain through informal learning, also the theoretical competence from formal or non-formal instruction is needed (Svensson, Ellström, and Åberg, 2004). Theoretical and practical knowledge together enables learning by reflection which, in turn, develops the competence as illustrated in Figure 1.

It should be noted that learning at work is not categorically informal (Billett, 2002). Also formal and non-formal instruction can be used at work. The challenge is, how the formal and non-formal instruction can and should be provided to the workforce?

In this paper, we introduce our preliminary model for workforce training and development (WOTRA). The model is based on the current learning models, methods, and modes, as well as on the organisational learning theories.
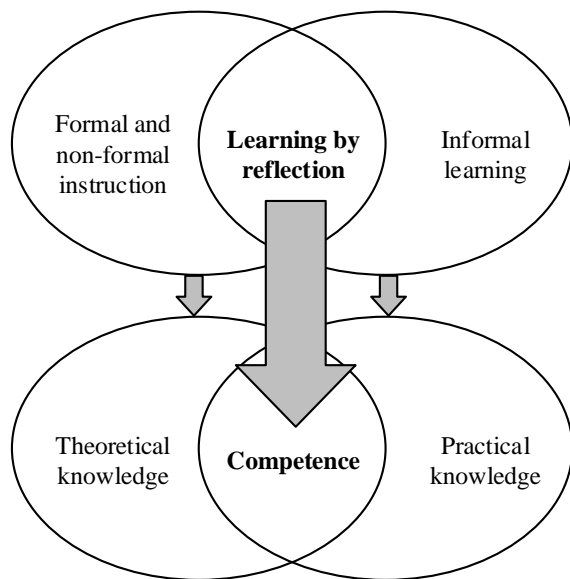
Figure 1: Learning by reflection leads to competence (adapted from Svensson et al., 2004).

2 METHOD

In this paper, we follow the Design Science Research Process (DSRP) approach by Peffers, Tuunanen, Rothenberger, and Chatterjee (2007) while building the model. The *problem identification and motivation* for the model is to enable formal and non-formal instruction for the workforce. Our *objective* is to allow the workforce to keep their competence current now and in the future. The results of *design and development* are reported in this paper as the preliminary model. The rest of the phases of the DSRP approach (i.e. *demonstration* and *evaluation*) are out-of-scope of this paper and are left for future research.

3 FROM INDIVIDUAL LEARNING TO ORGANISATIONAL LEARNING

In the modern information-intensive world, the work is often performed by self-organised teams (Hoda, Noble, and Marshall, 2010). In such teams, the education or title does not define the team members. Instead, all team members are equal, and their possible contribution to the team is defined by their competence.

This implies that teams should be formed around team members' competences. In order to do this, employers need to know their employees' competence. Unfortunately, this is not often the case. For instance, according to The Global Human Capital Report (World Economic Forum, 2017), Finland was number one on the development index in 2017. At the same time, over 80 per cent of white-collar workers think that their full capacity is not known by their superiors (Taloustutkimus, 2017).

While individuals can learn from formal and non-formal instruction, and by informal learning, the *organisations* can only learn from their members (see Figure 2). The feed-forward learning is a process where organisation innovates and renews (Crossan et al., 1999). The feedback learning process is opposite to this: it reinforces what is already known (ibid.).

Organisational learning is the basis for success when the knowledge comes more and more important success factor. Indeed, the knowledge transfer has been found to be a competitive advantage. However, the knowledge in databases and information systems is not enough; it needs to be connected to the right people for learning to occur (Siemens, 2005). The functional knowledge transfer is a competitive advantage only if the knowledge stays inside the organisation (Argote and Ingram, 2000). The only situation where knowledge sharing outside the organisation is regarded as a competitive advantage is a cluster (regional or industry), where organisations are learning from each other (Tallman, Jenkins, Henry, and Pinch, 2004).

As already stated, the knowledge can be a competitive advantage. But organisational *learning* is a sustainable competitive advantage (Hatch and Dyer, 2004). Thus, the focus should be on organisational learning. Organisations can promote learning by using appropriate leadership styles. The transactional leadership style can be used to promote feedback learning (Vera and Crossan, 2004), which enhances knowledge transfer and consequently strengthens the gained competitive advantage. On the other hand, the transformational leadership style can be used to promote feed-forward learning (ibid.), which allows the organisation to learn something new and thus strengthen the organisation's sustainable competitive advantage.

Resilient organisations are learning organisations that will maintain the high level of performance even under external events, pressure, and uncertainties (Boin and Van Eeten, 2013). The dilemma with resilient organisations is that in theory, they shouldn't work, but in practise they do (LaPorte and Consolini, 1991).
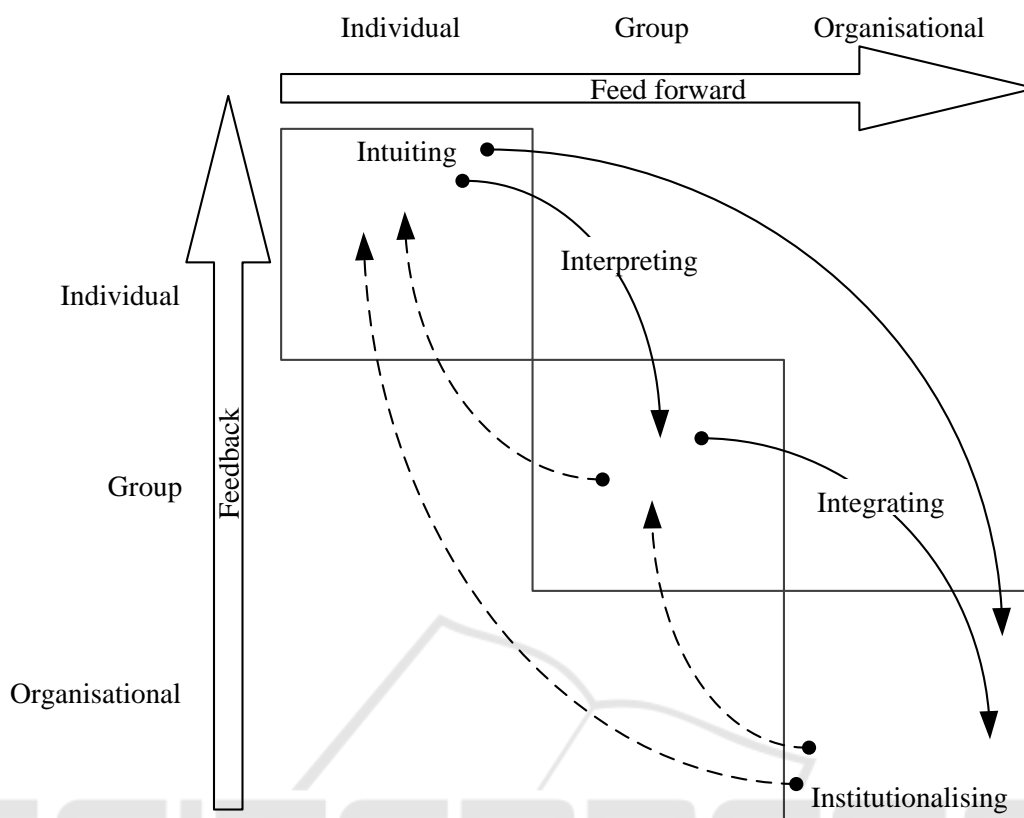
Figure 2: Organisational Learning as a Dynamic Process (Crossan, Lane, and White, 1999).

The organisational resiliency is defined as the ability of the organisation to manifest itself after a surprising danged, and as the ability of the organisation's management to quickly restore the order (Boin and Van Eeten, 2013).

The building blocks of the resilient organisation are resilient employees. In psychology, resilience refers to "effective coping and adaptation although faced with loss, hardship, or adversity" (Tugade and Fredrickson, 2004, p. 320). In the work context, the characteristics of the resilient employee are présence d`esprit (calm, innovative, non-dogmatic thinking), decisive action, tenacity, interpersonal connectedness, honesty, self-control, and optimism and positive perspective on life (Everly, McCormack, and Strouse, 2012). All these characteristics are learnable, so employees should thrive to learn these to become and remain resilient.

4 70-20-10 MODEL

During the last decade, the 70-20-10 model has received a lot of attention in organisations. It refers to the division of where and how employees learn (Kajewski and Madsen, 2012):

- 70% informal, on the job, experience-based, stretch projects and practice.
- 20% coaching, mentoring, developing through others.
- 10% formal learning interventions and structured courses.

The model originates from a survey by Lombardo and Eichinger (1996), where they studied organisations' top-management learning habits. The model as such is not scientifically proven, but it is arguably the most used model to explain how employees learn in practice. The model combines formal and non-formal instruction together with informal learning. Thus, from theoretical point-of-view, it can be used to develop employees' competence.

5 LIFELONG LEARNING

In the context of work life, lifelong learning means that learning continues throughout employees' career. In this section, we will introduce some key concepts related to lifelong learning.

Meta-skills are high-order skills required by other skills. Ability to learn is the most important meta-skill. The current leading learning theories, namely behaviourism, cognitivism, and constructivism, are interested in the *learning process*. However, these theories are not interested in whether the learning is *valuable* (Siemens, 2005). It has been argued, that connectivism would be more suitable for explaining the modern way of learning (Siemens, 2005). Connectivism has been criticised in that it is not a learning theory, but a pedagogical view (Duke, Harper, and Johnston, 2013). Still, it is recognised that understanding what is valuable to learn is important (ibid.).

According to The Global Human Capital Report (World Economic Forum, 2017), regardless of the job, industry, education background or country, there are two skills that are needed in the workplaces. These skills are interpersonal skills and basic technological skills.

6 LEARNING METHODS

6.1 Authentic Learning

Authentic learning refers to learning occurring during formal and non-formal education, where the learning setting is as authentic as possible. It covers things like authentic real-world tasks and problems, and simulations closely related to the studied field (Nicaise, Gibney, and Crane, 2000). As such, authentic learning provides elements from informal learning to formal and non-formal instruction.

6.2 Problem-based Learning

Problem-based learning is similar to authentic learning, as students are provided with an opportunity to solve problems similar to what can be found in real-life (Gallagher, Stepien, and Rosenthal, 1992). The difference is that learning occurs by solving the problems which are typically ill-structured. This means that one or more problem elements are unknown, they have unclear goals and unstated constraints, possess multiple solutions, solution paths, or no solutions at all, offer no general rules or

principles for describing or predicting most of the cases and, require learners to make judgments about the problem and defend them (Jonassen, 1997).

6.3 Flipped Learning

Flipped learning originates from *flipped classroom*, where asynchronous videos and practice homework were used together with active group-based solving in the classroom (Bishop and Verleger, 2013). Currently, flipped learning is seen as a learning-centred approach where the teacher or educator constantly evaluates the best way to use the class time (Nederveld and Berge, 2015). As such, the very basic and background information is provided outside the class room using videos and other similar material. All students are involved in the learning process, so passive learning doesn't exist in flipped learning (ibid.).

6.4 Accelerated Learning

Accelerated learning programs are structured so that students take less time to complete them than the conventional training (Wlodkowski, 2003). It can be defined as a "total system for speeding and enhancing both the design process and the learning processes" (The Center For Accelerated Learning, 2019). Accelerated learning is ideal to the situations where employees need to develop a totally new competence in a relatively short period of time (weeks or months) if compared to traditional vocational and university-level education (years). However, if compared to courses provided by commercial training organisations (1-5 days), accelerated learning requires much more time and commitment.

6.5 Micro-learning

Micro-learning (ML) combines micro-content delivery with a sequence of micro-interactions which enable users to learn without information overload (Bruck, Motiwalla, and Foerster, 2012). Typically, micro-learning takes only a couple of minutes at a time. Micro-learning has found to be suitable for professional development (Buchem and Hamelmann, 2010). Thus, it can be regarded as a pragmatic solution for lifelong learning at work.

7 LEARNING MODES

7.1 Instructor-led Training

Instructor-led training (ILT) is known as a "traditional" mode of formal and non-formal instruction, where the instructor has prepared a structured learning experience. ILT is best suited to a situation, where there is a need to study a totally new competence.

If an instruction takes place face-to-face in classrooms or at the workplace, instructors are able to assess the learning constantly and change learning methods as needed. The downside of face-to-face ILT is that it requires a great amount of time from both instructors and students.

7.2 Self-study

Self-study is a learning mode where students learn on their own phase, without an instructor. The learning material can be digital, such as videos and personal learning environments, or more traditional, such as books or practical work. Self-study can be structural, with defined learning objectives, or free-form, where students study without specific learning objectives.

Self-study is ideal for the situations where learning is not time-bound, such as keeping the skills current.

7.3 Blended Learning

Blended learning is a formal or non-formal instruction mode which combines instructional delivery media, instructional methods, and combines online and face-to-face training (Graham, 2006). As such, it can be a combination of ILT and self-study.

Blended-learning is ideal for the situation where some degree of ILT is required. It is less time-consuming than pure ILT but more time-bound than pure self-study.

8 MODEL OF WORKFORCE TRAINING AND DEVELOPMENT

8.1 Preliminary Model

In this paper, we have introduced multiple learning modes and methods. Each model and method is suitable only for a limited number of learning settings. Therefore, we propose the following model, illustrated in Figure 3.

First, the *learning goals* should be defined. That is, why and what to learn. Second, after defining the learning goals, the suitable *learning mode* can be chosen. Third, after the learning mode is chosen, the suitable *learning method* or methods can be chosen. As a result, the combination of learning goals, modes, and methods together forms the best way to learn.
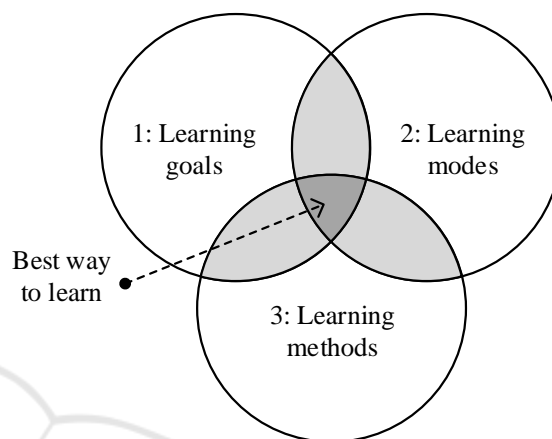
Figure 3: Model of Workforce Training and Development (WOTRA).

8.2 Learning Goals

We have defined learning goals for the three identified situations where employees require T&D. The first situation is where an employee needs to keep their professional skills current. The second one is where the employee needs to keep their modern workplace skills current. The third one is where the employee needs to develop a totally new competence.

In the next sub-sections, we assess how different learning methods and modes fit each of these learning goals.

8.3 Keeping Professional Skills Current

The fit of learning methods and modes for keeping professional skills current are assessed in Table 1. As the professional skills are likely to be relatively complex to learn, the ILT and blended-learning modes have the highest fit. In some cases, self-study is justified but is assessed here as medium. This is because without an instructor, assessing the learning can be very difficult, if not impossible.

Table 1: Fit of learning methods and modes for keeping professional skills current.

	FIT
LEARNING MODES	
Instructor-led training	High
Self-study	Medium
Blended-learning	High
LEARNING METHODS	
Authentic learning	High
Problem-based learning	High
Flipped learning	High
Accelerated learning	Low
Micro-learning	Medium

From the learning methods, authentic, problem-based, and flipped learning was assessed as the highest fit. This because, as already mentioned, professional skills can be complex and should be learned in as authentic setting as possible. Flipped learning helps to focus the face-to-face instruction to the most challenging subjects.

Accelerated learning is too time-consuming for just keeping the skills current. Micro-learning might be too "light" way to keep the skills current but is justifiable in learning simple skills.

8.4 Keeping Modern Workplace Skills Current

The fit of learning methods and modes for keeping modern workplace skills current are assessed in Table 2. The modern workplace skills are not as complex as professional skills. Therefore, self-study and blended-learning modes were assessed as the highest fit. ILT is too time-consuming but is justified in some cases.

Table 2: Fit of learning methods and modes for keeping modern workplace skills current.

	FIT
LEARNING MODES	
Instructor-led training	Medium
Self-study	High
Blended-learning	High
LEARNING METHODS	
Authentic learning	Low
Problem-based learning	Low
Flipped learning	High
Accelerated learning	Low
Micro-learning	High

From learning methods, flipped and micro-learning was assessed as highest fit. This is because modern workplace skills are simpler than professional skills, so these "lighter" methods are the most adequate.

8.5 Developing a New Competence

The fit of learning methods and modes for developing a new competence are assessed in Table 3. As developing a new competence is the most complex type of learning, ILT mode was assessed as the highest fit. Self-study is too "light" mode to this, but blended-learning might work in some settings.

Table 3: Fit of learning methods and modes for developing a new competence.

	FIT
LEARNING MODES	
Instructor-led training	High
Self-study	Low
Blended-learning	Medium
LEARNING METHODS	
Authentic learning	Medium
Problem-based learning	Medium
Flipped learning	Low
Accelerated learning	High
Micro-learning	Low

From the learning methods, only the accelerated learning was assessed as high fit. Authentic and problem-based learning may be suitable for some settings but are less intensive methods.

9 CONCLUSIONS

In this paper, we introduced a preliminary model of Workforce Training and Development (WOTRA). The model is based on the literature of current learning theories, modes, methods, and models.

9.1 Limitations

According to the DSRP approach, all resulting artefacts, such as WOTRA model, should be accordingly validated. During the course of writing this paper, this was not possible due to the tight schedule.

9.2 Contributions to Practice

The WOTRA model helps both employers and employees to choose the adequate mix of learning modes and methods.

9.3 Contributions to Science

Our preliminary WOTRA model is the first step toward creating a model for workplace training and development. As such, it is a starting point to foster the scientific discussion related to this important area.

9.4 Directions for Future Research

The WOTRA model should next to be validated by carefully studying organisations of different sizes and industries.

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