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## The learning dimension of digital transformation: Transforming with learning patterns

(Work-in-Progress)

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### ABSTRACT

The road towards a digital organization is partly technical but also about the skills and mindset of the personnel of the company. As the technological base for digitalization is fairly straightforward, the ways of supporting change in people are not evolving as rapidly. This paper suggests an approach to continue learning in an organization, based on concepts around pedagogical theory, learning patterns. This theoretical framework is transferred into a business setting, and the consequences are discussed from the digitalization perspective.

*Keywords:* Digital transformation, Organizational change, Learning patterns, Pedagogical theory.

### INTRODUCTION

The digital transformation challenge that most organizations and businesses face has many layers to it (Westerman, 2014; Schallmo et al., 2017). The digitalization technology is just one layer, and probably the one coming later in the transformation process. Tabrizi et al. (2019) point out that technology is not the main issue with digitalization. There are many other areas that must be managed, including: the business models, the organizational structures, workflows and processes, and the people dimension, all of which need to be in good order before any technology changes (Sathananthan et al., 2017). In a very general manner, the digitalized company could be described as a situation where the core of the operations and processes are digital, and the company has a strategic dependency on its digital resources. The organization is moving from people aided by digital tools to a situation where people are a part of digital organization. Digital transformation implies an all across the board technology intensive organization, demanding that people gain new skills and an ability to radically change their worldview of how business value is created (El Sawy & Pereira, 2013). Vial (2021) provides a concise definition of the concept of digital transformation: “a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.” There is a characteristic of digital transformation technology of being disruptive, creating the bases for big changes, as argued by Ebert and Duarte (2018).

In the big picture and in the direction of this paper, we are talking about a profound change in worldviews. This means there is a need to accelerate the learning culture of an organization in order to create both mindsets and skill sets that will make the transformation possible (Svahn et al., 2017). This will be the precursor for a strategic rethinking of an organization's value creation and delivery, building on customer relations based on real-time quality data. In practice, the development of the different fronts of learning, strategy, and process changes are concurrent efforts, but learning will pave the way. Learning is not only about new skills and organizational capabilities, but it is also about changing mindsets and worldviews. It is not just a teaching effort and skill training; rather, it is about building flexibility capabilities among those that will be in demand in a data driven business. Reality changes quickly, and doing business based on real time data requires the ability to rethink and retool the business processes (Bharadwaj et al., 2013). Changing worldviews and acquiring new skills take time and effort and should become a part of daily operations. The tasks and processes of the organization must include learning and change components. However, it cannot be locally and individually based efforts; instead, there needs to be a systemic dimension to learning. In the same way, it cannot just be centralized top-down pushes, or novelty growing in close communities from below; on the contrary, there needs to be an integrated strategy for learning for change.

Regardless of how you make the effort, organizational learning or learning organizations, as a structure or processes, there have been many approaches to the challenge. Besides the traditional corporate training, onboarding, up- or re-skilling, based on the traditional means of education, several different strategies for learning can be noted.

- Action research (Revans, 1980), a worker driven approach, where individuals and groups experiment with new ways of working and improving operations.
- Communities of practice (Wenger, 1998), where there is informal learning among special interest groups.
- Knowledge management (Nonaka and Takeuchi, 1995), where there is a formal setup of knowledge processes, from knowledge creation to transfer and application of new knowledge.
- Organizations Learning (Senge, 2006), which is a systematic approach to create behaviors and structures that promote a learning organization.
- Learning organizations (Garwin, 2003) presents the specific learning organization concepts. Here, three modes of learning—intelligence gathering, experience, and experimentation— are discussed as well as how they can be effectively deployed.

- PDSA cycles (Deming, 1986), PDSA or the Deming wheel, are strategies and methods to develop, test, and implement changes that can result in improvement.

In this paper, we look at a pedagogical model, which could serve as a blueprint for creating learning patterns for a systematic learning effort of an organization. The paper is organized as follows: we start by presenting a framework for strategic digitalization in order to provide an outline of the challenges of digitalization. Then, we go on to present a pedagogical framework, which we then transfer to an organizational setting. Thereafter, we provide an illustration of how to work with this. Finally, in the discussion, we show how the challenges of digital transformation can be tackled.

### **MODELS FOR DIGITAL TRANSFORMATION**

To understand the challenges of the digital transformation and what forces of change are involved, we use a model presented by Bharadwaj et al. (2013) as a starting point for a discussion on learning processes.

#### **Scope of a digital business strategy**

The scope of a business is about the interconnection that digitalization offers for the creation of digitalized business networks. For example, creating new products and re-developing them based on real-time feedback from extensive business networks, including all links in the value chain. The digitalized business networks break traditional business boundaries, including networks, ecosystems, alliances, and partnerships with both competitors and customers. There is an ongoing continuous change in these connections, what could be called the plasticity of relations of the loosely coupled networks over time.

#### **Scale of a digital business strategy**

The scale of a business is about reaching higher sales levels in larger markets. Techniques such as “cloud computing” enable the rapid up-scaling and down-scaling and allows for moving in or out of new markets. Multi-sided business models afford the organization to create new businesses on the back of traditional markets; for example, selling information gained in operations or selling services to suppliers, creating values in new parts of the value chain. This is about understanding a business from new perspectives, uncovering hidden values. A key strategy for understanding data as a strategic resource is captured by concepts such as “big data” or “analytics.”

#### **Speed of a digital business strategy**

The speed of the processes of the organization, such as product launching, decision-making, value chain reconfiguration, and network formation, is a key to success. The faster a company can react to new circumstances in the environment, the better it can adapt and act in a changing world. A key to such a dimension is the changing demands from customers. There is a level of dependence on the behavior among external partners, and how to influence that is a challenge.

#### **Sources of business value creation and capturing**

Four sources of value creation are discussed, including: information, multi-sided models, the co-creation of value in networks, and digital architectural points of control. An example of creating value from information could be driving direct sale, based on real-time data from consumer behavior. Finding new opportunities in current business models is an innovation effort to understand new values in already existing resources; for example, selling data from core processes could create a new side of an existing business model. Value creation, by inter-linking with new partners along the value chain, can come from creative thinking and the discovery of opportunities that can only be realized by digital integration, creating a network of cooperation. Depending on a company’s position in a digital network, value can be derived based on technological control of digital resources, for example, by creating gate keeping positions or choke points for information flows.

### **PEDAGOGICAL MODEL: LEARNING CYCLES FOR CONCEPTS AND PRACTICE**

In the end, a learning process aims at personal change and development of the individual’s goals, knowledge, and practical capability. Learning is a complex process and needs to be in sync with the challenges at hand; a digitalization process carries many of these. Learning is a process of acquiring skills and knowledge needed to perform actions to reach goals. To achieve this, teaching should be approached as a design science (Laurillard, 2013) in order to cope with new environments, and new cultural and technological resources. Patterns of how learning should be conducted need to be created based on the conditions of learning. The technologies used for creating the learning experience are an important part of these conditions, that is, different kinds of digital tools create new possibilities for learning. In this sense, the digitalization that drives the need for learning and change also contributes to new possibilities for supporting said change through novel learning processes. This is a key challenge of how the new digital landscape of an organization also provides new conditions for knowledge, change, and learning in that organization. The learning cycles are a blueprint for the deployment of digital learning tools; each learning action should, according to Laurillard, (2013), be matched with suitable technologies.

Laurillard (2013) sees a need for designing a set of learning activities and interactions between people or roles of the learning process. These actions need to be designed into learning cycles or teaching patterns, that is, interactions between teachers, learners, and peers of the learner. The design of these cycles or patterns is made with a number of components: learning actions, roles, etc., are organized into the learning cycles. The learning includes several dimensions; first, in terms of involvement, including both social and individual processes. The content of the learning includes both conceptual and practical elements: These are concepts that are used when talking about a subject and practice, and how to act based on the knowledge to reach practical goals. The content of the learning is material about concepts, models, theory, etc., by which the learner may acquire

the abilities to perform the needed actions. The understanding of the concepts is refined based on discussions, feedback, and commenting with peers and teachers. Based on the conceptual knowledge, the learner develops a practice, taking actions and reforming the practice based on feedback on outcomes, while refining goals.

The core set of pedagogical patterns include:

**Acquisition**, where the learner listens or reads the learning material, typically a lecture or a book.

**Inquiry**, where the learner is actively working with the material, for example, exploring, comparing, and reviewing documents or other teaching resources.

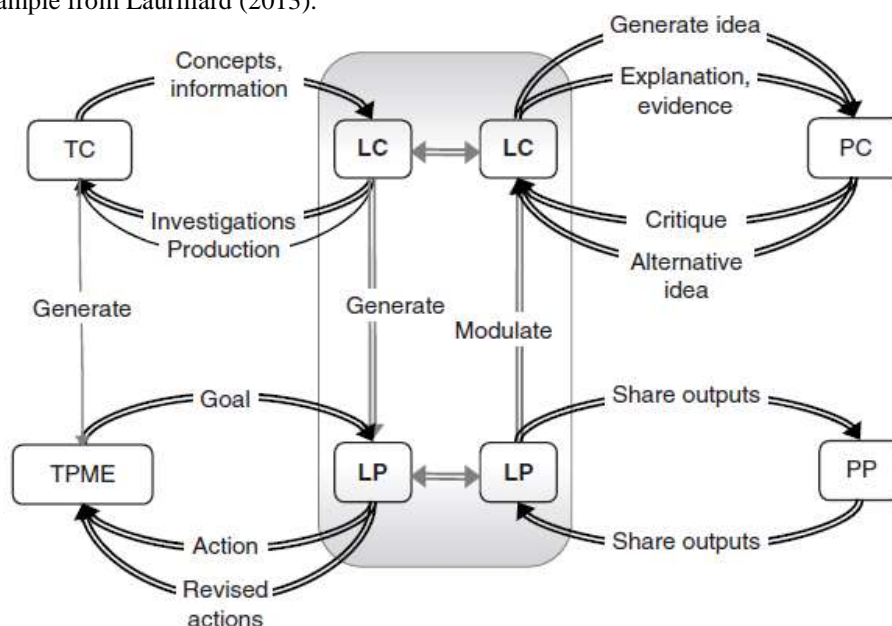
**Collaboration**, where the learner interacts with other learners, for example, in problem-solving or practical workshops. Collaboration is a process of knowledge building through participation and negotiation with peers.

**Discussion**, where there is learning through the articulation and debate on ideas and questions together with peers and teachers.

**Practice**, where the learner takes on actions based on his or her acquired knowledge and improves it based on how well his or her actions lead to the stated task goal, and uses the feedback as a self-reflection or critique from others to improve their next action.

**Production**, where the learning creates one's own knowledge artifacts, and where the knowledge is consolidated and articulated using the conceptual apparatus of the knowledge area, including detailing its practical applications.

The patterns are elaborated using diagrams, “conversational frameworks,” describing how the main roles as teachers, learners, and peers interact during the learning process. These interactions are focused on two fronts: a conceptual learning and a practical learning. This creates six major elements of the learning process: teacher concept (TC), learners' concepts (LC), peer concepts (PC), and another three for the practice focus (TP, LP, PP). In the case of collaborative learning, a generic framework could look like the sample from Laurillard (2013).



Source: “Learning through collaboration as a combination of learning through discussion and sharing of the outputs from practice and inquiry.” Figure 1.11 , Page 191. Laurillard, 2013.

Fig. 1. Example of the learning cycles: Collaboration

The construction of a learning pattern would mean working with such generic patterns as starting points. Depending on the needs of the teaching material and the learning environments, an active phase of design is needed to reach a solution. A simple cycle could be “T: explains concepts, L: reads texts, L: writes essays, T: marks essays.” Regarding collaborative learning, other patterns could be interwoven as building blocks (for example, acquiring, analysis, practice). The learning pattern is constructed by creating a script; the script consists of a number of learning cycles. In the collaboration case, several cycles can be seen; for example, the learner is seen in cooperation with peers in several activities, including idea generation, providing supporting evidence, taking actions, types of representations, and more.

### RESULTS: FRAMEWORK FOR OL AND DT

The theoretical frame by Laurillard (2013) is aimed at higher education and formal education. Formal learning is a situation of learning that might be very different compared with an organizational setting. However, the basic modeling technique and the generic set of learning situations suggested by Laurillard (2013) can contribute to targeted solutions of specific challenges in organizational learning (OL) and digital transformation (DT). The formal teacher is clearly not a natural position to be found in an organization. However, experts, technical consultants, change managers, or trainers of an organization would fill the role, and if these have less of a pedagogical background, working with the design of learning patterns would probably help them greatly. Any of the learning patterns as presented above could find good use in an organizational setting. The acquisition

pattern would fit the basic training of a company's standard procedure, in a simple "read – lecture – test – feedback" pattern, and in an extended version, contribute to more elaborate learning designs.

Looking at the challenges of the digital transformation process, as briefly discussed above, training on many levels could be necessary. The characteristics of digital transformation, as expressed with the scale, scoop, speed, and value dimensions, are the radical rethink that is required of the organization. Tackling the world-shifting dimension that is in hold in a digital transformation, collaborative and discussion learning patterns seem fitting. Laurillard (2013) describes collaboration as leading to the production of something new, i.e., solutions as outcomes of discussions.

The underlying pedagogical theory of collaboration could be traced back to variation on social constructivism (for example, Vygotsky, 1978). There are a number of central themes here: the nature and use of language, how discussion shapes the mind of the participants, and communication as a path to learning. People sharing worldviews and mental models, as well as new and better outlooks on the shape of the future emerge when different views meet. In particular, the scale and scope of dimensions of digital transformation speak of the need for radical rethinking.

Based on the learning cycles, Laurillard (2013) discusses the need for digital tools as a support and enhancement of the learning cycles. The learning actions, as discussed in this learning framework, are generic and in a way timeless. The implementation or realization of them is discussed by Laurillard (2013) to be digital to their nature. These suggestions and examples given at that time might be more or less outdated. Today, the collaboration script, where interactions between people are described, could be realized in a virtual reality room. Meetings in a virtual room, based on VR helmet technology, could be a way of creating collaboration, but there are many questions about whom to invite, how many, the principals for interaction, etc. Even more novel technologies could be put to use, for example, 'holographic communications technologies,' 'holographic calling,' 'holographic telepresence,' 'holographic type communications' (HTC) (Clemm et al., 2020). The learning experience in a workshop with full sized holographic representations of the participants will certainly affect the nature and quality of the interactions, when comparing to video meetings of today. The learning action of "critique" becomes markedly different if it is possible to act in full body language compared to, for example, in a video conference situation. The advent of new and more powerful tools for learning and knowledge transmission will continue to redefine the learning cycles and the impact on the organization in terms of change and transformation to new states.

The digital transformation process has many layers to it, from the choice of a business strategy down to actual learning actions that create new personal knowledge and change in behavior. The important thing is to work in the right order; hence, a business strategy first, and then start with the digital transformation process. Furthermore, a learning environment must be created on a principal level before learning technologies are selected and implemented. The key to finding the right recipe for organizational learning is the design dimension, namely the learning cycle is the design for the particular challenges of the situation at hand.

Four layers can be discerned, which are interconnected in change cycles, all with a component of people learning and changing as the pivotal point:

- Data, the data flows, which inform the organization of the changes in the internal and external states, more or less in real time. This is a driving engine and pushes the organization forward, adapting or acting to change the environment.
- People, learning from the data flow, interpretations and sense making as key processes, leading to actions. These insights will have an impact on the digitalization process based on what works or not.
- Digital transformation, the process of changing the origination, its processes, and business practices by the application of new digital tools.
- Business strategies, development of new business models, value change configuration, how resources are gained and deployed toward the stated goals, all in accordance with the demands and restrictions of the environment, and long-term value creation for the stakeholder.



Source: authors.

Figure 2. Learning and change- connection strategy, digital transformation, people and data

The cycles embedded in this model go both inside out and the reverse from the outside and inwards. In an inward going spiral, strategy defines the need for digital transformation, providing people with new tools to act in the organization toward goals, feeding on and driving the processes that are built around the data streams. In an outward moving spiral, the data flow in from the people on real time states of internal and external changes, providing the people in the organization with a new understanding on which to act. This might redefine how digital technologies are applied, and the strategies that guide the transformation processes. In the center of the cycles or spirals, we find people learning and changing their behavior, as the strategy and real-time data put pressure on them. How these learning activities are balanced and designed will be the decisive point of the digitalization process.

### **DISCUSSIONS: ORGANIZATIONAL APPLICATIONS AND IMPLICATIONS FOR TRANSFORMATIONS**

We can see a number of discussion points based on this exploration of the usage of a more traditional pedagogical theory in the context of organizational learning. The purpose is to bring a level of pedagogic rigor into the design of learning processes. The purpose is to think critically about the steps proposed, and not just a set of lectures and workshops, or what standard training recipe might be at hand. These include a structural aspect of the design of learning, but also the use of certain patterns, as mentioned above, with a focus on discussion and collaboration.

It should be noted that the pedagogical approach discussed in this paper does not replace any change model or model for organizational learning. The focus is on improving the learning process that is at the heart of the change process. Learning is the change of behavior and acquiring new knowledge, and there is an essential set of general actions that could be involved, regardless of the action. In Senge's (2006) model of a learning organization, for example, an ideal end state is envisioned. However, how an individual achieves personal mastery, and how the organization can be organized to support that pursuit, is not really discussed. To create a learning environment that can, for example, facilitate the building of a shared vision, the learning through collaboration script could be implemented. A collaboration script is a set of instructions prescribing how students should form groups, how they should interact and collaborate, including details such as the group size and composition, sequence of learning actions, roles, timing, and much more.

The argument here is that there is a need for a more formal understanding of learning processes that goes beyond the straightforward solutions such as reading up on practical instructions, discussions in workshops, and application in a trial-and-error mode. Breaking down learning into clear stages and steps based on a firm theory of learning (goals, actions, practice, feedback, etc.) provides a basis for integration of learning into the normal operations. Learning should be an integrated part of everyday operations; in light of this, the meaning of organizational transformation becomes an ongoing process, which is what the digital revolution means. Digital transformation is a constant state of change, with the mega data of the fully digital business landscape keeping a pressure on the individual to rethink how the world works or could be made to work better.

Use of IT for learning is a key component in the work of Laurillard (2013), where each action in the learning pattern should be supported by an IT component. As such, it falls into the general paradigm of digital transformation; just as any process in the organization is challenged by new technologies, so too are the training and learning process. The increased data about the world will create much greater speed, covering a greater scope and scale of operations, and will inform the individual about what works or does not. The speed of the transformation paradigm is the major challenge for a learning organization, with shorter cycles of what works and what is good. The learning processes should be directly connected to the operations, integrated as a self-adjusting part of the operations.

The use of the design perspective made by Laurillard (2013), viewing the creation of learning cycles as design thinking, connects it to the overall design effort of the digital transformation process. The learning processes become one component in the digital effort of the company. The flows of big data would be, in this sense, connected and fueling the learning processes and the learning processes become a part of the transformations. Hence, it connects the organizational design into the learning cycles, making the learning the facilitator of digital transformations. Value creation is a process of learning and innovation in a collaborative mode. Achieving speed advantages, that is, the rate of change that can be reached, is a quality of the learning pace that the organization can muster.

At the end of the day, there are just so many ways of educating or training people, whether it is in a school situation or in a company. There will be a mix of lectures, quizzes, tests, assignments, workshops, practice sessions, discussions, mentoring, coaching, reading of books, watching videos, doing write ups, giving feedback, or any other trick in the book of teaching. The conversational frameworks, as a means to construct dedicated learning environments, offer a way to tailor, in a structured way, the organization, based on the challenges at hand.

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### **REFERENCES**

- Bharadwaj, A., El Sawy, O.A., Pavlou, P.A., & Venkatraman, N. (2013). Digital business strategy: Toward a next generation of insights. *MIS Quarterly*, 37(2), 471-482.
- Deming, W.E. (1986). *Out of the Crisis*. MIT Press. Cambridge, MA.

- Ebert, C., & Duarte, C.H.C. (2018). Digital transformation. *IEEE Software*, 35(4), 16-21.
- El Sawy, O.A., & Pereira, F. (2013). VISOR: A unified framework for business modeling in the evolving digital space. In *Business modelling in the dynamic digital space* (pp. 21-35). Springer, Berlin, Heidelberg.
- Garvin, D.A. (2003). *Learning in action: A guide to putting the learning organization to work*. Harvard Business Review Press.
- Clemm, A., Vega, M.T., Ravuri, H.K., Wauters, T., & De Turck, F. (2020). Toward truly immersive holographic-type communication: Challenges and solutions. *IEEE Communications Magazine*, 58(1), 93-99.
- Laurillard, D. (2013). *Teaching as a design science: Building pedagogical patterns for learning and technology*. Routledge.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. New York, NY.
- Revans, R.W. (1980). *Action learning: New techniques for management*. Blond and Briggs Ltd.
- Sathanathan, S., Hoetker, P., Gamrad, D., Katterbach, D., & Myrzik, J. (2017). Realizing digital transformation through a digital business model design process. *Internet of Things Business Models, Users, and Networks* (pp. 1-8). IEEE.
- Schallmo, D., Williams, C.A., & Boardman, L. (2017). Digital Transformation of Business Models - Best Practices, Enablers and Roadmap. *International Journal of Innovation Management: IJIM*, 21(8).
- Senge, P. (2006). *The fifth discipline: The art and practice of the learning organization*. New York, NY: Doubleday.
- Svahn, F., Mathiassen, L., & Lindgren, R. (2017a). Embracing digital innovation in incumbent firms: how Volvo Cars managed competing concerns. *MIS Quart.* 41(1), 239-253.
- Tabrizi, B., Lam, E., Girard, K., & Irvin, V. (2019). Digital transformation is not about technology. *Harvard Business Review*, 13(March), 1-6.
- Vial, G. (2021). Understanding digital transformation: A review and a research agenda. *Managing Digital Transformation*, 13-66.
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.
- Wenger, E. (1998). *Communities of Practice: Learning, Meaning, and Identity*. Cambridge: Cambridge University Press.
- Westerman, G. (2014). *Leading digital: turning technology into business transformation*. Boston, Massachusetts: Harvard Business Review Press.