Developmental Transfer as a Goal of Collaboration between School and Work

A Case Study in the Training of Daycare Interns

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Abstract. *The aim of this article is to present a new model of collaboration between school and work. This model is funded on the concept of developmental transfer, in turn, based on activity theory. The article describes the features of this developmental transfer and provides an example of the way in which to apply this concept in vocational education, specifically applied to the training of daycare interns. The article illustrates and analyzes the phases of the developmental project using the activity system as a tool for describing the progress of the developmental work. Additionally, the signs of the developmental transfer are analyzed.*

Keywords: *Developmental transfer, activity theory, collaboration, vocational education, case study, internship*

Collaboration between School and Work as a Challenge for Vocational Education

In the beginning of the new millennium, the meaning of relations to working life has been emphasized at all educational levels in Finland. How do we prepare the student for working life to analyze the work situation critically and to anticipate upcoming challenges? Different kinds of solutions have been developed and offered. These include partner-based training solutions and real joint developmental projects in collaboration with the working life. These models provide interesting starting points for reducing the gap between school and work. They exceed the models of transmission of knowledge from the

school to working place. Nevertheless, some problems remain. In partner-based solutions, students work in collaboration with real enterprises and interview the practitioners to get up-to-date information in solving developmental tasks given at school. However, according to Peisa (1996, p. 164) the problem with this model is that experts in business life act only as the source of information or serve to analyze the realism of solutions created by students. Instead, the problems should be based on working life and not on the imaginary problems created at school.

Training solutions based on the problems of working life have been indeed developed. Lambert (1999) elaborated a new kind of training and developmental situation called 'learning studio' in the boundary zone between vocational teacher education, the workplace, and the school. The learning studio offered a possibility to evaluate and revise the ideas created in vocational teacher education. However, the problem of this model is that the collaboration is intermittent and the long-term continuity is therefore missing.

This article presents one viewpoint that will go beyond the gap between the school and workplace. The article is based on the research and developmental project in the Center for Activity Theory and Developmental Work Research in the University of Helsinki. Basically, it boils down to a question of transfer. How can schools equip students with the ability to transfer their knowledge – to use what they have learned to solve new problems successfully or to learn quickly in new situations. Developmental transfer based on activity theory and expansive learning (Engeström, 2001; Tuomi-Gröhn & Engeström, 2003b) gives one answer to this question. From the viewpoint of activity theory, previous accounts of transfer are inadequate, in that the unit of analysis, the learner, is still depicted as an individual. An activity-theoretical view (Leont´ev, 1978; Engeström, 1987) offers a new unit of analysis of learning and cognition: a collective, object-orientated activity system. The learning of an activity system, such as a school or work organization, and the learning of an individual are intertwined, and the individual's learning is understandable only if we understand the ways in which the entire activity system "learns." In this view (Tuomi-Gröhn & Engeström, 2003b), meaningful transfer takes place through interaction between collective activity systems. For example, the school and workplace may engage in collaborative interaction in which both learn something from each other. Solutions for novel problems are created by using the expertise of both activity systems. Transfer is not based on the transition of knowledge only, but on collaboratively creating new theoretical concepts and solutions to problems that lack ready-made answers. This process is multidirectional and multifaceted, involving transitions from school to workplace and from workplace to school. On account of its dynamic nature, this transfer is called *developmental transfer*. The task of this paper is to illustrate the concept of developmental transfer and how to promote it in education.

The polytechnic reform launched in Finland at the beginning of the 1990s, entailed numerous changes in vocational education. One of the reformations

was establishing a new program in Social and Health Care called 'practical nursing'. The reason for establishing a new program for nursing was that the education in the field of social and health welfare used to be based on narrow specializations. The nurses for hospitals, children's hospitals, personnel in day-care centers etc. were trained in different study programs which did not allow for mobility in working life. To solve this problem, and to facilitate the mobility and flexibility of the workforce, narrow specializations were merged into one broadly based program called 'practical nursing.' It prepares nurses on the secondary level of education for a range of careers spanning the entire social and health welfare sector from children to the elderly, from those in good health to those requiring intensive care.

Nevertheless, this reform has created a new set of problems. What content and forms of education can guarantee adequate expertise in such a broad field of practices? How should the structures and practices in the workplace be adapted to cope with the students' new situation? In addition to the training of employees with specific technical and manual skills, students should now be prepared to acquire new skills and be better equipped to deal with people and social relations. Those who have the previous kind of education could upgrade their vertical expertise in their narrow field as described in several novice-expert models (see, e.g., Benner, 1984; Dreyfus & Dreyfus, 1986; Glaser & Chi, 1988). However, practical nurses such as daycare workers have to be able to face new situations in working life without having learned specific answers to them in school. In these kinds of situations, expertise is not only manifested in performing known tasks. New problems arise constantly, and there is little reason to expect that their solutions can be quickly turned into routine repeatable procedures. These conditions give rise to a need for horizontal expertise, where practitioners must move across boundaries to seek and give help, and they must be able to find information and tools wherever these happen to be available (see Engeström, Engeström, & Kärkkäinen, 1995). The master-novice relationship is becoming problematic, because new situations demand dialogical, collaborative problem-solving. A central feature of this kind of expertise may be characterized as polycontextuality and boundary crossing between activity systems. This means bringing information, knowledge, and practices from one activity system to another (Collins, 1990; Cole, 1991; Engeström, 1992).

This study focuses on the training of practical nurses at the Helsinki Institute of Social and Health Care. The education of practical nurses was extended in 1998 from 2.5 to 3 years. For those students with only 2.5 years of training, an additional 20 study weeks of training was offered. The additional training of practical nurses included mainly working in the work place and participating in the developmental project. The aim of the internship was to create and experiment with a new kind of collaboration between school and work.

When starting this study, there were nine projects implemented in the train-

ing of practical nurses at the Helsinki Institute of Social and Health Care aiming at developmental transfer. The studies indicated (Tuomi-Gröhn, 2003; Lukkarinen, 2005) that the results of different projects were diverse. In some cases the learning results were even weaker than in the traditional internship. I have analyzed the reasons for the failures in my previous study (Tuomi-Gröhn, 2001). However, there were also very successful cases with results that also expanded to other organizations. This article is a continuation of my previous study (Tuomi-Gröhn, 2003) in the sense that one of the projects analyzed there continued also in to the following year. *The aim of this article is to analyze this longer project, find out how the collaboration between the school and workplace develops and what signs of developmental transfer are to be found.*

Developmental Transfer and Its Contribution to Vocational Education

In this chapter, I present the central features of the developmental transfer and how it facilitates in the collaboration between school and work. Moreover, the debate on transfer has intensified over the last twenty years (Detterman & Sternberg, 1993; Anderson, Reder, & Simon, 1997; Greeno, 1997; de Corte, 1999; Hatano & Greeno, 1999; Beach, 1999, 2003; a summary and analysis of different conceptualizations on transfer see Tuomi-Gröhn & Engeström, 2003b). The discussion in the previously mentioned publications has mainly concentrated on the debate between cognitive and situated approaches. Our research group in the Center for Activity Theory and Developmental Work Research in Helsinki is grounded in a developmental perspective on transfer that attempts to go beyond the opposition between cognitive notions and their situated challenges by shifting the emphasis from an individual to a collective conceptualization of transfer. Developmental transfer gives us a framework with which we can explain how new knowledge, activities, and practices are created collaboratively.

Developmental transfer implies that the basic unit of analysis of learning is a collective, object-orientated activity system like a school or a workplace (Engeström, 1987). In preparing to face a constantly changing society, the participants of different organizations, such as student, a teacher, or a practitioner, have to cross boundaries of different activity systems to seek and bring information, knowledge, and practices from one activity system to another. In this mode of activities, the basic model is expanded to include at least two interacting activity systems (Figure 1).

Based on the previous conceptualizations, Engeström (2001), defines three characteristics of the developmental transfer: (a) learning is a process in which several activity systems, such as a school, a student, and a workplace, implement a shared developmental project with contributions from all participants; (b) one or more theoretical concepts created during the learning process facilitate the understanding and reconstructing of the object of work in a new way; (c) the learning process leads to implementation of the new concepts as
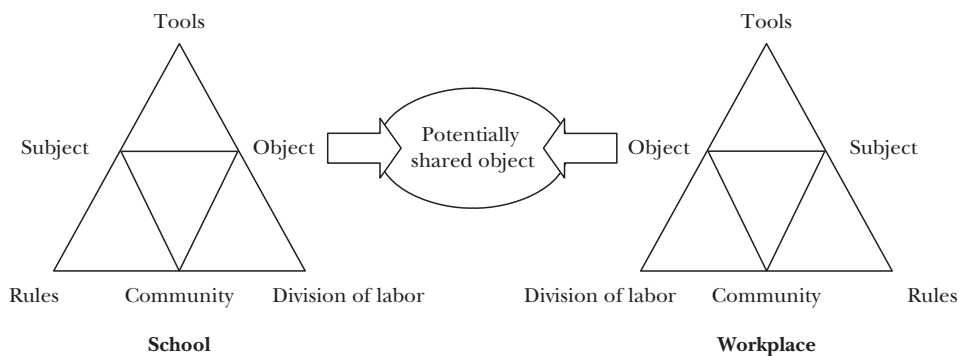
FIGURE 1   Two interacting activity systems

tools or models of new activities or solutions. The model of expansive learning (Engeström, 1987) is utilized to achieve these demanding goals.

In this phase we can raise the question: what actually transfers in the case of developmental transfer? It is not only the transfer of individual knowledge from task to task or from school to workplace. Instead, the goal is to give tools to students and practitioners to deal effectively with new situations. This *model of confronting a new situation with a process of expansive learning and multi-voiced discussion between two activity systems* transfers from one work situation to another. This is the very essence of developmental transfer.

Because activity systems are, by their nature, diverse and multi-voiced, contradictions and conflicts between different types of activities and activity systems can be the mobilizing forces for expansive learning cycles in activity systems. Expansion happens substantively, by constructing a more encompassing object and motive for the activity (*substance expansion*), and socially, by recruiting a growing number of participants in the transformation effort (*social expansion)* (Engeström, 2001). In studies based on developmental transfer (Tuomi-Gröhn, 2001; Lukkarinen, 2005) the results of the developmental projects have been evaluated by analyzing (a) the changes of the object of the work, and at the same time the change of the entire activity system, and (b) the expansion of new insights and working methods, often remodeled and revised, to other units or organizations.

In aiming to promote developmental transfer the school is in an important position to offer its expertise and support the efforts of workplaces to change by organizing developmental projects across the boundaries between school and work and by participating actively in developmental work. This means that school becomes a collective agent for change that works in partnerships with workplaces. It implies that the school needs to prepare its teachers and students not just to do their assigned routine jobs but also to work as boundary crossers between the school and the work organization, bringing new intellectual and practical tools and insights into the processes of change (Tuomi-

Gröhn & Engeström, 2003a).

From the student's point of view, one's future workplace will inevitably be enmeshed in developmental turmoil. Thus, the best way to learn is to become engaged in real life processes of change while still in school. Relative novices and outsiders can be valuable here because they see things from a fresh angle, they have time to reflect and take initiatives, and they are not yet caught up in the routines of the workplace. Internship periods often extended and substantively remodeled, produce natural opportunities for schools to take on new roles and foster collaboration with workplaces.

Developmental projects based on developmental transfer differentiate from other project work models in some remarkable ways: (a) the learner is not only the individual student but rather the entire team of student(s), teacher and practitioner, that is, there is not a student and supervisors but many learners; (b) role of the teacher is that of agent for change instead of the one who imparts knowledge; (c) the aim is to create new knowledge and new practices, whereby "traditional" projects are based on the application of the existing knowledge; and (d) the ultimate aim is the expansion of knowledge and practices extended also to other units or organizations. These are demanding goals for educational projects but the results (see Tuomi-Gröhn, 2001; Lukkarinen, 2005; Konkola et al. forthcoming) indicate that they are not impossible to achieve.

Research Problems, Research Target, Collection and Analysis of the Data

The aim of this study is to analyze the developmental project concerning the additional training of practical nurses. The research problems are as follows:
1. How does the activity system of the developmental work change in different phases of the project? How is the object of the work outlined?
2. What kind of signs of the developmental transfer are to be found during the project?

The research target was one afternoon section of a daycare center. The children were 6-years-old and were going to school in the next year. The section included one teacher and 13 children. In the beginning, the aim of the project was to assess the possibilities for children's physical activities in the daycare center and in the vicinity. The idea came from a kindergarten teacher. The student working in the project did not have previous experience with the physical activities of the children. Moreover, the aim of the student was to test, study, and implement the different possibilities for various physical activities. During the next term another student continued with same project; however, the topic of the project changed to that of creating a puppet theater. The total length of the project was one year. The aim was to create a collaborative team by the teacher, the kindergarten teacher, and the student. The training included, in addition to working at the daycare center, four days at the school. At the end of the internship, the project was presented at the workplace in a joint meet-

ing, called 'the arena of learning' attended by all those involved in the developmental project. Also an evaluation session of all projects in different workplaces was arranged in the school.

The data was collected during the first student's participation phase by a field researcher, who followed the ordinary activities of the workplace, audio-recorded the student's supervising team's meetings and meetings at the school, and interviewed the practitioners, the teacher and the student. During the phase of the second student, the different partners: the teacher, the student, the supervising kindergarten teacher and the head of the daycare center were interviewed. In addition, the head of the daycare center was interviewed one year after the project was finished. The interviews and the discussion data of the team meetings have been transcribed. The analysis of data is based on these, as well as on the field notes of the researcher.

I analyzed the data by describing the phases of the developmental project. The phase is determined by following the changes in the object of the developmental work. Accordingly, each phase is divided into themes which describe the means to promote the project. Each phase is characterized by the activity system of Engeström (1987). The signs of the developmental transfer in each phase are analyzed using content analyses.

The Phases of the Project

The developmental work proceeded by following the next phases and themes depicting each phase more closely.

TABLE 1   The phases and themes of the developmental project

Phase 1	Phase 2	Phase 3
Student works alone – traditional training concept	**Expanding activity – school and daycare center in collaboration**	**Peer working – the project of the daycare center**
Duration 2 months *Themes:* * Starting of the project and reading different kinds of material related to motor development and exercises of the children * Forming of the supervising team * Asking the interests of the children * Testing the motor abilities of the children	Duration 2 months *Themes:* * Insight of the relationship between motor and speech development * Searching for additional information and arranging training for the staff * Increase of physical exercises at the daycare center and changes of the curriculum * Collection of the information folder on the motor development of children * Collaboration and expansion of knowledge to the neighborhood organizations	Duration 3. 5 months *Themes:* * Watching the enactment of Pippi Longstocking in the National Theater * Searching for information from different sources * Producing different Pippi presentations * Visit to the back stage of the National Theater * Expansion of the child-centered way of working in the daycare center

In the next each phase and themes are described more closely.

Phase 1. Student Works Alone – Traditional Training Concept
This phase of the project took two months and it proceeded with the following themes.

Theme 1 Starting the project and familiarizing oneself with the written material. In order to start the project, the kindergarten teacher gave some theoretical material to the student dealing with the meaning of physical activities during different phases of life. In addition the student consulted her study notes on this subject. The kindergarten teacher also gave her a table summarizing different areas of physical activities with a description of how, and when, an average child should accomplish the different areas. Other related materials were also sought from the library and Internet. (Field notes)

Theme 2 Formation of the team. The student had difficulties in starting the project.

> Teacher: Have you already proceeded?
> Student: Not really. I am still in the starting phase.

The head of the center, the teacher, the kindergarten teacher, and the students training in this daycare center conducted regular meetings to discuss the project and its progress. The team tried to help the student in starting the project.

> Head: Do you find the subject difficult?
> Student: Although I have not yet done much, I think this job is OK. Especially because I do not know much about physical activities yet.
> Head: Yes, definitely.
> Teacher: Oh yes. And how much can one use the possibilities for physical activities, here, in this immediate environment? This could be one thing to study.
> Head: And, then, working in small groups trying out some new outdoor activities. Here, we have quite an excellent sports field right next to this house. Just take a few kids over there.
> Teacher: The project planning formula might be helpful to you. Write some aims on the paper and then plan some schedule ... as a tool, this project plan might help you. (Meeting of the team)

Theme 3 The interests of the children. The aim was to interview the children and ask what they are interested in and what their hobbies are. However, the interview ultimately dealt, what the children liked in the daycare center and this did not promote the project in any decisive way.

Theme 4 Testing the physical abilities of the children. The kindergarten teacher and the student tested the children's physical abilities, such as throwing a ball

and running. The test proved to be revealing: over half of the children had remarkable problems in moving and in their physical abilities that would have consequences in their later development. The staff noticed that the children with motor problems also had problems with their speech development.

> Student: Only yesterday we noticed that this child, who has some difficulties with his speech, cannot crawl either. We were wondering whether he has been able to crawl when he was a baby. I wonder if he has been moving around on his behind only.

The first phase of the project concludes here when the staff was made aware that the children with motor problems had simultaneous problems also in speech. This brought about a crucial change in the project.

The Activity System of the Developmental Work in the Phase of Student Working Alone

The developmental work can be described with the activity system (Engeström, 1987) as follows.

TOOLS
Knowledge of the physical and motor development of children
Test of physical abilities
Support of the supervising team

SUBJECT
Student

OBJECT ⟶ RESULTS
Possibilities for   Insight of the
physical activities relationships between
of children   motor and speech
                development

RULES   COMMUNITY   DIVISION OF LABOR
Rules of the   Daycare center   Student works and
individually-based   Supervising team   others supervise her
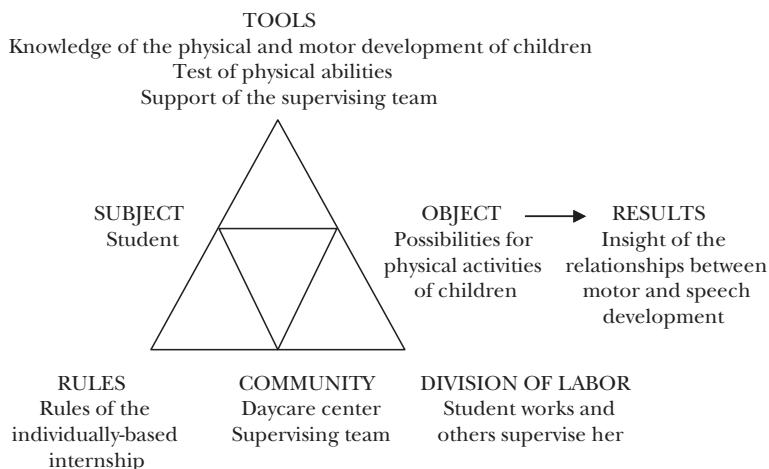internship

FIGURE 2   The activity system of the developmental work in the phase of student working alone.

In this phase, the developmental project was the student's responsibility. The statements of the kindergarten teacher, such as, "I am waiting for you to start work." and of the teacher "Remember the plan of the project" embody this attitude. Tools of the developmental work constituted the support of the supervising team and the knowledge scrutinized from different sources. The work was established on the rules of individually based internship, the student efforts and others who supervise her. The object of the student's work was to survey the possibilities for physical training. The object of the supervising team

was the learning of the student. This phase is called *student working alone.* The phase indicates that the real collaborative work is not easy. Although the goal of the team from the very beginning was to be aimed at a new kind of team work, it began as supervision of the student, just as in previous models of internship. The precondition of the developmental transfer was established in this phase: the joint developmental team was formed, including student, teacher and kindergarten teacher. Moreover, the developmental project was in a minor crisis during this phase, as it did not progress. A decisive step during the process, in any case, was the *insight concerning the relationship between the motor and speech problems.* It became a common boundary object which combined the viewpoints of the different actors in the following phase of the project (cf. Star, 1989).

Phase 2: Expanding Activity – School and Daycare Center in Collaboration

The following phase took about two months and progressed through the following themes.

Theme 1 The insight concerning the relationship between motor and speech development. When the results of the physical-ability test and the relationship between motor and speech development were discussed in the team, the meaning of this finding became clear.

> Head: Well, what does the whole daycare center get out of this? Definitely we are getting information that helps us make observations. This is very important for all of us. This is the way these projects should bring us new information that can help us do our job. I just began to think about this child and his problems thoroughly; you can really see the same thing in the group of the very youngest children. To help us make better observations, this is a really good project, indeed.

Theme 2 Searching for additional information and in-service training. It became clear that the entire staff needed additional training. Physical activities had been neglected in favor of other sub-areas of education. The teacher had a colleague preparing a doctoral dissertation on this subject. This colleague was invited to give a presentation on this topic to the staff. In addition, the speech therapist of the daycare center was consulted in this matter.

Theme 3 Physical activities were increased in the daily program and the curriculum of the daycare center was revised. New motor exercises and physical activities were increased, and, physical education was increased also in the curriculum of all children in the daycare center. The test of physical abilities was used to also test the new children coming into daycare in the following years.

Theme 4 Collecting the information folder for shared used. The student worked out a manual-like folder containing a summary of the central phases of the development of the physical abilities of a child, a test to measure them, guidelines to interpret the test, and several ideas concerning how to organize physi-

cal activities for small children.

Theme 5 Collaboration and expansion of the knowledge to other adjacent organizations and parents. The test results having become available, the head of the center decided to discuss the matter in a joint meeting with the staff of a mothers' counseling center.

> Student: I was thinking this morning that these kids have just had their six-year check up. I was wondering about their speech: what happened in those check-ups?
> Head: We cooperate with the mothers' counseling center. This new information is very important to me. Everything is not necessarily revealed in those check-ups; the situations are so tense and so on. You really don't see everything. But when you come to daycare, then these problems become visible.
> The matter was also discussed with parents:
> Head.: …parents should be learning to focus on the right things. It must be a trend in small children's families these days: you just push the kids around in a cart and serve the kid, in other words, everything should be ready. You do not train these very basic skills. This is an important area, where parents should be empowered (Team meeting at the daycare center).

The second phase ended here, as the student finished her internship.

The Activity System of the Developmental Work in the Phase of Joint Collaboration
The developmental project can be described with the activity system as follows:

In this phase, the way of conducting developmental work was changed. The activity had a shared object: the children's motor and speech problems, and the connections and possibilities to treat them. The activity was not guided by the rules of the individual internship but by the rules of collaboration with each one contributing using her own expertise. The entire team was in the process of learning. The community expanded beyond the boundaries of the daycare center to include mothers' counseling center and parents, and later also neighborhood daycare centers.

In this phase, the insight became a shared object enabling the dialogue between different actors. The shared object created a basis for encountering everyday experiences and theoretical knowledge, a feature Vygotsky (1978) refers to as one element of the zone of proximal development. Even though the teacher already mentioned the relationship between motor and speech development in the first team meeting, it became a fruitful basis for collaboration only as it was connected to the everyday experiences of the daycare center.

In this phase many elements of the developmental transfer were realized:

- A significant theoretical insight concerning the relationship between motor

TOOLS
Test of physical abilities
Expert's knowledge
Everyday experiences

SUBJECT
Team including
the student

OBJECT
Relationship⟶
between motor
and speech
development

RESULTS
Increasing physical
activities
Revision of the curriculum
Producing the information folder
Expansion of the knowledge to the
neighbour organizations

RULES
Rules of collaboration

COMMUNITY
Daycare center
Teacher
(Mother's councelling
center)
(Parents)

DIVISION OF LABOR
Everybody brings
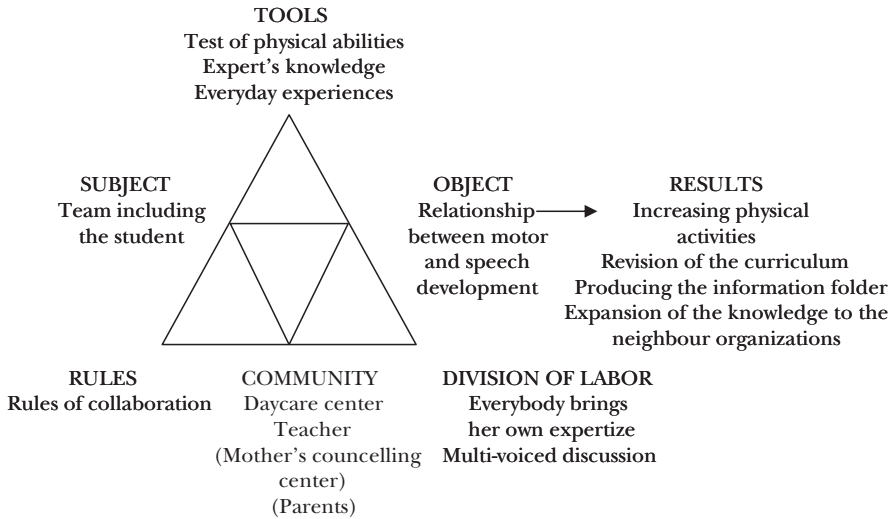her own expertize
Multi-voiced discussion

FIGURE 3   Activity system of the developmental work in the phase of joint collaboration

and speech was discovered.
- In the boundary zone between two activity systems there was a boundary zone activity created together, with a collaborative team as a subject, and shared object of the joint work created.
- This insight changed daily activities and the curriculum of the daycare center.
- An information folder was subsequently produced. It is a significant tool making the social expansion possible, thereby enabling new activity systems to use the knowledge created in the project.
- The knowledge was expanded to neighborhood organizations and children's parents.

This phase is called *expansive collaboration.* Both school and workplace made efforts in collaboration, but the activity was not restricted to a daycare center only. There were two *social expansions* to take notice of. First, the subject expanded from an individual, from a student to a team, including the benefits gleaned for both student and supervising team within the social networks of different actors; and, second, the results expanded to other daycare centers.

In this phase, the student finished her internship in the daycare center. The aim was to continue to promote the motor development with a new student intern.

Phase 3: Peer Working – the Project of the Daycare Center
During the next school term, a new student started in the daycare center, she continued the work with same group of children. Moreover, the teacher and kindergarten teacher were the same. However, the head of the daycare center

did not attend the meetings as frequently as in the previous term. This phase lasted the entire internship of the second student of 3.5 months. In the beginning, the aim was to continue the topic on children's motor development, but because of the interests of the student the topic was changed. The main aim was now to support the speech development of the children.

Theme 1 Visit to a National Theater to watch the play of Pippi Longstocking. The student decided to use the drama as a tool to promote children's speech. After this decision, the student's aim was to produce a puppet theater play. The idea was based on the visit to the National Theater where Astrid Lindgren's play of Pippi Longstocking was performed.

Theme 2 Seeking additional information from different sources. The student collected Pippi data from various sources, like the library, and the knowledge related to speech development from the curriculum of the daycare center.

Theme 3 Relationship between kindergarten teacher and the student. A close collaboration between student and kindergarten teacher was established from the very beginning of the internship.

> Kindergarten teacher: At some points, I already started to become nervous, because there was a deadline for the presentation of the puppet theater. And I said that this will not work. Well, the student insisted that it will work and we had a lot of fun. This kind of well functioning relationship is quite rare. It has been so nice and so fun to work together and the entire time one or the other takes new initiatives. (Interview)

Theme 4 Producing different kinds of Pippi presentations. Presentations were produced in different phases. In the first phase the children made the shadow puppets by themselves and Pippi was performed for their own group using these puppets. The children's self-confidence increased and speech expression was easier because "the puppet was speaking" and not the child.

> Student: We started to read the story of Pippi. Already in this phase we noticed that through the mediation of the puppet some children had an easier time telling about themselves. The self-confidence increased. (Arena of learning)

In the next phase, the requirements increased, the Pippi story was extended, and it was presented to staff and other children in the daycare center.

> Kindergarten teacher: This Pippi story started when our group had the turn to take care of the party at Easter. And we transferred the Pippi idea there. One of our girls Mia (pseudonym) is very talented both in music and speech presentation. She was Pippi and she played one whole story. In a way, this was the first performance. (Interview)

The presentation expanded step by step into that of an entire drama, and at the same time it offered individual challenges according to the needs of each child.

> Kindergarten teacher: The next presentation was many acts longer, many stories of the book, and it lasted a little bit longer. All the children had one or more roles and all the children had the possibility to participate. In these presentations, every child overcame herself, indeed. For Mia, this actor of Pippi, this was a possibility to show what she is able to. We often think that the children who do not want to participate are marginalized but those children without challenges are marginalized as well. And then alternatively we had a boy, Peter (name changed), who did not talk at all in the autumn. He only nodded expressing yes or no. In the last performance, Peter sang alone and had a long discussion with Pippi. In this way, when you give these kinds of small possibilities and support, and, if the child succeeds, so too does his/her self-confidence become strengthened. And it's so amazing, the result, how much these children can achieve. Actually, this is as much a reward to this student as to me from this project. Furthermore, everybody liked the acting, performing, singing alone, talking whatsoever. (Arena of learning)

In the end, the puppet theater performance was also produced, which was the actual aim of the student intern. It offered challenges concerning speech and performance but, in addition, also provided manual skills, because the puppets were made by the children themselves. An added advantage entailed having the parents and siblings invited to this performance as well.

> Kindergarten teacher: Around the month April the student intern had a puppet theater for which the children had made the puppets by themselves. Here also she wanted to emphasize the manual skills. The heads were made on the end of a stick using paper-mache and glue; they were dressed using cloth and they were sort of big hand puppets. And there were again new parts of this Pippi book, and we then produced a puppet performance presented to the teachers. We created the plot of the play together, but the lines the children made by themselves. (Arena of learning)

The feed-back from the parents and staff was very positive.

Theme 5 Visit to become familiar with the backstage of the National Theater. The children returned to the National Theater as 'professionals' in order to get acquainted with all the preparations needed before actors can take the stage.

> Kindergarten teacher: The aim was to understand what the theater is about. It is not only that everything is ready when the actors come appear on

stage. Indeed, there are plenty of other persons, professionals who are needed before the drama is ready to be staged. (Interview)

Theme 6   Child-centered way of working expands in the daycare center. Later it beacame evident that the way to take children into the planning of the activities also expanded the other practices in the daycare center.

> Head: We had here in our center a tradition that the adults presented to the children. Now along with this project we have learned this child-centered way of working such that we have taken the children's ideas and interest more seriously into the planning of our activities. And they have succeeded! (Interview one year after the ending of the project)

The phase finished when the internship of the student came to an end. The entire project finished in this third phase, because the children went to school in the next autumn and the drama as a working method did not expand to other departments of the center.

The Activity System of the Developmental Work in the Phase of Peer Work
The developmental work of the last phase can be described with the following model.

TOOLS
Literature
Ideas from the National Theatre
Insight of the relationship between motor and
speech development
Previous experiences of the student
Curriculum of the daycare center

SUBJECT
Student and
kindergarten
teacher

OBJECT
Speech
expression

RESULTS
Increase of the
self-confidence
Development of
the speech

RULES
Rules of the
daycare center

COMMUNITY
Daycare center

DIVISION OF LABOR
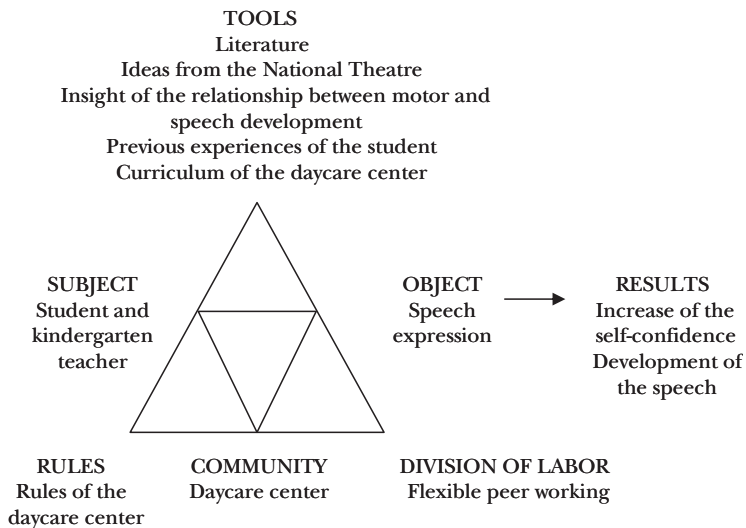Flexible peer working

FIGURE 4   Activity system of the developmental work in the phase of peer working

In this phase, the way of working was changed to peer work between the student and the kindergarten teacher. The meaning of the supervising group was minimal. The rules of the daycare center guided the work and the community restricted to the daycare center. Division of labor was flexible peer working. The object of the work altered to that of supporting the speech expression of the children. Results involved the increase of the self-confidence and speech

of the children aside from the original aim of developing motor abilities.

It should be noticed that there was once again a change between the tool and the object of the work. Insight concerning the relationship between motor and speech development was transformed from the object in the previous phase into a tool once again, as in the first phase of the project.

From the viewpoint of the developmental transfer, there was a *substance expansion* between the second and third phases of the project. The object of the work was changed from the promotion of motor development to that of a speech development, based on the same original theoretical insight. Other elements of the developmental transfer to be found also included remarkable changes in the activities of the daycare center, for example, by using drama expression the children's speech development was improved. Even though the way of using drama as a method did not expand to other departments, the child-centered way of working expanded into other activities of the daycare center. In this case, it is a question of *social expansion* inside the daycare center.

However, what is problematic from the point of view of the developmental transfer is that the collaboration between the school and the workplace was minimal. Even though the teacher worked as a supervisor in the project, her input was not needed because the project proceeded so well. The student intern even felt that the sessions arranged at school and the visits of the teacher to the workplace were organized in vein. This had the effect that the good results did not transfer to the use of the school. On the other hand, the withdrawal of the head of the daycare center had the effect that the results did not expand to other daycare centers.

From the viewpoint of the workplace the project was very successful. The kindergarten teacher and the student formed a peer group in the workplace, while the student worked as a full-fledged member of the community (see Wenger, 1998). This phase is typically representative of the expert-novice model (Lave & Wenger, 1991) of working at the workplace. The student worked as a motivated peer of a more experienced practitioner. The object of the work was not the learning of the student, as in the first phase, but rather the solution of the real, authentic problems of the workplace. This phase is called *peer working at the daycare center.*

Conclusions

The aim of this article was to develop and evaluate a new model for collaboration between school and work. The theoretical departure point is developmental transfer based on the activity theory and expansive learning. The questions that can be asked include: How successful was the project analyzed here in producing developmental transfer and what are the signs of the developmental transfer?

I evaluate the project based on the criteria of developmental transfer described in the theoretical background of this paper (Engeström, 2001), which

will be briefly summarized: (a) A school, a student, and a workplace implement a shared developmental project with contributions from all participants; (b) One or more theoretical concepts created during the learning process facilitate the understanding and reconstruction of the object of work in a new way; (c) The learning process leads to implementation of the new concepts as tools or models of new activities; (d) Expansion happens substantively, by constructing a more encompassing object and motive for the activity (*substance expansion*), and socially, by recruiting a growing number of participants in the transformation effort (*social expansion*).

The following figure illustrates how different criteria of the developmental transfer have been indicated in different phases of the project.

In the first phase of the developmental work, the first precondition (A) for the developmental transfer was created, that is, the collaborative team between the boundary zone of school and daycare center was assembled. Boundary crossing and challenges related to it have been the target of many recent studies. New concepts to describe and understand this phenomenon have been created (see, e.g., Star & Griesemer, 1994; Wenger, 1998; Beach, 2003; Kerosuo, 2006). Wenger (1998) discusses the concept of *boundary practice* by referring to overlapping activities of the participating activity systems. The shared object of the work is not a precondition to a boundary practice in Wenger's model. The first phase of the developmental work represents this concept. Different partners are in co-operation but the objects of the work are different, since the supervisor's object is the student's learning and student's object is the developmental project. Student and teacher are boundary crossers bringing
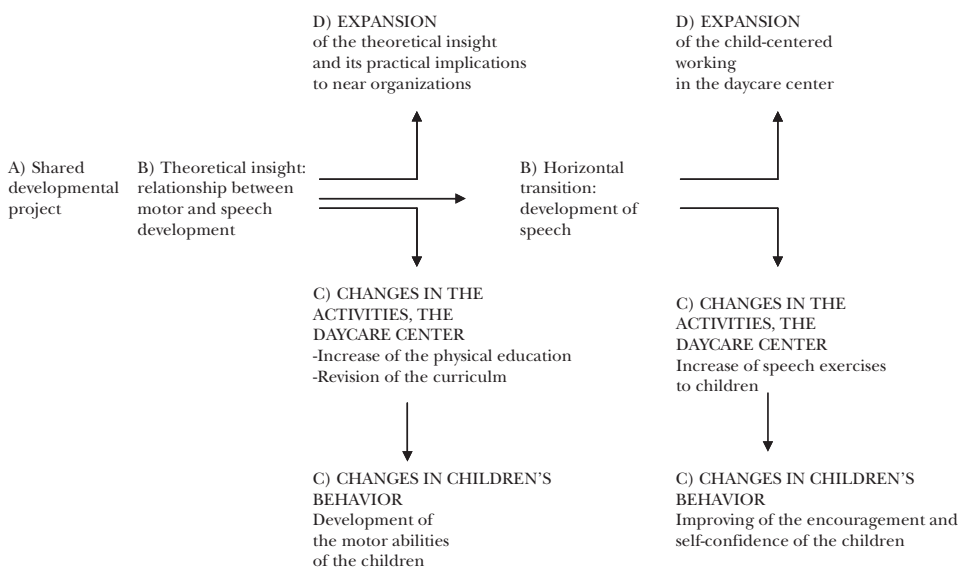

FIGURE 5   Signs of the developmental transfer in this project

information and ideas from one activity system to another. Belonging to different activity systems at the same time offers a possibility for coordinating different views.

At the end of the first phase, the second criteria (B) of the developmental transfer was fulfilled: a theoretical insight concerning the relationship between motor and speech development was discovered. This insight proved to be a decisive finding that facilitated the understanding and the reconstructing of the object of work in a new way. The insight and its functioning can be described with the concept of a *boundary object* created by Star (1989). According to Star, a boundary object refers to a concrete or abstract tool that combines the viewpoints of different actors. In this case, it worked as a tool facilitating the combination of the theoretical knowledge of school to the everyday experiences of the daycare center. Holland and Reeves (1994) discuss different perspectives, and how dialogue and argumentation between them is a precondition for the creation of new innovations. That was the case also in this project. Furthermore, Vygotsky (1978) and Davydov (1990) emphasize the fruitfulness of the combination of everyday and theoretical concepts in proceeding in the zone of proximal development.

In the second phase, the working of the supervisory group changed in a crucial way. Instead of the student and the supervising team, there was a collaborative team with a shared object. The insight brought about in the previous phase was a boundary object combining different viewpoints, which was then transformed into that of a new shared object of their work. The boundary object refers to an object, but it is *a tool* for boundary crossing, not the object as used in activity theory. Objects and tools are in constant interaction with each other and there are transitions between them (see also Lambert, 2001). Also in this case, the insight regarding the relationship between motor and speech development was first a boundary object, a tool that combined the worlds of school and work. Later this tool transformed to that of a shared object of the entire collaborative team, thereby facilitating the creation of new innovations in the activities of the daycare center.

Furthermore, new activities were created on two levels: in the activities of the daycare center (criteria C) and in the activities of the children (criteria C). In the second phase, physical exercises and testing of the children were permanently increased and physical education was added to the curriculum of the daycare center. There were changes also in children's behavior, since the physical abilities of the children improved.

The second phase of the project represents the *boundary zone activity* (Konkola, 2001). It describes a new kind of collaboration between two activity systems. Actually, it is a further step away from the boundary practice where partners, in a way, are working side by side with diversified objects. In the mode of boundary zone activity, a new shared object is created which changes the entire work activity. This is a basis for expansive learning and developmental transfer.

Related to the theoretical insight there was a horizontal transition in the third phase. The two-fold theoretical insight combining the motor and speech development made the horizontal transition possible. Also Engeström, et al. (1995) describe horizontal transitions in the creation of new concepts. In this case, the horizontal transition occured in creating new kinds of activities in the daycare center. The peer group consisting of the student and kindergarten teacher concentrated on the speech of the children and, as a result, the speech expression and self-confidence of the children improved. At the same time, the object of the work in the previous phase: the relationship between motor and speech development, converted to a tool of the work. It facilitated the evolution of the new actitivies for the children.

The final criteria (D) of the developmental transfer are comprised of expansions, substance and social expansion. There were also signs of expansions in this project. The change between the second and third phase of the project represents the substance expansion. The same theoretical insight is benefited in the creation of new kinds of activities. Social expansion was realized in many ways. Firstly, new physical activities expanded to other departments of the daycare center and the theoretical insight and practices based on it, in turn, expanded to a mother's counseling center and other daycare centers. There was also expansion concerning the parents. Also they were informed on this theoretical insight. In the third phase a child-centered way of working was expanded to other activities of the daycare center. The problem with this very successful phase, lies in the fact that the results did not expand outside the daycare center, nor to the school or the neighborhood organizations. Here is an indication of the usefulness of the boundary-crossing activity: the expansion of the results into other organizations. At the same time, it illustrates the differences between the traditional expert-novice model and the model aiming towards developmental transfer. The knowledge and experiences based on the traditional model only weakly expand outside the work community.

Moreover, there were changes in the concept of internship. The first phase represents the traditional internship model. It illustrates that the collaborative work is not necessarily easy to achieve, it has to be developed in negotiation between partners. In the second phase, the elements of developmental transfer were at it's best. The workplace and the school found a shared object, and a boundary zone activity was created (Konkola, 2001), which combined two activity systems as collaborative partners. Each partner brought its own expertise into use that produced new kinds of expansive activities. In the third phase, the concept of internship was restricted to the student and practitioner, representing the typical expert-novice model. These phases illustrate the results gained in different models. At its best, traditional individually based internship benefits a student as she learns new knowledge and practices. The working model based on developmental transfer produces new knowledge and practices, which also expand to other organizations. The daycare center, the student, the teacher and adjacent organizations are learning and work activities change.

This phase illustrates how horizontal expertise increases by polycontextuality and boundary crossing between activity systems. The third phase illustrates how the peer-working model can bring good results in the workplace, but these results do not expand into other activity systems.

From one point of view, however, the goals were not fulfilled. What were the benefits of the school? The students learned a new collaborative way of working and individual teachers were very enthusiastic about the new working methods and also learned to recognize the challenges of the current daycare. But what about the school? Did anything change in the school? The changes in the content of the teaching and the curriculum were zero, nor did the new working model expand into other study programs. One reason for this might be that, due to the organizational change in the administration of the city of Helsinki, the study program of practical nursing was moved to a new institute. In the new institute it was isolated, insofar as the representatives of the new institute did not commit to this project. Because it was isolated in a new organization, its possibilities to affect other study programs was restricted. Reformations are thus always connected to power and its own motivation and not only to features of learning in and of itself. McCaule, et al. (1994) also emphasize that the missing support of leaders and other staff is a central feature making developmental work difficult. The change in organization might, however, not be the only explanation for the school's problems. Changing the school has proven to be problematic also elsewhere (Miettinen, 1990). To change a school, the developmental project should be targeted at the school and the entire school community. Aims to change the school, based on the efforts of individual teachers, fade easily with the resistance of other teachers.

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