

From eLearning to Digital Transformation: A Framework and Implications for L&D

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Abstract—How can the learning function (L&D) support learning and innovation ability of the entire organization in times of digital transformation? The core challenges for the learning function are twofold. **Competence clarification:** What are relevant “digital competences” in terms of knowledge, skills and attitudes that employees need in order to cope with digital transformation? **Competence development:** How to organize, design and support learning processes contributing to digital competences and digital transformation?

L&D needs to move beyond adding eLearning and blended to the established services in order to provide this support. Building on a framework originating in the context of business engineering and applying it to corporate training and human resource development, we explicate what digital transformation may imply for the L&D function. As L&D functions explore and exploit the options sketched out, they live digital transformation in a way that enables them to effectively and efficiently contribute to digital transformation at an organizational level.

Index Terms—Corporate L&D, digital competences, digital transformation, learning management.

I. DIGITAL TRANSFORMATION

A. Digital transformation as challenge and opportunity

Digital transformation currently is one of the major challenges in all industries. It embraces the realignment of technology and new business models to more effectively engage customers at every touchpoint in the customer experience lifecycle. Therefore, successful digital transformation begins with an understanding of digital consumer behavior, preferences and choices. In a next step, major consumer-centric changes within the organization are required to address these needs. The implications are relevant for all industries. Organizations will need to continue existing services, while developing strategies to manage the shift in mix between analog and digital.

For that reason, organizations are challenged to consider the exploration of new business opportunities over and above currently existing ones. They have to establish a general development orientation and implement innovations while at the same time pursuing efficiency in utilizing and optimizing existing business opportunities. In consequence, there is pressure on organizations to engage in dynamic development. Hence, they need to enhance their continuous learning ability, an essential precondition for coping with change and successfully establishing innovations (e.g. [1]).

B. Digital transformation in education and corporate learning

Digital transformation is also discussed in the context of educational organizations: institutions at primary, secondary and tertiary levels as well as providers (internal or external) of corporate training and human resource development services. In the corporate context, the topics discussed range from new formats for learning and development (e.g., MOOCs and nanodegrees, informal learning and performance support), platforms for learning and collaboration (e.g., cloud based services) as well as integrated processes (e.g., from knowledge maps via competency gap analyses to training needs aggregated at the company level) (see [2], [3], [4]). In addition, it is pointed out that digital transformation is not a matter of “bolting on” elements of social and mobile learning to existing services and programs but rather a matter of establishing changed cultures of learning and defining new business models for corporate L&D [5]. This is particularly relevant if one accepts the premise that workplace learning first and foremost takes place at the (increasingly digital) workplace rather than any segregated training area [6].

Looking at educational institutions more generally, digital transformation can be understood as affecting all major processes from educational marketing, application and participant / student management via program and course development all the way to assessment, certification and alumni management (e.g., [7]).

There are several implications of the above for corporate L&D:

- 1) L&D units need to be able to 1) clarify competences required for successfully doing business in a digital economy (knowledge, skills and attitudes of both leaders and employees) and 2) effectively and efficiently develop these competences.
- 2) In order to achieve this, L&D needs to broaden its scope and to develop competences for providing not only formal training services but also facilitation and support of more informal learning activities throughout the organization.
- 3) Finally, L&D needs to transform itself. L&D cannot effectively support digital transformation of the entire organization if it does not “go digital” itself. It has to live and breathe digital life, explore the opportunities provided by digital transformation and become effective in providing learning services in a digital world.

II. DIGITAL TRANSFORMATION IN L&D: A FRAMEWORK

Building on concepts derived from business engineering, Berghaus et al. have proposed a framework for digital transformation and business development [8]. Their model comprises both a range of business engineering aspects and a maturity model. According to

them, digitally mature organizations, are characterized by the following:

- 1) Customer experience – they provide products and services that are aligned with the digital lifestyle of customers.
- 2) Product innovation – they employ digital technologies in order to provide innovative products and services.
- 3) Strategy – they focus their strategy on exploiting the potential of digital technologies.
- 4) Organization – they provide digital competences internally in an effective and efficient manner.
- 5) Processes – they align all processes with digital structures and employ automatization wherever possible.
- 6) Collaboration – they employ digital technologies within the organization to support and enhance communication, collaboration and mobile working.
- 7) ICT – they employ IT infrastructures and information systems so as to enable new digital products, services, communication and transaction.
- 8) Culture – they are open to and understanding of digital technologies and relevant skills are deeply rooted in the organization.
- 9) Transformation – they manage digital transformation as a process at the top leadership level and they are guided by a clearly formulated roadmap.

Based on our understanding of educational management [9], we have adapted this framework for the realities of L&D units as support functions within business organizations and will cover the following aspects in this contribution:

- Mission and vision for L&D
- Strategy
- Customer experience
- Innovation and change process
- Product and service portfolio
- Processes
- Roles
- Communication and collaboration
- IT infrastructure.

An overview of the adapted framework for digital transformation of corporate L&D is provided in Table II, below.

III. DIGITAL TRANSFORMATION IN L&D: EXPLICATION OF THE FRAMEWORK

A. Mission and vision

L&D units are service functions. Their mission, usually, is to support their organization's strategic goals. Currently, an important overarching goal for many organizations is to speed up organizational learning and innovation in times of digital transformation so as to be as successful as possible in a digital economy. A possible vision for L&D units (or an element in such a vision) is to be able to provide this support in an effective and efficient manner and thereby to firmly establish itself as a valued business partners not to be replaced by an external service provider [10].

B. Strategy

A strategy is the roadmap for achieving the mission and vision. In the context of digital transformation, relevant strategic initiatives are a focus on key digital competences and the systematic exploration and exploitation of digital media for products and services. Exploration and exploitation of digital media is discussed further below. In this section, we will focus on relevant competences.

What are the competences required for digital transformation? A large number of frameworks and characterizations have been put forward, most of them based on skills development and the ability to use a specific set of and / or applications. Digital Competence can be defined as "the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment." [11]. Table 1, below, provides the competence dimensions and examples of competences proposed by [12].

Digital competences go beyond subject matter competences as the ability to use specific tools or applications in performing tasks. They also comprise critical thinking abilities, particularly with regard to contextualizing and evaluating information. And they also comprise social competences as these are relevant for matters such as understanding digital identities, communication and collaboration in a digital world [13].

Grounded in the discussion on digital literacy, [14] propose a framework for digital competence keyed to digital transformation and comprising three levels:

- 1) Digital competence as general skills and attitudes organized around key processes, the components may be mastered at different levels of expertise, varying from basic skills to more analytical competence.
- 2) Digital usage as the application of digital competence within specific professional or domain contexts.
- 3) Digital transformation as achieved when digital usage enables innovation and creativity and stimulates significant change at the individual or organizational level.

We will take up the idea of three levels of competences again towards the end of this contribution.

TABLE I.
COMPETENCE DIMENSIONS AND EXAMPLES OF COMPETENCES

1 Information	1.1 Browsing, searching & filtering information
	1.2 Evaluating information
	1.3 Storing & retrieving information
2 Communication	2.1 Interacting through technologies
	2.2 Sharing information & content
	2.3 Collaborating through digital channels
	...
3 Content creation	3.1 Developing content
	3.2 Integrating and re-elaborating
	3.3 Copyright and licences
	...
4 Safety	4.1 Protecting devices
	4.2 Protecting personal data
	4.3 Protecting the environment
	...
5 Problem solving	5.1 Solving technical problems
	5.2 Identifying needs and technological responses
	5.3 Innovating and creatively using technology
	...

C. Customer experience

In order to provide products and services that are appreciated and valued, L&D needs to understand not only customer expectations but also customer experiences and journeys (e.g. [15]). This is true for both basic phases in the customer journey: 1) becoming a customer of L&D and 2) being a customer of L&D. While there are many important touch points along the customer journey that are not related to digital transformation, more and more are: searching for services on the WWW; web pages or intranet pages with information on products and services; participant testimonials in communities and forums; online registration; email welcome messages to participants; course start pages on learning platforms / LMSs with usability for mobile devices; online learning materials; immersive learning environments based e.g. on serious games or simulations; collaboration platforms for team assignments; etc.

D. Innovation and change process

In order to fulfil their mission with respect to digital transformation (see above), L&D units have to provide learning opportunities. Depending on the situation at hand, these have to 1) systematically develop digital competences among employees or 2) be aligned with expectations of already digitally minded employees. To achieve this, L&D has to engage in innovation and change

relating to new service formats (e.g. support for informal learning, see below), altered processes (e.g. increasing use of digital resources in the process of learning, see below) or new roles (e.g. the role of a learning content curator, see below). This requires L&D to manage two processes in parallel [16]:

- 1) The innovation process, typically unfolding via the steps “invent” (often outside of L&D), “innovate” (e.g. introducing an innovation such as a flipped classroom course design for a first time) and “roll out” (e.g. spreading and making flipped classroom course designs a common format).
- 2) The change process, typically unfolding via the steps “unfreeze” (e.g. confront internal trainers with challenges related to established training designs), “move” (e.g. point out advantages of flipped course designs and enable trainers to make these happen) and “stabilize” (e.g. support trainers in altered work practices so as to make flipped designs for them a routine affair).

E. Product and service portfolio

Developments in digital technologies (Web 2.0 and social media) have given rise to a heightened interest in informal learning and learning facilitated through social media (e.g. [17]). These developments have led to numerous voices calling for a reinvention of corporate learning (e.g. [18]). On the one hand, it has been argued that, in the future, corporate learning will be superfluous as web-savvy employees will solve knowledge and performance issues themselves rather than look for training services (e.g. [19]). On the other hand it has been argued that corporate L&D will need to broaden its scope and mission, providing not only professionally designed and managed formal learning opportunities, but also supporting informal learning in the workplace (see [9], [20], [21]).

Relevant extensions of standard and extended training services (the latter including specifically designed transfer and performance support) are the following: curation services relating to learning contents as well as tools for personal learning and personal knowledge management (for the latter, refer to [22]); facilitation services relating to reflection and learning in the workplace, for example through support for team leaders in transforming selected team activities and meetings to learning situations; and enablement as well as support services for informal learning in, for example, networks and communities.

Currently, much attention is devoted to supporting social and informal learning through digital media. However, digital transformation also provides much development potential when it comes to formal learning. We will turn to this aspect for a moment.

With regard to formal blended learning, several basic designs have emerged over the last 15 or so years. These comprise flipped classroom models, project based models and transfer oriented designs featuring either two or three phases. Often, the assumption is that digital media can be usefully employed only or primarily in online phases but not so much during on site phases.

TABLE II. DIGITAL TRANSFORMATION FRAMEWORK FOR L&D

Mission & vision	L&D supports organizational goals in the era of digital transformation & does so effectively as well as efficiently.
Strategy	L&D focuses on key digital competences and systematically explores and exploits digital media for the design of collaborative, engaging and immersive learning experiences.
Customer experience	L&D understands customers / participants and designs customer journeys as well as touchpoint experiences exploiting digital media and platforms
Innovation & change process	L&D manages in parallel - the innovation process - the change process
Product / service portfolio	"Standard" trainings & courses (incl. eLearning) Extended training & performance support Curation of contents & tools Facilitated learning & reflection in the workplace Collaboration, exchange & learning in networks & communities Inform on contents & process Motivate & link to prior knowledge Develop resp. distill & elaborate Share & discuss Determine status Determine status & enable personalized path Present resp. process information Apply, practice, routinize Document & reflect Digital advance organizers Online Pinboards E-books, wikis, curated collections Online Forums & conferences Peer feedback & eTests eTests WBT & video "Clickers" Workaids & simulations Annotated video ePortfolios Cockpits & dashboards (for facilitators / learners) Gamification- & rewarding systems Commitment devices & community support A wide range of practices not in focus in this paper
Processes	L&D moves away from more linear processes (e.g. ADDIE) towards more agile development processes (e.g. SAM).
Roles	New roles and profiles for learning professionals such as - managers of learning communities - curators of learning content
Communication & collaboration	Effective and efficient collaboration with internal and external stakeholders, partners and team members supported through web technologies, social media and mobile devices.
IT infrastructure	Cloud-based LMS and authoring; learning experience platforms for integrating paths based on third party platforms, intelligent tutoring systems, etc.

However, digital transformation in working and learning environments makes this distinction between on line and on site blurry. Increasingly, workers and learners are always online and always have mobile computing devices at their hand – regardless of whether they are in the office, on the shop floor, commuting, at home or in physical training location. In consequence, which learning activities take place at a physical learning facility and which at other locations becomes less relevant. Key to success in learning is the focused pursuit of learning outcomes through the configuration and orchestration of activities, tools and media.

Designs for formal learning and training may comprise the following basic elements [23]:

- orienting learners / participants to the program and soliciting ambitions and / or concerns;
- determining prior knowledge;
- motivating and linking to prior knowledge,
- presentations;
- dialogic development;
- individual or team assignments aiming at either developing or applying solutions to problems;
- sharing and discussing of solutions;
- assignments aimed at practicing and routinizing;
- determining progress or status as preparation to a final assessment or certification;
- documentation and / or reflection of learning.

Alongside these activities, both teachers / facilitators and participants alike need to plan, monitor, and motivate learning activities: their own activities (learners / participants) and the activities of participants in a given course or program (teachers / facilitators).

Each and every activity mentioned above (and others not mentioned) can be supported through the use of digital media. For example:

- attractive advanced organizers can be created (and easily shared) on the basis of web services for visuals or infographics;
- virtual pin boards can help obtain (anonymized) voices (hopes / concerns etc.) from participants at an early stage in the learning journey;
- classroom response systems (“clickers”) can help determine (in an anonymous manner) where participants stand with regard to key concepts / knowledge / attitudes throughout a course: from the beginning right to the end; trainers / facilitators can employ this information so as to better connect to prior knowledge or to conduct brief classroom assessments (which in turn may indicate required adjustments to the planned program);
- web based trainings (WBT), eBooks, videos and curated collections can provide materials for self-study as well as team assignments – both outside of as well as during on-site sessions;
- student work can be documented in and shared via personal digital notebooks, personal weblogs or study team wikis;
- course weblogs and course wikis can be employed to document work results generated during a facilitated classroom session;
- digital worksheets and performance aids allow for easy adaptation to and integration in the personal work environment later on;
- video recordings of role plays, presentations or other work activities such as handling of machinery can be annotated, commented on and discussed via services for social video learning;

- results of individual and teamwork as well as various topics can be discussed in between on-site sessions via online forums and community platforms;
- virtual classrooms sessions can be employed for the same purpose and may also be used to integrate brief contributions from off-site experts during on-site sessions;
- documentation of and reflection on learning and personal development – along with sharing and peer feedback processes – can be supported through personal weblogs and ePortfolio systems;
- cockpits and dashboards can support both teachers / facilitators and participants in monitoring activities and in keeping up to date on requirements or submissions (e.g. [24]);
- gamification and rewarding systems can support student motivation and participation in course activities – even though there is a debate on how effective extrinsic motivating factors such as points or leaderboards are in the long run (e.g. [25]);
- commitment devices such as personally configured reminders and community support services (e.g. www.stikk.com) assist participants in specifying and attaining personal goals; recent research indicates that the use of such systems contributes to study success [26].

This is not to suggest that employing the tools and media mentioned is an end in and of itself. Innovation on a technical level through the use of new media and tools does not necessarily lead to didactical innovation or quality improvement [27]. Employing digital media and tools needs to be guided by their benefits and affordances relative to the goals that are pursued and their contribution to a “strong” learning environment [28].

F. Processes

The portfolio of services mentioned above is realized via a range of different processes. With regard to formal learning, standards have been established. These involve models such as ADDIE (Analysis, Design, Development, Implementation, and Evaluation) or Gagné’s nine steps of instruction and derivatives of these (see the discussion above and [23]). When it comes to the management of projects in corporate L&D, the ADDIE model is challenged by models such as SAM [29], which are inspired by prototyping approaches and design thinking. Agile approaches to managing projects in L&D are relevant not only for the development of eLearning resources such as WBT or platforms employed in training but for other projects as well. Tools for digital collaboration (see section H, below) both within and across organizational boundaries support this move towards more agile procedures.

G. Roles

The extension of the service portfolio (see section E, above) gives rise to new roles and profiles for learning professionals. Among these are curators of learning content, facilitators of reflection and change in teams or managers of learning communities. Learning content curators, for example, survey the landscape of easily available learning resources. Examples are open courses offered by various MOOC providers (and aggregated by specialized websites such as www.class-central.com/), Open Educational Resources (OER) made available through specific portals (e.g. www.oercommons.org or www.merlot.org) or providers of large libraries of video resources for learning, both commercial (e.g.

www.lynda.com) and non-commercial (e.g. khanacademy.org/). Key tasks and challenges include the identification of relevant resources, the assessment of their fit with internal requirements (e.g. level, length, workload, pacing, etc.) and making these resources findable for (potential) internal users. The latter aspect may be achieved, for example, via manually created overview pages, via dedicated curation services (e.g. scoop.it) or via technical integrations with existing platforms.

H. Communication & collaboration

In order to provide the above mentioned products and services in both formal and informal learning, L&D professionals need to collaborate efficiently and effectively with both internal and external partners: business partners; concept developers; designers of courses and media; trainers and facilitators; IT experts, etc. In the context of increasingly digital workspaces and the need for resource efficiency, L&D needs to be fluent in a wide range of technologies for supporting communication, collaboration and (informal) learning.

I. IT infrastructure

For a long time, IT infrastructure for learning (both “traditional”, online and blended) has been synonymous with learning management systems (LMS) – which have been pronounced dead as often as they have been called indispensable (see e.g. [30]). Recent developments with regard to IT infrastructures for learning include moves toward cloud based LMS services and cloud based authoring services. In addition, new types of systems are becoming available. These include intelligent tutoring systems (e.g. knewton.com), mobile apps as access points to learning and performance support or learning experience platforms that support the integration of learning contents that is distributed on different external platforms and marketplaces (Bersin 2015).

Learning professionals often perceive internal IT services as taking a hard line with L&D, blocking efforts to explore and exploit innovative web services in the realm of learning. This is particularly true in security conscious industries such as banking. In order to support digital transformation in the organization, L&D needs to build alliances with other units and to jointly engage IT services in discussion on what is desirable, what is necessary and how the infrastructures required can be made available.

IV. MOVING FORWARD

We started out on this paper by asking how corporate L&D functions can contribute to enhancing an organization’s learning and innovation ability in times of digital transformation. The framework for digital competences provided by [8, Ferrari 2013] provides L&D functions with a starting point. However, digital transformation requires not only general skills and attitudes. These skills and attitudes have to be applied and used in the specific functions and professional domains that constitute the organization. Digital transformation emerges when usage enables innovation and creativity that then leads to significant change – at the individual or organizational level.

As L&D units and L&D professionals pursue “going digital” in their own domain and operations, they

experience digital transformation firsthand in a way that enables them to effectively support digital transformation at an organizational level. The framework we have been developing in this contribution points out what learning professionals need to work on in the pursuit of this transformation.

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