2013 Lecture "From Teams to Knots: A Challenge for Future-Making"

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The lecture was given online to participants in Japan on June 17, 2013, from the Center for Research on Activity, Development and Learning CRADLE, University of Helsinki, Finland. This lecture commemorated the publication in 2013 of the Japanese translation of Professor Yrjö Engeström's book, From teams to knots: Activity-theoretical studies of collaboration and learning at work.[1]

The title of this talk is "From Teams to Knots: A Challenge for Future-Making." I would like to briefly describe how this recent book called *From Teams to Knots* emerged as a research project and what I see as next steps or future challenges in this type of analysis. This particular book is unusual in that it presents results from research on teams accumulated over a long period of time—more than 10 years of looking at teams in very different organizational settings. The

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whole book is kind of a journey in time. It not only documents what has happened to my own theoretical understanding of teams but also how the world has changed during that time and how teams themselves have been transformed, let us say, between 1990 and 2008. Much has happened in the world of work and in the world of learning, which means that this book not only analyzes teams but also the historical transformation of teams. Initially, my assumption, my hypothesis, was quite naively that teams represent the future of work—that people should indeed learn to work in collaborative groups and make decisions and develop and change their work practices in teams. At that time teams were understood as relatively stable formations; people would remain in the same team for a lengthy period of time, so the idea of a team was something like a miniature community.

Now, a much more contradictory picture of teams emerges from the analyses that are reported in the different chapters of this book. First of all, teams are very different depending on what kind of work and what kind of production they are embedded in. If you have a team in a craft workshop, it looks very different from a team in a global company that mass produces some goods and is using teams to streamline and to continuously improve its processes. Teams are not a single monolithic formation. Historically, there have been different kinds of teams, and the first lesson from this project is that you should not actually talk about teams in general. You should always ask what kind of production, what kind of work, what historical type of work and production this particular team is embedded in. This historical perspective on work and workplace learning is unfortunately still quite rare. Most research on learning, and on learning in workplaces in particular, is actually oriented to the here and now. There is also a tendency in learning theories to present the ideal learning as an ahistorical model that should be valid forever. The historicity of teams and historicity of learning in teams is the first lesson from this book.

Historical types of production can be presented in a simplified way. We can talk about craft work and production that is dominated by tacit knowledge and very stable work habits that are usually not articulated in any explicit way. Historically, craft modes of production have been largely replaced by mass production, which is based on explicit and articulated knowledge and rules, while production processes are carefully described, with the aim of saving labor and automatizing production as much as possible. Process enhancement refers to the phenomenon of connecting continuous improvement with everyday work, which means that the practical knowledge of frontline workers also becomes very crucial. Mass customization is a much more recent phenomenon in which products and services are customized to particular clients and customers. In other words, this requires that mass production be combined with various forms of flexible modification of products and services according to the needs of the customers.

Finally, in this model, the current interest is very much in various forms of co-configuration or co-production in which customers or clients are directly

involved in the production of goods and services so that this is actually done jointly, which requires continuous dialogue and negotiation between the producers and the clients.

Now, this simple image tells you that if you put teams in any one of those boxes, they look very different, and they serve different purposes. In process enhancement, teams are actually tools for making the processes more efficient and reducing waste and bottlenecks in various productive processes. In co-configuration, a team typically would be needed in order to establish a better collaborative relationship with the customers to actually produce something jointly.

The analysis also shows that teams are internally contradictory. Often, teams are depicted as something wonderful, something supportive and very strongly learning oriented, so that teams become a kind of ideology: teamwork is good. This type of ideology is often found in management literature. However, many critical researchers claim that teams are actually only a new type of tools of management control. To put workers into small teams allows the management to keep them better under control. I think that both of these perspectives are very limited and that when you look at real teams, you see both, the control aspect and the more emancipatory aspect of actual innovation and learning.

A key lesson from this book is that you should look beyond the ideology, both the ideology of teams as positive and the ideology that depicts teams as only a management plot to control workers. However, going beyond that, you see very contradictory processes at work in teams. Above all, it is important to try to identify the emancipatory potential in any concrete team setting. However, the classical teams with stable membership and clear boundaries are actually fading away. They are becoming rare. These kinds of traditional teams are increasingly difficult to find in any real work setting today. They are being replaced with much more fluid and flexible forms of collaboration. Rapidly changing combinations of people and expertise are put together and dissolved. Teams are simply in many cases becoming too rigid and not sufficiently quick to change and react to

new demands. This, of course, reflects the fact that markets are so rapidly changing that new products, new services, new types of customers, and new types of production profiles are constantly needed in companies, and, therefore, a relatively stable team structure can become an impediment for this type of flexibility. However, these new fluid forms of collaborative work are actually quite poorly understood. We do not know very much about them. What is clear is that when traditional teams are dissolved and replaced with these more fluid forms of collaborative arrangements, workers and managers often lack support and tools, and the situation can become extremely stressful and difficult to handle for both workers and their supervisors. For that reason, I found it very necessary to try and understand this new more fluid form of collaborative work, and I call it "knotworking." That is why the name of this book is *From Teams to Knots*. The "knot" refers to a situation in which people come together to solve a problem or accomplish a task, but they are not together permanently. They come together, do the task or solve the problem, and then they disperse again. It is this kind of pulsating movement of coming together through forming a knot, working together intensively for a period, and then dissolving that I call "knotworking."

It means that workers in various kinds of organizations today have to move from one type of collaborative combination to another very quickly, and often they are involved in multiple collaborative knots at the same time. I define "knotworking" as a rapidly pulsating distributed and partially improvised orchestration of collaborative performance between otherwise loosely connected actors and organizational units. This means that we need to understand the rapid formation of these knots, how they work together, how they achieve something, although they do not have so much common background, and then how they dissolve and the next knot is formed with a somewhat different combination. It is this kind of pulsating movement of tying, untying, and re-trying together seemingly separate threads of activity that is the core of knotworking.

What is important about this type of work is that there is no longer a single center through which all this is organized. It is not the single center or command that says, "Okay, you work now together for the next two weeks on this problem." It often happens that these knots are formed without any clear authority making that decision, simply because they become necessary. What is typical to knotworking is that it is no longer clearly controlled by a single center of authority. The center of authority and initiative keeps shifting from moment to moment even within that single period of collaboration. Who is the boss who is leading these changes? In fact, typical to knotworking is that the one who has the best expertise or the best idea for a given situation takes the lead, and then when they move to a next step in the project, somebody else takes the lead. The leading role is no longer assigned permanently to somebody.

This is especially clear when we look at, for instance, medical work where various specialists or various areas of medical expertise have to collaborate to care for a patient who has some complicated chronic condition, typically with multiple symptoms and perhaps multiple illnesses, such that no single doctor can tell others what to do. Each one of those specialists must contribute, and they do not have time for official meetings in which somebody is the boss. They must learn to coordinate in a much quicker and more flexible way to keep each other informed but yet not wait for a long time for others to give their opinion. In other words, there is a very strong element of improvisation and quick resolution of situations. However, this quickness alone is not enough. The participants also need to have a long-term shared perspective that keeps them together. This type of knotworking is a dialectic between quick improvisation and long-term perspective. It is essential to remember that in knotworking, the customer or the client, or the patient or the student, is a co-producer. That means that knotworking happens through negotiation. A constant negotiation is underway.

You could say that knotworking is essentially a type of work, a type of production in which the participants continuously generate future-oriented solutions. The production of existing services and goods is melted together or integrated together with continuous development, future possibilities are continuously envisioned to develop and improve practice. This is a very future-oriented type of negotiated collaborative work and collaborative problem solving. This is important and poorly understood. Typically, when work is analyzed, the issue of future-making, or how the future is constructed in work, is neglected. Usually, it is thought that, okay, the future belongs to the management, that the management will design the next plans, and then they are implemented, and the workers just go along. In today's world, that is too slow and too mechanical. Future-making is becoming a part of everyday work.

Now, let me give you a quick example from a very recent research project that we have been doing on knotworking here in our center at CRADLE[2] in Finland. This example is a project called "Knotworking in the library." This is a

project we have undertaken in the past three to four years with the university library of University of Helsinki.

The City Center Campus Library of University of Helsinki is housed in a new building. It is an architecturally impressive and beautiful building. At the same time, it represents a big challenge because the library of a university, an academic library, is supposed to serve researchers, professors, and lecturers as well as the students. In fact, the university library traditionally is primarily meant to serve university researchers. However, in today's world, researchers do not go to the library very often anymore because everything is available to us online. In other words, the digital services we receive through computer networks allow us to get what we need; publications, journal articles, even whole books can be obtained electronically without going physically to the library. Why do they need this big beautiful new building if nobody goes there? Of course, students still go because they have to pick up their textbooks and read for their examinations, but that is not enough for a good academic library. They want also to serve the researchers, us, who are the traditional core clients. Otherwise, it becomes just a quick repository of textbooks, and that is not the idea. In fact, the university library typically employs very competent librarians who know their domains very well and who are very interested in serving researchers. The problem is that these internet-based services, including Google and many others, seem to be making the library obsolete for researchers.

In the library activity system, the subject is the librarian, and the object used to be the needs of researchers who wanted books and articles from the library. But now they are not there anymore. Researchers have disappeared. The question is, what kind of instruments, what kind of services could we offer to the researchers to bring them back to the library? Existing services clearly do not work. What could we offer them? Or are we becoming obsolete? This is the question for the librarians. This issue of what we could offer to researchers also raises the question of who has the expertise to serve the researchers. Are there

enough librarians who can offer them really customized services that correspond to their needs? These questions were really bothering the employees and managers of this new, beautiful Center Campus Library of University of Helsinki.

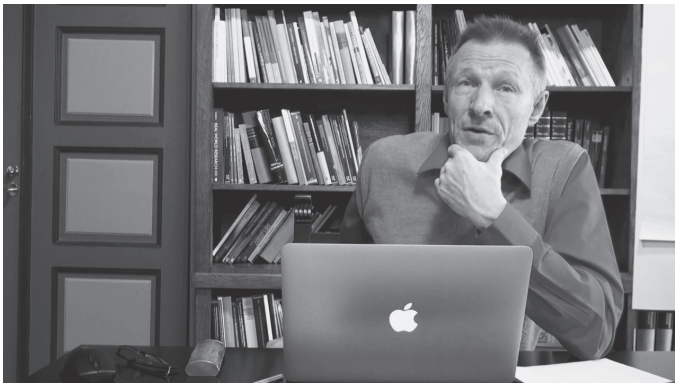
The library management of the university wanted our research group to come and conduct a Change Laboratory intervention with them to analyze the situation and to try to find out what to do about it. We suggested that perhaps the idea of knotworking with their clients, with the researchers, could be a solution. This means that maybe the librarians should learn to get out of the library to meet the researchers in their departments and research centers where the researchers work, and thereby establish a new type of continuous problem-solving and knotworking relationship with the researchers. This might gradually also bring the researchers back to the library to meet with the librarians and to work with them.

This led to about three months of weekly Change Laboratory sessions in which we analyzed the situation. We invited four research groups to serve as pilot clients, and about 20 librarians were involved. We realized that they needed to redesign their services, to create what they call "service tray" or "service palette" in which the new services that researchers need are made clear—explicit—so that they can be offered to researchers. They also created what they call a "pyramid of customization." Not all services that libraries produce can be custom-made for individual research groups. There are also mass-produced services such as offering textbooks to students and so on. They needed to develop a model for the new services and a model for the customization of services.

A new division of labor was needed, which they began to call "knotworking library." This is a division of labor in which they could flexibly find ways to achieve sufficient specialization so that they could actually serve quite demanding research groups. For instance, if you have a research group that specialized in international law, they needed very peculiar kinds of services. You have to understand where the databases of international law are, court cases, etc., how to access them, and how to negotiate ways to get exactly the type of information that this discipline and this type of research requires. However, you have to be able to do more than specialize because you must be able to move. It is impossible to have so many librarians that every research group would have their own librarian. In other words, every librarian also has to be able to move between research domains and research groups to some extent. This notion of a knotworking library became very important for them.

They developed a service tray for research groups which contained several big elements: research data management services; literature and information-seeking services; services to support research visibility in the scientific community; and finally, research assessment tools that help to assess the impact and value of the research done. In the middle of these four elements is training and support for research work, the idea that the librarians should actually help

the researchers gain the ability to continuously operate as partners with the library. This type of a model was the first step. However, the second step was equally important because they needed to think about what services really need much customization specific to each research group and what services can be more standardized. They developed a pyramid of customization, where the top of the pyramid is the most specific; for instance, the management of research data is an area in which it is very difficult to produce standardized mass solutions. Each discipline has its own kinds of data and its own special types of data management problems. For instance, if you think about experimental psychology using a lot of, let us say, neuroimaging data that requires much memory in a visual form, it is very different from data that, for example, the humanities use, which is typically textual data. Each research group needs its own type of solutions and its own type of support. However, at the bottom of the pyramid are researchers' simple needs for literature and acquisition of what is being published. Those can be standardized quite efficiently. We can offer researchers standard services of continuous feeds of new publications in the researcher's specific domain using their own keywords, etc. They need to develop this model incorporating a whole range of different levels of customization or standardization in order to start thinking how to divide the labor, who does what, and how much work is required because the library does not have endless resources. It has to figure out how to do this with its existing personnel. This was a very important model for librarians that helped them to design their work, to fit the new needs of researchers.



Now, all this is connected to knotworking in very interesting ways. While they were creating these new tools, these new models, at the same time librarians started taking their own knotworking initiatives. Here is a little example from the last Change Laboratory session in which a librarian says:

> "Now we have founded in the spring a joint editorial team. This is an editorial team that cuts across the different campus libraries. University of

> Helsinki has four campuses, each with its own library, and we realized that data management support for research groups should be actually planned together across these libraries so that each library does not have to do it separately. At the moment, this group has members from the Center Campus Library and Viikki Campus Library, which is the natural science library, and we expect to get members from other campuses as well. So far, we have fine-tuned the web pages and added information concerning the Center Campus so that it is no longer just serving Viikki. Our dream is to make it a good tool that we can generally offer to researchers. Actually, we put together a knot here."

The librarian used this word, "knot," meaning that they created this collaborative group across these campus libraries without asking permission from the director or going through formal administrative procedures. They simply decided that they needed to do this together, and they were not going to waste time and energy with going up and down in the hierarchy—they just did it. This is a very important element of knotworking. The director of the library reacted by saying:

> "What has been interesting, what we have learned from this knotworking with research groups—and I actually hoped it would happen—is that we will get similar thinking taking root inside our own organization. When a problem appears, we gather appropriate experts in the organization for a short period, and then we try to solve the problem, make a proposal how to proceed and then possibly re-organize ourselves again. In some areas, this is already becoming visible. People clearly dare to take responsibility for development; such ad hoc groups have emerged."

Knotworking is also a big challenge to the agency of the participants, to start taking this kind of initiatives. Like the library director said, "People clearly dare to take responsibility for development." It's a question of courage to take initiative and to break the pattern of waiting for something to come from above.

Now, this means—and I am starting to summarize what I have been trying to say—that future-making requires both expansive use of artifacts and transformative agency from the participants. In the library case, this pyramid model of the services functioned as an expansive artifact which they used to see how they wanted to move toward the future. In a way, we can call it a "where-to artifact." Artifacts in themselves do not determine how they are used. The very same pyramid picture could be used also restrictively to impose something on the participants from above. However, this artifact was constructed by the participants and used by them to build their own future. It is not the artifact itself that determines whether it is expansive or restrictive. It depends on how it is constructed and used in work.

When this opening-up of new possibilities is happening, we can identify

specific actions that we might call "actions of transformative agency." There is often resistance such that people actually start saying, "No, this is not a good idea," and this resistance can be a very important first step toward a genuine transformation. If people do not resist, they may not be seriously involved. You often have to resist before you get seriously involved. It is a natural reaction that first you say, no, that is not the way we want it, and only after that, you can start to decide your own way.

Criticizing is important because it means that you see what is wrong in the present situation. What needs to be changed? Then there are actions of explicating possibilities saying, "aha, perhaps we could do that; it has been done somewhere else." Envisioning is already much more like actually concretely depicting a future model of the activity. Then there is committing to change actions, which typically takes the form of saying, "I will do it", or "Let us do it tomorrow." This is commitment. Finally, taking actual, material change actions is the most consequential and mature form of transformative agency.

Notes

1 Engeström, Y. (2008). *From teams to knots: Activity-theoretical studies of collaboration and learning at work.* Cambridge: Cambridge University Press.

2 Center for Research on Activity, Development and Learning CRADLE, University of Helsinki