Draft of Toward a trialogical approach to learning: Personal reflections

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Abstract. The purpose of present article is to examine challenges of lifelong learning from the perspective of three metaphors of learning, i.e., knowledge acquisition, participation, and knowledge-creation. From the knowledge-acquisition perspective, learning is seen as an individual mental process. The participation perspective, in turn, examines learning as a process of growing up and socialization to a community and learning to function according to its shared practices. The third, knowledge-creation perspective aims at overcoming the dichotomy of the two other metaphors; it highlights transformative, expansive, and innovative aspects of learning through construing it as a longstanding collaborative effort of knowledge advancement. If the knowledge-acquisition view emphasizes within-mind monologue and the participation view dialogue between minds, then the knowledge-creation approach, the author proposes, is trialogical in nature because it addresses trialogues between participants and shared objects of their activity. The present investigator’s own challenging learning experiences are considered in reflecting on various aspects of learning and human development.

Introduction

Within one generation, European societies have transformed from agricultural to industrial, industrial to information, and, currently, from information to knowledge society. While the world is radically transforming, the theories that are used to explain and understand human learning and development have to be reconsidered. The traditional view, according to which learning is based on inherited and fixed individual capacities, does not provide an adequate basis for understanding the present era that requires everyone to engage in learning throughout their lives. Working life, at present, places a person repeatedly into a situation where he must surpass himself and acquire skills which he thought were not at all possible to acquire. Learning appears to involve reciprocal processes of personal and social transformation taking place across a long period of time (Engeström, 1999). In order to understand such processes, investigators need to develop frameworks that assist in examining learning as a multi-level phenomenon that, beyond individuals, takes place in groups, organizations, and networks. Within rapidly transforming environments, learning has to be seen as process of transformation, expansion, and knowledge creation rather than as merely a process of individuals’ assimilating already existing knowledge.

In the present paper, I reflect on various aspects of learning based on my personal experiences in overcoming learning challenges (see Hakkarainen, 2005). I have functioned as the director of internationally linked research group – currently involving about 15 full-time doctoral and post-doctoral researchers – at the University of Helsinki (see www.helsinki.fi/science/networkedlearning) for more than 12 years. The path I started on was quite different. I have an exceptional background for academics in that I repeated classes (years) in primary school twice due to my difficulties in learning languages, such as Finnish, Swedish, and English. When I repeated the last year of junior high school, I was sure that I would not survive high school: That was my reason for going to...
a vocational school to pursue a career as a milling machine operator. In the vocational school, I became interested in learning all over again. Vocational studies allowed me to exercise some missing skills as well as fill certain pressing gaps in my knowledge. Gradually I realized that “everything can be learned perfectly”, provided that you are committed enough. This created such a strong feeling in my power of learning, my sense of efficacy, that toward the end of my vocational school, I told some of my teachers that I am going to study to become a “doctor” (PhD). It was a long and multi-faceted process. I worked many years at Nokia Cable Factory as a lathe operator within a prototype laboratory. Simultaneously, I entered an evening school that allowed me to finish my comprehensive education, as well as high school. It took four years. I did not enter the university before I was 25. I became a learning researcher partially because I wanted to better understand the background of my own and other people’s challenging personal and collective transformations. The present article is grounded in my own learning trajectory because I consider it my duty to put myself on the line in terms of sharing my own boundary-breaking learning experiences in various talks and publications.

Three metaphors of learning

In the present paper, processes of learning will be examined through the three metaphors of learning, i.e., a) knowledge acquisition (monological), b) participation (dialogical), and c) knowledge creation (trialogical) (Paavola, Lipponen, & Hakkarainen, 2004; Paavola & Hakkarainen, 2005; Hakkarainen, Palonen, Paavola, & Lehtinen, 2004).

While these metaphors were not created for purposes of personal reflections, they appear to provide the conceptual tools needed to make sense of my own and many other agents’ trajectories of learning. I am elaborating these metaphors together with my colleagues within frames of the Knowledge-Practices Laboratory (www.kp-lab.org) project; this integrated EC project aims at developing technology-enhanced tools for facilitating innovative practices of working with knowledge across higher education and workplaces.

The traditional, cognitive approach examined learning as a process of individual knowledge acquisition taking place with the human mind (within-mind monologue). The participation or situated view, in contrast, considered learning to be a process of growing up and socializing to a social community and its norms and practices (dialogue between minds, Sfard, 1998). Together with my colleagues, I argue that one should additionally consider a third, distinct metaphor that addresses sustained individual and collective efforts in creating and advancing knowledge (trialogical processes mediated by shared objects of cognitive activity, Paavola & Hakkarainen, 2005). While the first two have been extensively examined and investigated, the third aspect is mostly unknown territory. Yet, in order to have a comprehensive view of learning one needs to take all of the perspectives, simultaneously, into consideration.

The knowledge-acquisition perspective

In psychology, learning has traditionally been considered as an individual phenomenon. It is assumed that learning takes place within the human mind, and that it is mental process in nature (Fodor, 1981). The mind is considered as a kind of container and learning interpreted as a process of filling this container with knowledge (for criticism of this view, see Bereiter, 2002). You, as an individual, have a very important role in learning. No one can, for instance, learn foreign languages on your behalf; you have to do it yourself or lose a great deal of your autonomy. This is one of the hard lessons that every learner has to go through.

The limitation of this approach is that it focuses on learning as a process of within-mind monologue. This approach tends to imply that if someone is unable to learn, there is something wrong within his or her head (brain). For a long time, I thought that I was a
rather slow or weak learner, so labeled. If you have once doubted your ability to learn, but figured out that you are wrong, you are not likely to make the same mistake. After learning to gradually overcome significant obstacles of learning, I started to question the meaningfulness of taken-for-granted beliefs and individualist assumptions regarding learning. Because I did not consider myself as an exceptional person, it was natural to consider, using analogies, whether the same understandings could be generalized to other students. Between people, there prevail many kinds of natural differences regarding learning, differences that become prevalent when students who are developing at an individual rate are instructed in homogeneous age groups (Rogoff, 2003). One develops faster, and another one slower. While this agent may learn novel things quickly, it may require a considerable effort from another person. Individual differences in learning are, however, too often seen as absolute and categorical rather than relative and developmental in nature.

Figure 1: Knowledge-acquisition metaphor. This metaphor examines learning as an individual and mental process. The human mind is considered as a container or archive that is filled in with knowledge.

Olson (2003) pointed out that individual differences have social basis: Categorical individual differences emerged with institutions that focused on selecting and classifying students to investigate groups representing various levels of school achievement and correspondingly varying educational tracks. Mass education, according to Olson, constructs (to consider one example) young students with a propensity to disturb others as “hyperactive” (ADHD). The best and ideal students, from the system’s perspective, are labeled “gifted”. Even if these kinds of categorizations emerge on the basis of comparing students with one another, they are considered and interpreted in an absolute and categorical way. Yet individual differences are, paradoxically, less closely related to the individuals to whom they are attributed, than to the institutions responsible of educating them (Olson, 2003). The structure and nature of the institution determine, that is, set the qualities of ideal individual; this information is then utilized in psychometric instruments which measure attributes that predict such persons’ success. Consequently, there are good reasons not to think that categories used to classify people, such as gifted and non-gifted, intelligent and stupid are “natural” or “innocent” in nature.

Although I have been ‘slow learner’, my learning history reveals that the label was not—it turns out—actually indicative of a lack of capacity to learn. Maria Clay (1998) emphasized that so-called “slow learners” are able to obtain good results when they are provided guidance tailored to their specific knowledge, personally meaningful epistemic goals, and personal difficulties. With external assistance, they may become active builders of meaning and knowledge. Learning difficulties can be overcome when teachers
and educators engage in intensive interaction with learners, learn to know them as individuals as well as understand their specific ways of learning and development. All learners should be allowed to build new understanding by relying on what they already know as well as capitalizing on their personal strengths and resources and proceeding to follow their own interests. A good learning environment allows many paths for achieving joint learning objectives, that is objectives which the learner has a say in formulating (Clay, 1998).

While cognitive psychology has significantly contributed to the advancement of learning theory, it has been too much preoccupied with individual and mental processes. Yet learning cannot be explained by individual characteristics; it is also related to the environment in which the person is functioning. It is useful to apply the concept of self-organization, which suggests the evolution of a structure in a system, which is, in the main, internally driven; the overall character of the system changes, because of evolving changes in subsystems and their relations (Hakkarainen, Lonka & Paavola, 2004). An evolving learning network may self-organize, because of small events, in a way that leads to ‘learning difficulties’ in the participants, or in a way that assists them in overcoming obstacles. In my case, lack of motivation, problems of concentration, disregard of homework, regular skipping of school, and the actions and reactions of my teachers and other students, led the learning network initially to self-organize in the way that led, so it was said, to a ‘failure’ of individual learning, due to an imputed lack of capacity. I would argue that, although my personal characteristics did not likely undergo essential changes, the network self-organized later on in a way that supported my overcoming learning difficulties. What was needed was one degree more of effort, covering certain critical gaps of knowledge, and systematic training, sometimes under teachers’ guidance but most often in interaction with other students, in missing procedural skills. In my case, it was crucial to have a network of social activities assisting my learning, networks that existed outside, rather than inside of classroom. In seeking to understand the process I have described, it appears essential to expand the scope of investigations toward social and cultural aspects of learning.

**The participation perspective**

Socio-culturally oriented investigators have argued that ultimately learning is a matter of growing up and participating in social communities and learning to function according to their shared practices, norms, and values (Lave & Wegner, 1991; Sfard, 1998). All required cognitive competencies are transmitted through processes of cognitive apprenticeship that transform newcomers’ peripheral efforts to oldtimers’ central participation (Lave & Wegner, 1991). Overcoming of learning difficulties becomes possible when the learner’s development and cognitive growth is facilitated by a rich context of cultural participation. For myself, such connection had be present in the case of all thresholds that I succeeded overcoming in my learning history. Cultural participation harnesses diverse distributed and networked intellectual resources for supporting learning, many of them outside of the educational institution in question. These resources may be divided according to a) materially distributed intelligence; 2) socially distributed intelligence, and 3) the development of identity and agency.

Just as the capabilities of a networked computer cannot be located inside of its processing unit, human intelligence cannot be found inside of the human head; human intelligent activity is distributed across a “wireless network of intelligence,” based on culturally and historically evolved cognitive tools and artifacts, and heterogeneous networks of people and artifacts (Clark, 2003; Donald, 1991; Hakkarainen, Lonka & Paavola, 2004; Vygotsky, 1978). Learning and intelligence do not just take place within the individual human head or brain, but are processes distributed over a network of various cultural-historically developed tools and instruments, i.e., cognitive prostheses.
(Clark, 2003). Merlin Donald (1991) has proposed that the architecture of human intelligent activity profoundly changed when the emergence of literacy (epistemic technologies of writing and visualization) opened up the External Memory Field (EXMF). You can develop much more complex ideas on paper than you can do in human working memory due to its processing limitations.

Figure 2: Participation metaphor examines learning a process of growing up to a community and learning to function according to its norms and value. This approach highlights transformation from peripheral to central participation as well as here-and-now dialogue between participants.

It is said that if you do not learn to write, you do not learn to think. Apart from foreign languages, I had learning difficulties in my mother language. I was not able to express myself in writing for a long time. It did not help to have a left-handed person’s unreadable hand writing. Toward the end of comprehensive education, I tried to compensate for this weakness by learning to use a typewriter. We did not have any courses in such things, so that I still type with one hand and by using only one or two fingers. Gradually, I developed a habit that whenever I had a problem that I did not really understand, I wrote notes about it. Consequently, I was asked to write articles for the newspaper of the student union of my school concerning issues in which I was regarded as knowledgeable. When the others said that they did not understand what I was trying to say, I started to write my pieces of text again and again – occasionally, even ten times. For a long time, I assumed that others are able to achieve a much better result already during their first writing cycle. Only when I learned about writing as a process, long after these experiences, did I realize that I had independently developed a corresponding productive knowledge practice. After some experience I learned to produce a relatively decent text already on the first try. Ever since, writing has been one of my intellectual strengths; it did not, however, come naturally, but through deliberate cultivation concerning practices of using corresponding epistemic technology.

In this regard, I am not alone, but in good company. In science and other extremely demanding activities, articulation of complex ideas takes place at the boundary surface of artifacts in interaction between the internal and external memory loops. This fact was acknowledged, for instance, by Albert Einstein who pointed out that “my pen is smarter than I am” (Skagestad, 1999, p. 552). When the Nobel-winning American physicist Richard Feynman gave a manuscript full of text and diagrams to Charles Weiner, who was investigating the history of his thought, the latter asked if this was “a record of the day-to-day working”. “I actually did the work on the paper” Feynman responded.
Slightly confused Weiner specified: "Well, the work was done in your head, but the record of it is still here." "No, it's not a record, not really. It's working. You have to work on paper, and this is the paper. Okay?" (Gleick, 1992, p. 409, quoted by Donald, 2001, p. 301). Human beings are able to entertain more complex thoughts when working within external memory field than they can do in their unassisted minds. Many pedagogical experiments that I have pursued in school have were aimed at investigating how technology-enhanced learning environments, those which foster epistemic practices based on intensive collaborative writing, can be used to facilitate learning (Bereiter & Scardamalia, 1993; Hakkarainen et al., 2004).

Beyond merging people and cognitive prostheses, there is another aspect of distributed cognition, i.e., fusing of minds in social communities and networks. Humans’ specific capacity is to fuse their cognitions into higher-level intellectual systems that allow sharing of knowledge and cognitive achievements (Hakkarainen, Lonka, & Paavola, 2004). Even when we examine learning of an individual student, in the background there is a large number of people who instruct, coach, and channel his or her intellectual efforts. Many youngsters need, for instance, adult presence and support, especially for structuring and managing their usage of time. Learning takes place in the whole network rather than merely at an individual node of it, i.e., the learner. The significance of such network support should not be underestimated. While carrying on my comprehensive education and taking part in an evening school studies, I focused on learning that was based on collaboration rather than individual competition. My learning history is full of examples of me being coached by other students and, reciprocally, me providing numerous lessons regarding mathematics or physics to someone else. These experiences made me understand that “teaching is the most effective form of learning”. This is because teaching something to another person requires much deeper understanding than personal mastery of knowledge. Many gaps of understanding become apparent only after you have tried to instruct someone else.

The lesson learned from these experiences is that many things that are hard to learn at school become accessible when you have the privilege of approaching them in a rich context of cultural participation. Sociocultural approaches help us to understand that learning is always a process of building identity and developing agency in interaction, while there is an opening up of the trajectories of future development. Success in learning does not imply constant success, but most of all meaningful and creative recovery of failures (Hakkarainen et al., 2004). If you are succeeding constantly, it means that you are not setting the level of desired accomplishment at a sufficiently high level. Even when people are failing in their formal studies, they may have a great deal of agency that is expressed through overcoming difficulties and pursuing various personal, professional, or social projects. Rich and long-standing experiences of cultural participation have an essential role in learning because they facilitate gradual transformation of habitus (Bourdieu, 1977; Roth 2002); this may require tremendous efforts and take only place across long periods of time. We may ask whether it would be possible for students to overcome what learning difficulties they have – difficulties that would endanger their progress is school – if they were given an opportunity to take part in such cultural resources and experiences, and those resources, especially people, were actively available. In my case, collective activities of my generation that promised to change the world stimulated a great deal of the confidence that I was able to muster across my early life cycle.

The knowledge-creation perspective

We argue that these two metaphors of learning are not sufficient to address challenges of the emerging knowledge society that require constant and deliberate transformation and pursuit of innovation (Bereiter, 2002; Engeström, 1999; Hakkarainen, et al., 2004).
The acquisition view examines how already existing bodies of knowledge get transmitted to learners, and the participation approach addresses how people get socialized to prevailing practices. Both of these metaphors may be developed to take novelty and innovation in consideration, but this does not appear to be where these approaches are at their best. Consequently, the present investigators have proposed that a third metaphor of learning is needed as a basis for theory and empirical investigation. We call it the knowledge-creation metaphor (Paavola, Lipponen, & Hakkarainen, 2004; Paavola & Hakkarainen, 2005). If the knowledge acquisition metaphor is monological in nature in terms of within-mind processing of knowledge, and the participation metaphor highlights dialogical interaction, the knowledge-creation metaphor is said to be trialogical in nature because it is a process organized around systematic and deliberate pursuit of advancing shared objects of activity (Paavola & Hakkarainen, 2004). In the middle of Figure 3 are shared “trialogical” objects because pursuit and development of these entities is the central aspect of knowledge-creation. The objects may be conceptual (questions, theories, designs) or material (prototypes, concrete products) in nature or represent practices to be collectively reflected on and transformed.

**Figure 3:** Knowledge-creation metaphor. This metaphor addresses sustained processes of advancing shared objects of activity whether those are conceptual (questions, theories) or material in nature or represent practices being reflected on and transformed. Knowledge-creating learning has become more accessible to educational institutions with the advent to technology-enhanced learning environments that elicit systematic collaborative knowledge creation. The process takes place in interaction between personal and collective efforts.

The argument of the present article is that rather than mere knowledge acquisition or social participation, learning may be seen as a process of knowledge creation, even at the upper elementary level. My own early knowledge-creation effort were deeply embedded in collective student activities across the 1970s; it was like being in an extracurricular graduate school that provided me much more advanced knowledge practices that
the school ever did. When I was about 13 year old, I became interested in the student union of my school and started to take part in provincial as well as national meetings. From newspapers and television, we saw poverty, misery, and war that were difficult to integrate with such “home district” education (i.e., education addressing mainly local affairs) that we were provided. Simultaneously with failing in my school studies, I became interested in activities against the Vietnam War, apartheid, and neocolonialism, and started to actively search for information about these issues from various sources. I gradually became so knowledgeable about the Vietnam War that some of my classmates started to ask me to tell them about the war and related issues. They called themselves my disciples. While still not doing very well during lessons, I was answering all kinds of explanation-seeking questions and providing more or less coherent arguments during the breaks, regarding global issues that were not at all addressed at school. Beyond international ones, also educational issues concerned us. We wanted to do meaningful rather than rote learning; collaboration, rather than collaboration.

I learned practically all my academic skills though taking part in collective student activities. Since my middle-school years, I had a central role in student unions of all those educational institutions in which I studied. The network that was supporting my intellectual growth emerged from outside rather than inside of school. It took place in activities organized by students themselves rather than ones which belonged to the official curriculum of the school. I do not think that it is an accident that, for instance, the present Prime Minister of Finland (Matti Vanhanen) was one of the activists of the organization. From the 13 (my age) to 19-year-old participants in those meetings have become the current political, cultural, and scientific elite of Finland. With hindsight, some of the ideas elaborated were not so smart after all, but overall participation in these activities provided deep enculturation to a very high-level of epistemic practices, comparable with those of university education. Intelligence and creativity are not in the head but embedded in collectively cultivated knowledge practices that channel the participants’ efforts in the way that elicits deliberate advancement of knowledge. A crucial transition in my educational career took place when it suddenly came to my mind to apply collectively cultivated knowledge practices to my own school studies.

These social activities made me to tackle extremely complex international (e.g., the Vietnam War) and national (transformation of Finnish education) issues from a very early age. In order to understand these issues, I was forced to start reading various types of research reports, government committee memos, scientific articles, and publications. Participation in such social activities made me constantly stretch my cognitive abilities and epistemic resources. While the knowledge and understanding in question was constantly validated in face-to-face meetings and in conducting various projects, its process did not represent mere dialogue between minds. I was constantly involved in writing various documents that synthesized our collective understanding regarding the issues involved. These documents were discussed across a large number of meetings involving conflicts between different perspectives and political opinions. Some of the documents were very large (close to a hundred pages) involving complex arguments and detailed analyses. The issues appeared to be larger than life, so I was completely immersed in these activities and extremely motivated to do so. While taking part in student activities, I often carried many documents with me – to the extent that I was jokingly called “bag brain” by my classmates. They were right in terms of the intelligence not being in your head but distributed across such inscriptions. It was natural to expand such practices toward professional production of academic knowledge across my post-graduate and doctoral studies.

Discussion
The present paper is about different approaches on learning that are critical for understanding both individual and collective challenges of learning characteristic of our time. It is also about how I learned to learn, and, in particular, learned to learn in a different way, based on working with others on common projects, such as reports and proposals to the government. Much of the learning occurred outside of formal educational programs. These were my own investigations based on my own interests, and some were more influential than my school learning. Now, with hindsight, I know that this story is about my "knowledge practices," ways in which knowledge is pursued, developed, and advanced in a social setting. I now call the ideas, writings, reports, plans, and so on, "knowledge artifacts" or "trialogical objects," terms I did not even know at the time.

From self-organization and dynamic systems theories have emerged models of human development that help to examine systems processes of human cognitive development. For example, let us assume that a child is especially interested in stories that he or she hears. This encourages parents to read more and more stories. This elicits the development of the child’s intellectual skills and makes possible the sharing of even more demanding stories. As a consequence of dynamic interaction between cultural-historical environments, caretakers, and the child’s intellectual achievements, open up a novel transactive developmental pathway (Sameroff & Mackenzie, 2003) in which the agent and environment are in a dynamic interaction. Initially minor differences in intellectual performance, motivation, and commitment multiply when the agent in question searches for and encounters more challenging environments (Ceci, Barnett, & Kanaya, 2003). These environments, in turn, elicit the development of new intellectual competencies, making even more challenging environments accessible. Apparently something like that described above was going on in my case. Like many other people, I actively selected the environment in which I was growing; I shaped it, and was shaped by it. Such processes explain the puzzling phenomenon that someone who appears initially unable to learn, may end up with a higher level of intellectual achievements than most of the learners appearing to be more promising.

![Diagram](image)

**Figure 4. Transactive process of intellectual development** in which a person’s cognition coevolves with the heterogeneous network of humans and trialogical objects of activity. Mounting competencies make more demanding environments of activity accessible to the agent (an individual or community) that elicit further enhancement of epistemic and intellectual resources.
I have seen the world both bottom up and top down: The history of challenging learning experiences has taken me from the worst students of a mediocre school to an extremely selected population of academic professors. This group of investigators, selected out of numerous candidates, is often regarded as talented or exceptionally creative. These kinds of characterizations, which I may use when writing a letter of recommendation, make me to smile. I am convinced that “giftedness”, if there is such a thing, is something that emerges from an agent’s whole learning history rather than is innate or pre-given. Those things that an agent is able to do today do not exhibit his or her mysterious ‘individual abilities’, but most of all represent development-historically evolved competencies being cultivated and realized socially in a process of surpassing oneself. While genuine differences in individual intellectual capabilities emerge from such processes, those are developmental and historical rather than absolute and categorical in nature.

I do not see any essential differences between those blue collar workers that I met in Nokia Cable Factory and those whom I currently meet in scientific conferences. The spirit of experienced professionals’ is not burning like a fire within because these people are somehow individually different from the others deficient in capacities or intrinsic motivation; it is a result of human growth taking place, embedded in social context, through longstanding, sustained, resilient, and honest overcoming of difficulties, crossing boundaries, and going through personal and cultural intellectual growth (Seligman & Csikszentmihalyi, 2000). Higher-level agency being formed in social communities appears to be carved from such tough and resinous wood whether it occurs in university’s lecture hall, at the loading dock of a harbour or in another challenging environment of activity. Hence I believe that “intelligence is not something pre-given or inborn but largely a result of collective activity. It grows though overcoming difficulties involved in pursuing courageous and creative projects and enterprises within environments conducive to such undertakings. It is a bright fire that only interaction between agents taking part in networks and artefacts supporting their activities [causes] to flare up and grow” (Hakkarainen, Lonka, & Lipponen, 2004, p. 367).

References


