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De-Linearizing Learning

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DE-LINEARIZING LEARNING

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Abstract:

Given the fast changing and accelerating world, reforming education constantly requires our full attention. The requirements to knowledge and skills will change on a constant basis. But, how to keep up to acquiring the latest and most relevant knowledge in such a dynamic time? And how do we deal with the almost exploding sources of knowledge that can be used in the learning process? This paper introduces a new way of looking at education, where it is not only the students who learn; not only teachers who educate; not only the researchers who find out new developments; and not only the practitioners who use knowledge and skills. The paper is meant to sketch a de-linearized way of looking at learning as opposed to the traditional linear learning approach. It develops a view on a new learning reality that needs further elaboration to proof the relevance of this approach.

Keywords: non-linear learning, lifelong learning, roles approach to learning, social innovation in learning

I. INTRODUCTION

In a world where information technology and society are increasingly intertwined, there is a need for access to high level knowledge and skills. Educational institutions offer programs in order to meet these needs, often supported by modern eLearning, supported by all kinds of facilities to optimize the learning process in a linear way. Linear learning will be common practice in the sense of transferring knowledge from the teacher to the student. This approach of learning assumes that the learning requirements and the learning objectives are clear and explicit.

Our current times are characterized by high levels of uncertainty about future developments; therefore linear learning is of declining importance because learning objectives are increasingly difficult to formulate. Traditional approaches do not take into account the expectations and learning requirements of the new generations and the changing world. The developments also point to the existence of labour market mismatches, due to inadequate skills, limited mobility or dissatisfactory wage conditions: the societal requirements are large: in Europe more than 7 million people in the 15-24 age group are neither in employment nor in education or training, and 11% of the 18-24 are early school leavers, and other expressions of that mismatch exist. These directly impact the requirements for education, and consequently the requirements for eLearning.

In this article the **role of eLearning** will be studied in the light of a fundamental new approach to learning, leaving the traditional linear learning model behind. In this new approach, we assume that every participant alternately plays all the roles (student, teacher, researcher, and practitioner) of the learning process.

This approach introduces a form of de-linearization in the actual process of learning. Following this reasoning in this paper our focus will be on the following question:

What impact has the process of de-linearizing the learning process on the requirements for eLearning?

Developments in the learning process will be studied, as well as the impact on requirements regarding IT and used in a comprehensive way, letting those involved in the learning process play all roles to fulfil expectations on the specific learning topic.

II. SETTING A NEW SCENE FOR LEARNING

In modern society, problem owners, active in organizations, are not prepared enough to deal with the problems they are facing. They have to get access to relevant knowledge and skills but due to an increasing specialization these problem owners (who may be *individuals*, *organizations* or even the *society* as a whole) will have **to acquire knowledge from a growing number of sources.** In general terms this process of getting access to relevant knowledge and skills has to be covered by learning, to be able to deal with the actual problems. In general terms, a **higher degree of divergence in access to knowledge is necessary** to be able to handle actual developments. But in a setting where you are unable to formulate the exact requirements for knowledge, the traditional processes in learning - with their focus on building up knowledge to solve a well-defined problem – cannot provide the problem owner with the necessary abilities. Aside from the traditional linear learning approaches there is a growing need for more flexibility in the - partially informal - learning process.

A **need for divergence in knowledge and skills together with a problem solving attitude** will be crucial in managing the problems we are facing. And the outcome of the learning process is increasingly hard to predict. It **requires knowledge on a broader range of topics;** and an increase in **depth of knowledge is needed**. Skilled people have to cooperate on solving problems in a dynamic context where the outcome of this cooperation will be emergent and – as mentioned – by definition unpredictable.

Summarizing, to be able to have **access to this broadening set of aspects** (knowledge, skills, and attitude) a growing need for a growing number of specialists will arise. From a logical point of view, this development implies that in order **to cover the whole field of an actual and dynamically changing problem, these specialists have to be involved**. These specialists - with their deepening knowledge on their specific area- will become increasingly dependent on each other.

It is this development which makes it necessary to include the process of acquiring, getting access to and developing new knowledge and skills as a new field of attention in future eLearning technologies.

We therefore introduce a role approach where the roles of **student, teacher, and researcher** as well as that of the **practitioner** will be used. In a later phase of the research, other roles may be added. As a consequence, focusing on the growing difficulties of *finding the appropriate knowledge combined with the introduction of the roles approach* form the basis of this future research. **eLearning has to be able to facilitate the different roles individuals play in the learning process in order to come up with effective and flexible learning solutions**.

The broadening of sources of relevant knowledge makes it obvious that the current state of traditional eLearning environments, with its focus on a predefined transferring of knowledge from teacher to student, is not able to meet those requirements. In this article we first elaborate on the theories behind this new way of learning; and then we will look at the impacts it has on eLearning requirements. In our view, this is the real challenge eLearning faces in this new approach to learning .

III. THE THEORETICAL FOUNDATION

As mentioned above and based on the research of Thijssen, Maes, and Vernooij (2002) we switch over to a role approach to learning. We identify the following roles:

1. **student**;
2. **teacher**;
3. **researcher**;
4. **practitioner**.

Someone who is playing the *student role* is looking for knowledge and skills on a permanent basis to develop him/herself.

The objective of the *teacher (role)* is to educate students about matters which he or she has studied specifically and which are relevant for the student to master the specific discipline.

Introducing the *researcher* makes clear that permanent attention to increase the “discipline-specific” knowledge is important and not trivial.

Where the teacher is actively involved in building knowledge the *practitioner* is the one for whom the (new) knowledge should be relevant.

In learning environments, built along the above lines and identifying the above mentioned roles, the scientific division between rigor (teacher and researcher) and relevance (student and practitioner) comes into full practice.

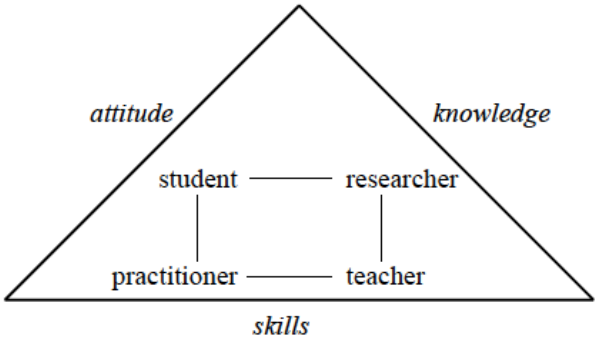

Figure 1 The original Learning by Sharing model (Thijssen et al., 2002)

The four stakeholders categories are combined by Thijssen et al. (2002) in a learning model. This model – *Learning by sharing* – focuses on the process of learning where the key elements are the exchange of knowledge, building skills, as well as the development of an exploring attitude.

Learning by sharing assumes that every individual being involved in any learning process might have to play any of the identified roles at any moment of time. Applying this approach to the person who was identified as being a student, materializes into the following insights:

The student playing the *teacher* role, for example, implies that he/she must be able to "educate" his or her peers about matters which he or she has studied specifically and which are relevant to their mastering the discipline and might have an impact upon their own "end products".

A student playing the *researcher,* has to do research on something which is relevant to the discipline, sufficiently important and not trivial. Students should therefore have no difficulty in learning about the current state of affairs in the discipline to evaluate the relevance of their research topics, at least to some extent.

Acting in the *practitioner* role, the student will work in a way where the studied material will be used in a tangible way with a focus on the ability to evaluate the relevance of, for example, case studies.

In an extension of the learning by sharing model, a focus is introduced on the implication towards learning styles (Thijssen & Gijselaers, 2006). Three learning styles are introduced.

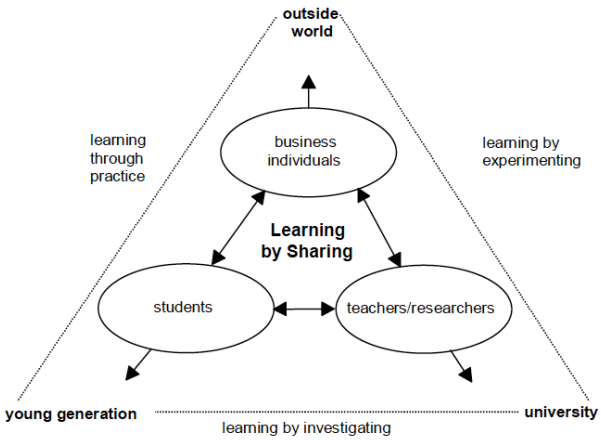

Figure 2 The adapted Learning by Sharing model (Thijssen & Gijselaers, 2006)

Thijssen and Gijselaers (2006) describe the learning types as follows:

- *Learning by investigating*
  As far as research (learning by investigating) is concerned, the direct link between the scientific world and the business community enables researchers to identify areas in which to conduct truly *relevant and innovative* research. This ensures the production of *useful knowledge*, that is knowledge useful for practitioners (Argyris & Schön, 1996). The notion of researchers as practitioners refers to the empirical testing of a theory, after which it can be adjusted according to (business) practice. In this way, *applied research* becomes research that matters for business practice.
- *Learning by experimenting*
  The basis for deciding whether or not the accumulated knowledge is valuable can only be found by experimenting. Learning by experimenting is thus an important aspect for the intellectual development of the individual involved in the learning process.
- *Learning through practice*
  In literature (Dijksterhuis, 2007) it is known that 90+ % of human behaviour finds its basis in applying actions from an existing repertoire, learning in this phase is focusing on extending the action repertoire.

The three identified styles of learning are firmly based on the insight that individuals have to play the different roles in an orchestrated way to ensure that an optimal learning process will take place. The different individuals should therefore be collaborating in a connected world where the identified roles are used to optimize the building of relevant sets of knowledge and skills. This presumption forms the basis of what is called the *Connectivism* approach in learning theory. As we will see later in this paper, it is the fourth type of learning theory. Based on these insights, a different set of eLearning requirements will emerge. Later in this document we will further elaborate on this.

These modes of operation form an integral part of a peer-learning oriented pedagogy. The “open learning layer” (Balthas Seibold; Balthas Seibold, 2009) includes:

- the open licensing of content as spearheaded by the “Open Educational Resources” (OER) movement (Wiley, 2009)
- the focus on ‘self-empowering’ study groups of self-organized peers (peeragogy.org 2013)
- the open structure and learning goals.

According to Siebold[1], in a connected world, learning by sharing is the only sustainable way of learning. This moves the Cartesian dictum of *"I think, therefore I am"*, to a *"We participate, therefore we are"*, as John Brown and Richard Adler (2008) nicely put it.

Over the past few years, experience was acquired concerning the design of new curricula under different circumstances. In literature this different approach to learning is also identified as the 'Natural Learning' (A. W. Abcouwer, Abcouwer, & Truijens, 2005; A. W. Abcouwer & Truijens, 2004). As an important aspect of facilitating this specific learning style *the use of a modern e-learning environment has proven to be a success factor*.

In order to be able to understand this changing role, the concept of **natural learning** first needs a closer examination. Defining the natural learning concept is by no means easy; also, because there are only limited scientific foundations for this type of learning. According to some, it is based upon Gardner's theory of *multiple intelligences* (1985, 1999). Others think it is based on the *social constructivism,* among others Piaget and Vygotskyv (Nelissen & Van Grootheest, 2004). Natural learning assumes that when a student is brought into a meaningful situation, the learning output is considerably higher than when the learning takes place in a meaningless situation. From the learning demand that is summoned, the student will next take courses and workshops and will seek for new learning settings to build up relevant knowledge. To better understand the learning setting, we have to focus on the *different learning theories* that are at stake nowadays in more detail.

IV. LEARNING THEORIES AND THE LINK TO LEARNING IN AN ORDERED OR UNORDERED SETTING

The literature on learning approaches names several different approaches, of which the best-known are behaviourism, cognitivism and (social) constructivism. Connectivism, as we mentioned before as a new and separate approach, has only recently been proposed (Siemens, 2004), based on changes in society and new insights into the impact of ICT/internet on learning. Below we give a brief description of the mentioned approaches (A. W. Abcouwer & Smit, 2007):

- In ***behaviourism***, learning takes place in a repeated process of action and feedback. The best results are achieved by positive affirmation of behaviour. Skinner's (1958, 1972) view on learning has been highly influential in the field of education. In his view, learning is the observable change in behaviour. In education, the main characteristics of behaviourism are the focus on positive and negative affirmation of behaviour, as well as a constant need for tests and feedback.
- In ***cognitivism*** learning has been established as a response to behaviourism. Apart from the observable behaviour that behaviourists believe in, internal processes are also important (Valcke, 2000). Therefore, this approach is focused on: knowing, obtaining knowledge, internal mental structures. The main focus is on guiding the student in using the right learning strategy and helping to relate new knowledge to existing knowledge. Guidelines for cognitive learning are: an active involvement of the student, hierarchical analyses, knowledge building on the basis of other knowledge, structuring, organizing and sharing knowledge, creating a learning environment that enables and encourages students to make connections to existing knowledge and finally, using progress tests and final tests to monitor progress.
- ***Constructivism*** states that people put a meaning on experiences in their own way (Bartlett, Burton, & Peim, 2001; Cole & Cole, 2001). The approach starts from the idea that a person absorbs certain experiences into his already existing knowledge (assimilation). In addition, a person can rearrange his own concepts in such a manner that the new concept can be included (accommodation). Lev Vygotski and Jerome Bruner added the social component to constructivism. They assumed that communication

[1] http://10innovations.alumniportal.com/learning-by-sharing/connectivism-creating-learning-communities.html, retrieved on Nov 2nd 2015

represents a strong added value in the learning process (as described by Bartlett et al., 2001)
Learning within social constructivism consists of creating and arranging concepts in the brain. Therefore it is not learning fragmented knowledge by heart, but the development of meaningful concepts on the basis of experiences and a realistic context (Cox, 2005; Kolb, 1984; Kral, 2005). In this approach learning is made into a social activity, which is carried out together with others. By means of collaborating and communicating, the student is obliged to clarify his thoughts and he is confronted with the weaknesses of his ideas (VanLehn & Randolph, 1993). A more recent implementation of the ideas of social constructivism can be found in the Natural Learning approach as founded by Van Emst (2002).

- ***Connectivism*** is proposed to explain the impact of new technology on learning. Learning has always been considered as a process inside of an individual, yet according to connectivism, learning is a process that may occur outside the individual, within an organization or database. Connectivism is based on theories on chaos, network, complexity and self-organization. The connections by which we can learn are more important than what we currently know, i.e. “the pipe is more important than the content of the pipe” (Siemens, 2004). The combination of ideas created by weak links can create new innovations and insights. Connectivism starts from the individual, whose knowledge is extracted from a network, the individual him or herself is a member of. He or she feeds this into organizations and institutions, which in turn feed back into the network, giving the individual the possibility to continue learning. This cycle is instrumental in successful learning.

With the focus on knowledge and behaviour the first two learning approaches require a clear view on *learning objectives and learning outcomes* with their translation in well-defined programs and curricula.

In the constructivist learning approach the learning process will be the *result of the cooperation* between people. Learning in this approach is the result of cooperation, formulation of learning objectives is much more difficult.

In the connectivism approach formulating learning objectives is even more difficult. In this view the most important is to be member of a network of knowledge owners/workers, the required knowledge will not be defined in advance and during the learning process the knowledge – if available - will be found when necessary by *using the network*. This learning style was developed due to the fact that developing skills or the possession of obtaining factual knowledge became less important in comparison to skills in *where* to find needed knowledge (Siemens, 2004). Since knowledge is fluid and increasing in quantity, success depends on *expertise in seeking and evaluating new information* (Chen, Wu, & Ma, 2010).

Formal education represents a fraction of the learning in which any individual is engaged. Informal learning on the other hand occurs throughout the day via networks of colleagues, personal relationships, and multimedia and forms the biggest part of learning nowadays. Downes (2013) and Siemens (2004) state that within the traditional learning approaches (Behaviourism, cognitivism, and constructivism) education is mainly focused on transferring fixed knowledge to learners and programs prepared by experts like teachers, professors, educators. Furthermore, almost all learning activities happen within structured boundaries such as classrooms or homework and are more content-based rather than context-based. The connectivist approach on the other hand is based on chaos, self-organization and network theories (Siemens, 2004).

A different approach to eLearning has to be developed related to this development. It is this development that forms the basis for our objective to *de-linearize learning* and our focus on *new requirements for eLearning environment*. In the next paragraph we will further elaborate on our view on *eLearning in modern times*.

V. RELATION TO LEARNING IN EVERY DAY PRACTICE

Learning in the 21st century in a complex and dynamic world, is a life-long process. The need for a more informal way of learning – outside traditional learning institutions – is of growing importance. Based on the introduction of the roles approach, as described in the previous paragraph, the role of the traditional education institutions will be changing. It is our opinion that this role-based approach makes it possible to get a much closer relationship with market requirements. Nowadays, the distance between learning institutions and real practice in organizations lead to a situation where a gap can be recognized between learning requirements and teaching. This can be covered by allowing everyone who 'owns' specific sources of knowledge, to start a course. We have to be aware that this will lead to a growing importance of the ownership and IP issues around knowledge, but also – as we will see later – to a growing importance pf quality assurance regarding the knowledge that is included in the learning process.

The necessity of this development is partly based on the fact that education has to bring us to a future that we cannot grasp yet. Based on this view on reality, an important development in today's and future's learning has stated:

- Given the unpredictability of future life, the role of being a student, as a temporary phase in someone's life, by today has changed completely: *we all – from birth until death – keep on learning via many different channels*;
- Nobody will play the single role of being a student any longer in its traditional sense of being a receiver of knowledge and information. More often *new roles* will be added to that of an active formulator of information and knowledge. This will allow him/her - based on experiences - to transform into an *active formulator of curricula*, offering the transfer of knowledge that others may use in their active life;
- The traditional distinction between teachers and students is of declining interest in current day life; *interaction between people* is one of the most efficient ways to study, making use of the rich sources of experiences that everyone brings in to that cooperation, therefore the role and *importance of new communication technologies* like social media and networks have risen enormously and rapidly;
- As a result of this development the formal educational system is no longer able to keep up with the fast changing developments in current society with its profound impact on living and learning environments.

All by all, a completely different approach to roles in learning and to learning institutions should be facilitated by new forms of learning and by facilitation thereof via eLearning solutions. In our view the *newly proposed eLearning environment* and the general (open source) availability of it will make it possible to deal with educational issues on a broad field of study.

VI. CONCEPT OF DE-LINEARIZED LEARNING

Concept

The fact that dynamic developments within and in the vicinity of systems demand increasingly more attention, has been known for a while. An important reason for this is the fact that it keeps becoming clearer and clearer that organizations can no longer assume that current successes will be sustainable in the future (Fukuyama, 2011). Being aware of this is certainly not limited to organization theory by itself. Other disciplines also pay attention to the dynamics in change processes of systems. Fundamental research in this field took place in for example ecology. The resilience alliance[2] has been involved in research into the understanding of ecological system changes for the last 35 years. As a major reflection on the work of this allience, we refer to the

[2] http://www.resalliance.org/

Panarchy bundle, which was edited by Gunderson and Holling (2002) describing the understanding and controlling of natural systems (organization, people and nature) recognized a cyclic development, which is referred to as the *adaptive cycle*. Also in the field of business studies a growing number of faculties describe cyclical developments of organizations in different forms (Chandler, 2014; Ensor, 2011; Perez, 2002; Praag van, 1986). To understand the need for different learning styles better, we will introduce a specific view on organizational change.

The logic of change

Based on the approach of Thompson (1967), combined with the theory on strange attractors of Lorentz as referred to by Gleick (1987) Parson c.s. (1990) developed a model that further elaborates this tension and translates it into the influence of ICT on organizations. In their model they use the axes *want* and *can*. *Want* in the sense of providing direction, where an organization decides on the course it wishes to take and *can* in the sense of the ability to actually enabling this direction. This view was further elaborated by Abcouwer et al. (2006; 2010, 2011; 2015). It is called the *Adaptive Cycle of Resilience* (ACoR). It is specified that this motion is not random. There is certain logic in it: the development path is generic in character. The starting point is that an organization is in a state of ***equilibrium***. There is confidence that the organization is able to cope with threat from outside using the currently applicable management skills, as available within the existing dominant coalition. If external influences disturbing this equilibrium can no longer be denied or if a 'Black Swan' (Taleb, 2010) occurs, the organization is generally too far out of phase to be able to find a way out of the arisen situation. In that case we speak about a ***crisis.*** We use the following definition for a crisis:

An organizational crisis is a situation in which an organization resides, where the traditional ways of problem solving are no longer applicable and the organization is aware of that.

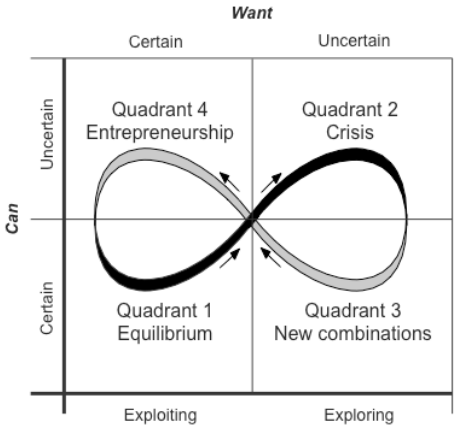

Figure 3 The adaptive cycle of resilience (A. W. Abcouwer & Smit, 2015)

In a crisis there is a need to add new varieties to the repertoire of actions: ***New Combinations***. These new varieties are not part of the existing repertoire of action mean that new interventions and countermeasures have to be developed. In most cases this means that learning and research processes for new knowledge have to be initiated.

When new combinations are developed the organization is facing the moment of making the final choice for the action to be implemented. This marks the change from quadrant 3 to quadrant 4: ***Entrepreneurship***. This choice demands an actual decision, which will often lead to an uncertain

result. The experiences acquired in the pilots or the scenario analyses will not have led to a situation in which the developed skills enable the organization to scale up towards actual production circumstances. The switch to a new equilibrium situation (and therefore a new quadrant 1 situation) demand unremitting labour and the reorganization and/or rationalisation of business processes before the organization gets back to a relative state of balance between want and can. After this, the whole game starts all over again.

The above described simplified descriptions of the adaptive cycles provide a first idea of the development as this may take place within organizations at different levels. In a changing context as described above, attempts are made to identify steps the organization might take. It is important to bear in mind that the organization came from a situation of stability. As referred to already by linking to Thompson (1967), this situation can be described as a balance between what the business wants/needs and what it is capable of (Sanchez & Heene, 2004). In a situation of stability, everyone knows how to respond to disruptions. The emergence of a crisis on account of a disruptive event confronts the organization with new challenges (Christensen, 2013; Taleb, 2010).

Impact on learning

Using the theoretical approach as described in the previous paragraph, the way how interventions and countermeasures are chosen may differ a lot. To be able to deal with these differences, different learning styles have to be introduced. Often a distinction is made between exploring and exploiting. This difference forms the bases for ambidexterity, as it is referred to in literature (He & Wong, 2004; Raisch, Birkinshaw, Probst, & Tushman, 2009). It elaborates on the insight that a distinction has to be made between the exploration of new possibilities and the exploitation of old certainties in (organizational) learning. In a modern learning setting both sides are evenly relevant. It means that in learning both ways of gaining knowledge have to be elaborated. It means that a balance has to be found between linear learning and a learning style that can deal with situations where nobody knows what will going to happen in terms of possible futures (mind that we use futures – plural – because future developments are really unknown so we should prepare for different possible futures). To be well prepared to this setting everyone has to focus on the potential changes in that future, which also means that everyone needs to learn new things and has to have interest in education. One has to learn to be able to deal with a range of possible futures.

New and innovative approach to learning

In our view a modern eLearning environment should focus on three main aspects of learning:

- the identification of relevant sources of knowledge and information and their owners;
- the roles of the actors of the learning cycle mechanisms;
- changing the aspects of the roles of the different participants of the learning cycle.

VII. DIFFERENT VIEW ON SOURCES OF KNOWLEDGE AND INFORMATION

A logical consequence of what we stated before is that we will have to be more open to different ways of teaching and learning – a different way of choosing the learning environments and supportive learning technologies that best fit to the needs of the interested parties is at stake.

It is important to identify that we mention ‘interested parties’, because the one who is playing the student-role in our view is not only the person attending schools to study from teachers, but everyone (whether it is a person or an organization or the society) who would like to obtain relevant knowledge.

Our current and deep research work in the field of eLearning allows us to state that there are certain issues that form barriers to efficient life-long learning:

- identifying the right information to be taught to the interested parties is of growing difficulty given the dynamics of change processes that take place in the current societal setting;
- identifying all the sources of relevant knowledge and information (if you are able to identify the requirements) to be taught to the interested parties is increasingly difficult. The traditional view of the teacher who knows it all and the student who is sponging knowledge and information has proved to be increasingly irrelevant. Finding the relevant knowledge and information is becoming a new and intriguing field of study. Modern eLearning environments should facilitate this search. It is quite obvious that the current eLearning environments, like the broadly used Blackboard and Moodle, are by no means able to facilitate this process of getting access to relevant and necessary information and knowledge. In the research we further elaborate on current up-to-date eLearning environments that might be used in this new approach to learning;
- and when the right knowledge and information has been found, identifying the right methodology and tools to transfer it to the interested parties, as well as preserve it for future use, is not really supported by current day traditional learning technology, but the development of new systems is starting up. Where possible we will include these developments in our future research.

VIII. THINKING IN ROLES VERSUS THINKING IN PERSONS

The above mentioned view is in line with what we already mentioned earlier. Current developments assume that in a dynamic and rapidly changing world - where we live in - we have to be more adapting, more open to the new ways of learning, meaning:

- restructuring the roles of students, teachers, researchers, practitioners and everyone else, who possesses knowledge, and actively involve them in the learning cycle - it is not only the teacher (as a person) who teaches, and it is not only the researcher who is creating knowledge, etc. We have to become aware of the fact that everyone plays one of these roles given the setting they are in. Everyone is in a sense an important source of information that might be of use for someone else, and even broader, relevant information may come from unexpected places as well. We have to learn to be open to that situation;
- It is also important to become aware that the demand for knowledge and skills is no longer focusing only on the needs of individuals. Organizations and society as a whole also have their requirements regarding the knowledge that facilitates them to have access to the knowledge and creative capacities to deal with future demands – which leads to a different view on knowledge- and information-needs to be relevant and fulfil those needs.

We also regard a change in the roles of teachers in this changing perspective: we believe that the teacher role has to be responsible for transferring all the knowledge formulated based on the knowledge of the practitioners, researchers, and from other available sources one may think of, to the interested parties. It is crucial in our view to identify that this role can easily be played by the traditional ‘person’ teacher as well as by any other person involved (the traditional ‘person’ student, practitioner or researcher). The impact of this changing relationship between person and role has an unknown impact on the functionality that modern eLearning environments will have to offer. The future research will focus on the development of a new theoretical view on that needed functionality. It is also our intention to build prototypes of systems offering these types of functionalities.

IX. REQUIREMENTS TO ELEARNING SYSTEMS TO FACILITATE THIS LEARNING APPROACH

Based on the insights as introduced in this paper we can summarize the requirements for a modern eLearning environment along the following three lines.

- **The process of acquiring, making accessible and where necessary, developing new knowledge and skills**.
  The traditional assumption that all knowledge has to be available before learning can start, is no longer relevant in our rapidly changing world. The process of finding the appropriate knowledge is an integral part of the learning process and has to be studied in full detail to be able to define the requirements for a collaboration system that facilitates this process. In an international context, getting access to knowledge and skills is also influenced by cultural differences and the question whether people are willing to share their knowledge. In future research, identifying an ownership role may in that sense make this issue clearer and more explicit;
- **The actual teaching process**.
  As mentioned before, a growing number of specialists will be involved in the teaching process. This will lead to different requirements for technologies supporting this new learning process. In this sense, we identified the student - , the teacher - , the practitioner – and the researcher role. Focusing on these roles instead of looking at the person who plays the role makes the process of choosing the appropriate learning approach - including the way technology can facilitate that - much easier. Thinking in terms of roles also makes it possible to introduce different levels of involvement on an individual, organizational or societal level;
- **Assessment of results and dissemination of this learning approach**.
  New methods of learning require new methods for assessment. Where the traditional linear focus in learning was on the transfer of knowledge from the teacher to the student, assessment was mainly focusing on the effect of learning in terms of the knowledge gained by the student and on the effectiveness of the learning process itself. The approach taken in this research leads to an extra aspect we should assess. Given the fact that every person involved in the learning process can play the role of supplier of knowledge (teacher- or researcher-role), the quality of the knowledge itself should be assessed. Where a broader range of stakeholders will be able to add knowledge to the used knowledge base means that we will have to develop mechanisms assuring the quality of the knowledge involved as well as methods to remove knowledge that appears to be irrelevant in the context we are working in. In traditional approaches, the process of choosing which knowledge is relevant enough to be included in the knowledge base - in use in the learning process - is solely assigned to the teacher in cooperation with the researcher/specialist (both as persons) as suppliers of knowledge.
  In the new learning approaches to be developed, the dissemination, in its meaning as exchanging knowledge and experiences in a broader context, by using the focus on roles in the learning process, will be obviously included in the process itself. Technology will be developed to facilitate the dissemination of experiences. By paying attention to this aspect of learning, quality assessed knowledge and skills will be made available for future use and forms in that sense a logical source for others. Dissemination is, in this sense, an integral part of the research project itself: there is a need for the development of a new learning ecosystem.

X. POSITIONING THE RESEARCH FIELD AND ‘FOR FURTHER RESEARCH’

In our view on the foreseen learning reality, sources of knowledge and information are no longer limited to traditional learning institutions. A broader and more international approach is of growing importance and also a necessity. Getting access to different sources on information and

knowledge doesn't stop at any border. Studying this topic from an international perspective is crucial for better understanding the contribution from different cultural backgrounds. This leads to the following fields of further study:

- We will have to identify all the roles of learning cycles in more detail (teachers, students, researchers, practitioners) and focus on a wider range of aspects (formal education of individual students; developing the skills for the organization; life-long learning in the society; ownership of knowledge and skills [IP]; differences in culture and willingness to share);
- We will have to develop a different approach to formulate learning requirements and needs regarding assessment methodologies to decide on the knowledge necessary to fulfil those requirements;
- We will have to focus on really new methods for the assessment of eLearning environments and technologies that can facilitate this different view on learning
- Focus on practitioners, owners of knowledge, or in a wider aspect: formal position of education of individuals; developing the skills for the organization; life-long learning in the society, also the differences in culture and willingness to share, all these issues have to be studied from a different perspective. The research will have to be accomplished with the help of online innovative tools and foundational research practices.

The research will finally result in a summarizing overview that will be crucial for understanding the learning and skills development cases and the educational reasoning, this all in an international context where international research and requirements are at stake. It will lead to basis insights into innovation actions to be taken. It will also serve as a tool to change attitudes on learning techniques and methods of individuals, organizations and societies, emphasizing the importance of cooperation and common work, improving the innovation and creative capacities of learners and supporting the new role of teacher.

ABOUT THE AUTHORS

Toon Abcouwer

Toon Abcouwer works at the University of Amsterdam. His research interest is on how organizations deal with crisis situations. Especially the different roles that information and information systems play in the various phases of crisis handling has his special interest. It is crucial for management to learn to deal with the problem to integrate that roles in one single Information systems infrastructure.

It is his believe that traditional governance approaches only offer a partial solution for that.

Bas Smit

Bas Smit is working as an information manager for the university of Amsterdam, overseeing the field of educational logistics. As an ICT consultant he's closely involved in supporting the developments both in logistics and education. With a high interest in utilizing technology to improve learning, Bas has worked closely with Toon Abcouwer in several articles regarding learning and the use of technology.

Emőke Takács

Emőke Takács has started her carrier as a researcher at the Hungarian Public Administration, where she was involved in training civil servants. She then has worked on the EU accession of Hungary and Romania, getting close to EU policies. She is an expert on EU funds and project management, delivered trainings, tutored eLearning courses, directed several scientific and research projects. Her interest is in efficient knowledge acquisition and management.

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