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Collaborative Knowledge Building for Accessibility in Higher Education

The inclusion of human diversity on the teaching & learning processes at Aalto University

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ABSTRACT

This paper examines accessibility from the point of view of inclusive teaching and learning in the higher education. Instead of focusing on the various disabilities, addressing the needs and the diversity of all students is adopted as a starting point. We present several conceptual tools regarding the process of collaborative knowledge building. Finally, we suggest an iterative cycle of developing inclusive teaching and learning by using a PDCA tool with the continual iteration on communities of practice level among all stakeholders.

KEYWORDS

Diverse students, Inclusion, Knowledge building, Learning

INTRODUCTION

In this paper, we will present the frameworks, activity theory, and collaborative knowledge building for practical work to improve accessible academic culture. Thus the objective of this paper is to show which kind of theoretical frameworks may be useful in highlighting the current challenges in higher education (HE) organizations in supporting diverse students' learning. In conclusion, we suggest that these challenges and their solutions found by the stakeholders should be addressed explicitly in the annual planning process of a HE organization. In parallel, we will present a challenge for educators and developers: **How to help diverse students who are able and willing to participate in the creation of new knowledge to develop into active members of academia and the world?**

The success of inclusive HE is influenced by how all the stakeholders within an institution respond to external drivers for accessibility such as legislation, guidelines and standards (Seale 2006c). We divide our paper on three operational domains. 1) Non-discrimination and disability: Accessibility research, in general, focuses mainly on accessibility legislation, guidelines and standards, and the rules contained within them. E.g. The *Finnish Non-Discrimination Act* (21/2004) requires reasonable steps to be taken to help people with disabilities to cope and advance in their career. However, the objective of higher education actors should not be only to comply with legislation but to address the needs of students (Seale 2006a, 2006b). In addition, 'disability' is a vague concept in academic context where learning to collaborate and learning from collaboration is a must to all stakeholders. 2) Performance improvement, or quality management, at Aalto University and its schools is based on the PDCA (Plan, Do, Check, Act) cycle (Deming circle), a tool for continuous improvement (Figure 1). PLAN is gathering information on the process and on the basis of that information to plan improvement. DO is simply to carry out the plan, establishing objectives and communicating the change. CHECK means monitoring performance against the plan to ascertain if the objectives are being achieved. ACT means to standardise the changed process once it is in control and it has been determined that it actually delivers the planned improvement. At Aalto University, the practice of reviewing and revising objectives and developing activities is considered a spiral, a continuous process in which each round of development takes us closer to the objectives we have set. 3) Actual teaching, learning, research and artistic activity taking place everywhere on the campus. Diverse stakeholders are faced with collisions of interests and clashes of views almost daily.

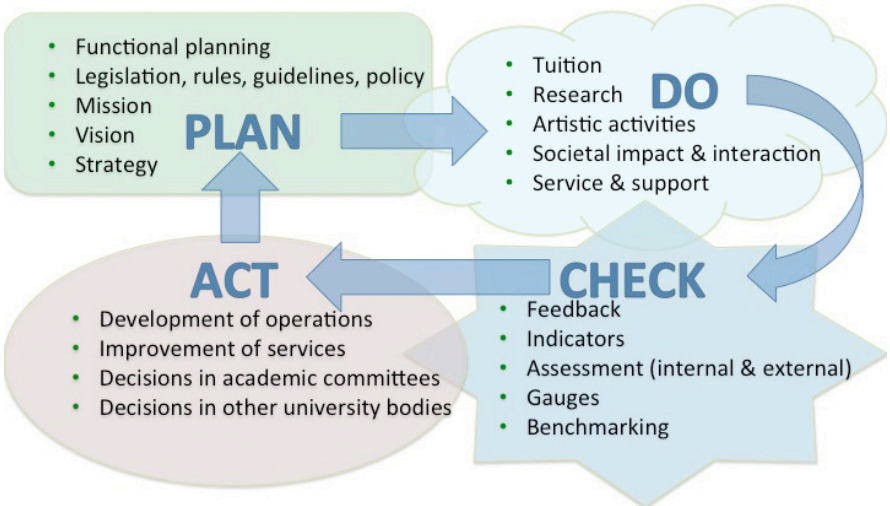

Figure 1: PDCA (Plan, Do, Check, Act) principle for continuous improvement.

Thus, it is essential to learn how the academic community in its entirety can build knowledge based on evidence (Raike 2012). We admit that every

student is a unique individual, a learning novice growing to become a master with peers in our community and we seek to support this process in all operational domains. Hence we will use term *diverse students* to cover all students, and propose designing *enabling blended learning environments* (facilities including networked learning) rather than concentrating on special services or disability issues per se. We believe this kind of approach could promote more inclusive strategies for a university. An enabling learning environment would keep the community knowledge building and innovative mind-set alive empowering the whole academic community. We have seen that inclusive research, teaching and learning are relevant for not only "disabled" (the first domain) students, faculty and staff, but for all learners of the community (third domain). The effective use of the quality management (second domain) ensures that the university allows the stakeholders to learn also with unconventional methods or with the language or possible cultural style they do not master best.

ACTIVITY THEORY

A modern faculty would need more evidence-based information about how the student communities and cultural subgroups make the sense of the diversity of academia. A traditional and tested way to collect the data is to use formative interventions (Engeström 2011) in the recreation of academic policies and culture. The 'formative intervention' is grounded in the modern *activity theory* (Engeström 2009) and action research traditions. Here we will use the term 'co-design' to cover co-design, action research, participatory design and formative interventions. This paper is based both on the practical collaboration and on the findings from co-design projects made at the Aalto University to promote inclusive and enabling environments, accessible to all students (Kitunen 2009; Raike 2006; Raike & Hakkarainen 2009). In addition, Honkela, Izzardust & Lagus (2012) introduced promising text mining for wellbeing and similar methods for large data sets are easily available for academic institutions.

Three principles of the activity theory are often accepted in co-design research projects: a) People live in a reality that is objective not only according to natural sciences but socially and culturally defined properties as well; b) Internal activities cannot be understood if they are analysed separately from external activities, because they transform into each other. Internalization is the transformation of external activities into internal ones; c) Human activity is mediated by tools in a broad sense and the use of tools is an accumulation and transmission of social knowledge.

Development of inclusion is not only an object of academic study but also a general research methodology. The basic research method is the formative experiment, which combines active participation with monitoring of the developmental changes of the study participants (Engeström 2009). The unit of analysis is *motivated activity directed at an object* (goal). The goal-directed action is conscious and quite often students expose the motivation during the learning activity discussions. Thus the Engeström's model in Figure 2 is useful for understanding how a wide range factors work together to impact an activity.

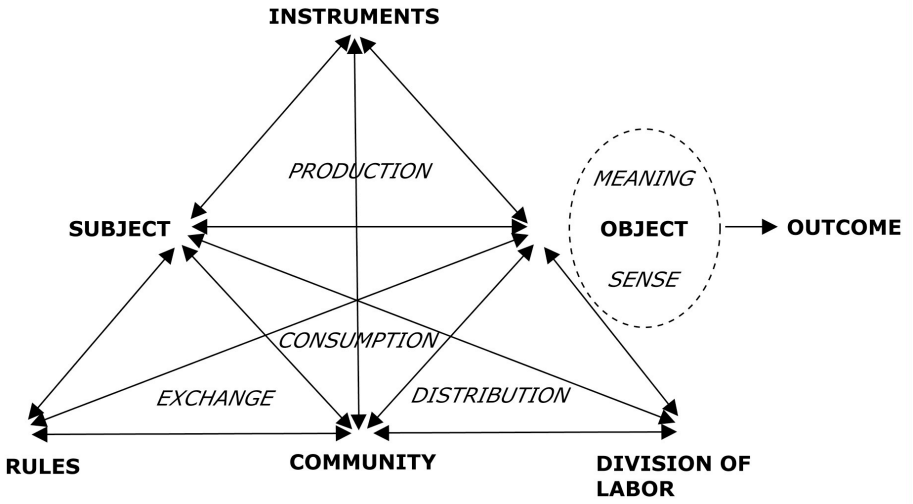

Figure 2: Activity System (Engeström, 1987, p. 78; re-drawn by authors).

In order to reach an outcome like a more accessible workshop for multi-lingual student group, it is necessary to produce certain objects (e.g. experiences, knowledge, and physical products). Instruments (artefacts) mediate the subjects' (stakeholders') activity (e.g. tools used, documents, mobile devices and schedules) with the community (university organization or the student community). Also, the community may impose exposed or hidden rules that affect activity. The individual student as a subject works as a part of the community to achieve the object in this framework (Figure 2). Any activity normally features a division of labour, i.e. the roles of faculty, staff and students.

Engeström (2001) reminds, that the object of activity is a moving target, not reducible to conscious short-term goals. He summarizes the activity theory with the help of five principles:

1. A collective, artefact-mediated and object-oriented activity system, seen in its network relations to other activity systems, is taken as the prime unit of analysis.

2. Activity systems are multi-voiced. An activity system is always a community of the multiple points of view, traditions and interests. The division of labour in an activity creates different positions for

the participants, the participants carry their own diverse histories, and the activity system itself carries the multiple layers and strands of history engraved in its artefacts, rules and conventions.

3. Activity systems take shape and get transformed over lengthy periods of time, that is, the problems and the potential of a HE community can only be understood against the history of university. Thus, educational work needs to be analysed against the history of its local organization and against the more global history of the HE concepts, procedures and tools employed and accumulated in the local activity.

4. The central role of contradictions as sources of change and development. Contradictions are not the same as problems or conflicts. Contradictions are historically accumulating structural tensions within and between activity systems. When an open activity system adopts a new element from the outside (for example, a new technology or a new object), it often leads to an aggravated secondary contradiction where some old element (for example, the rules or the division of labour) collides with the new one. Such contradictions generate disturbances and conflicts, but also innovative attempts to change the activity.

5. The possibility of expansive transformations when activity systems move through the relatively long cycles of qualitative transformations. As the contradictions of an activity system are aggravated, some individual participants begin to question and deviate from its established norms. In some cases, this escalates into collaborative envisioning and a deliberate collective change effort. An expansive transformation is accomplished when the object and motive of the activity are reconceptualised to embrace a radically wider horizon of possibilities than in the previous mode of the activity. A full cycle of expansive transformation may be understood as a collective journey through the zone of proximal development of the activity. (Engeström 2001).

It seems quite clear in the activity framework that we need to know more about two complex issues if we aim to improve the quality management of the HE with a PDCA tool. First, what type of academic tasks might be the most conducive to fostering the intellectual development of novice students? Second, when can an academic task most effectively be offered to students? The zone of proximal development is determined by the cognitive tasks the learner can first complete in collaboration with an advanced peer but later is able to accomplish alone; the zone of proximal development is

the move from the present level of development to the new potential level of development. However, in the university setting, context intelligence can be seen as an index of what a novice can do and is capable of doing while interacting with experts either in a classroom or using the collaborative tools providing flexible opportunities for advanced collaboration.

COLLECTIVE KNOWLEDGE BUILDING PROCESS

The multi-voicedness of the academic community is multiplied in networks of interacting activity systems. It is a source of trouble and a source of innovation, demanding the actions of translation and negotiation (Engeström 2001). Engeström (2001) proposes to examine the activity theory and its concept of expansive learning with the help of four questions:

1. Who are the subjects of learning? This includes all the stakeholders if we agree with the principle 'learning community'.
2. Why do they learn? The activity of the community towards an objective (goal) is a result of a motive (need) that may not be conscious.
3. What do they learn? Do they start conscious individual or group action towards a specific goal and sub goals or criticize without collaborative activity for improvements?
4. How do they learn? The operation structure of activity is typically automated in the organization and thus not conscious concrete way of executing an action according with the conditions surrounding the goal.

University students are confronted with a pluralism of values, both in courses and in their interaction with a diverse student body. 'Personal epistemology' describes the critical intertwining of cognitive and affective perspectives as a student develops more complex forms of thought during studies. According to Hofer (2001), personal epistemology addresses students' thinking and beliefs about knowledge and knowing, and typically includes some or all of the following elements: beliefs about the definition of knowledge, how knowledge is constructed, how knowledge is evaluated, where knowledge resides, and how knowing occurs.

Academic activity intensifies at the beginning of the studies when students start to develop personal epistemology to meet the needs of collaborative knowledge building with the assistance of faculty. The practice of academia involves exposing the personal epistemology of the novice for peer review in discussions, joining the academic discourse by learning the necessary

argumentation skills, conceptualizing the discipline in question, and gradually improving knowledge building and other academic skills. Hence the knowledge building is the formulation of personal epistemology to refine knowledge artefacts and address the authentic and complex problems of the world.

Williams & al. (2010) believe that collective intelligence, defined as the general ability of the group to perform a wide variety of tasks, stems from how well the group works together. According to their research, those groups whose members had greater levels of "social sensitivity" were more collectively intelligent. Moreover, the researchers found that the performance of groups was not primarily due to the individual abilities of the group's members. Williams & al. (2010) hypothesize that it might be possible to improve the intelligence of a group with different techniques: by changing the members of a group, teaching the members better ways of interacting, and giving the members better electronic collaboration tools. Thus, what individual students can do alone is losing importance; what matters more is what students can do with others (i.e., collaboration), especially with the use of technology.

The complex process of growing from a novice to an expert can be supported by collaborative knowledge building activities and practical co-design projects with students. The process of the knowledge building is essentially the same from early childhood to the most advanced levels of theorizing, invention, and design and across the spectrum of knowledge-creating organizations. However, the diverse students should be the experts at their own motivation, whereas the role of the faculty is to turn the motivation into agency (the division of labour). Learning at the collective level is the outcome of the interplay between the individual and collective types of knowledge as they interact through the social processes of collaborative activities.

Figure 3 depicts the knowledge building that starts with individual knowledge and personal epistemology and develops into the ability to argument, to shared understanding and finally to reach collaborative knowledge (Stahl 2000).

One distinctive feature of the knowledge building is that knowledge can be seen as *knowledge artefacts* “existing out there,” which have a certain value or function. The view of knowledge as abstract conceptual artefacts created by humans to specify the relationships of other objects, in the form of explanations or theories, originates from Popper (1972). By simulating the culture and practices of expert communities, such as a scientific research

community, novice students engage in a problem- and explanation-driven inquiry (Raike 2006; Raike & Hakkarainen 2009).

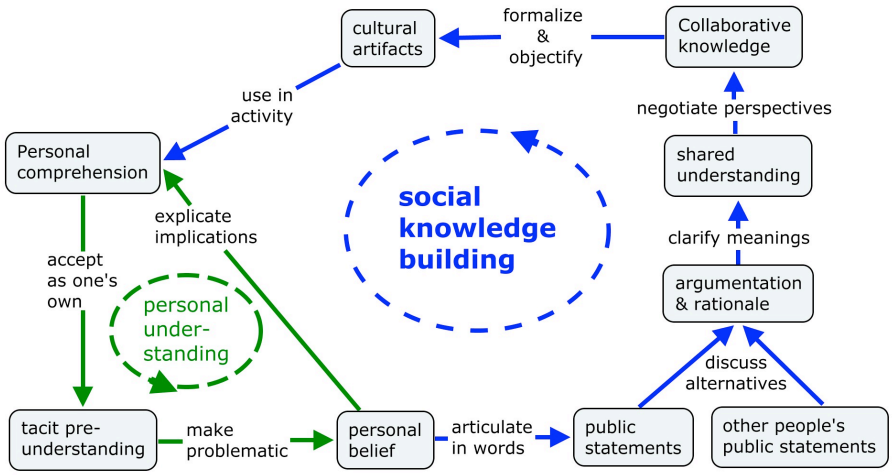

Figure 3: A diagram of a knowledge-building process (Stahl, 2000; re-drawn by authors).

Moreover, in problem-based learning processes, information is treated as something that needs to be explained. Instead of the direct assimilation of the information, students construct knowledge through solving problems in the communities of practice (Wenger 1998). The knowledge artefacts that students learn to use, modify, or create are laden with social and cultural values; these artefacts (technical tools, signs, language, machines, websites and script activities) persist as the structures of mediation in HE.

The knowledge building for accessibility addresses the need to educate both students and staff for a world in which knowledge creation and innovation are incessant. The knowledge building may be defined as the production and continuous improvement of ideas of value to a community, through means that increase the likelihood that what the community accomplishes will be greater than the sum of individual contributions and part of broader cultural efforts. This is the precise reason why we need to understand and modify the administrative PDCA tool in the activity theory framework. The knowledge building in higher education takes place typically in student groups, academic teams, and faculty communities of practice, either in classrooms or using networked learning environments. Within the planned, given and defined learning environment, individuals construct new knowledge in their role as a partner in co-design processes. Thus, a learning environment is not a simple entity that exists independently of its stakeholders; especially faculty need to be concerned about the possible insufficiency of the appointed learning environment where students interpret and evaluate even contradictory information and make decisions vis-à-vis the multifaceted problems of the university and academic studies.

DISCUSSION AND CONCLUSIONS

We claim that students are not engaged in creative knowledge building for accessibility in a broad sense if they are merely engaged in study attainments and their contribution is limited solely in administrative actions or university management system activities like enrolment on courses and exams, reading various instructions and reporting delay or progress. Thus we need a more holistic approach to inclusion that really perceives all students as creative members of the academic community of practice. Practitioners of higher education should consider the role of learners' motivation and *activity* in the knowledge building process as an essential part of successful blended learning. The evidence indicates that the interaction among the stakeholders like teachers, support services, staff developers and students must be taken into account if we are going to improve the accessibility of academic activities. Same time we will be able to avoid the categorization of people as students with special needs or "different" or "foreigners" and thus subtly exclude part of student communities from creative collaboration.

Seale (2006a, figure 4) has applied Engeström's (1987) systemic model of activity to the accessible e-learning practice of higher education practitioners.

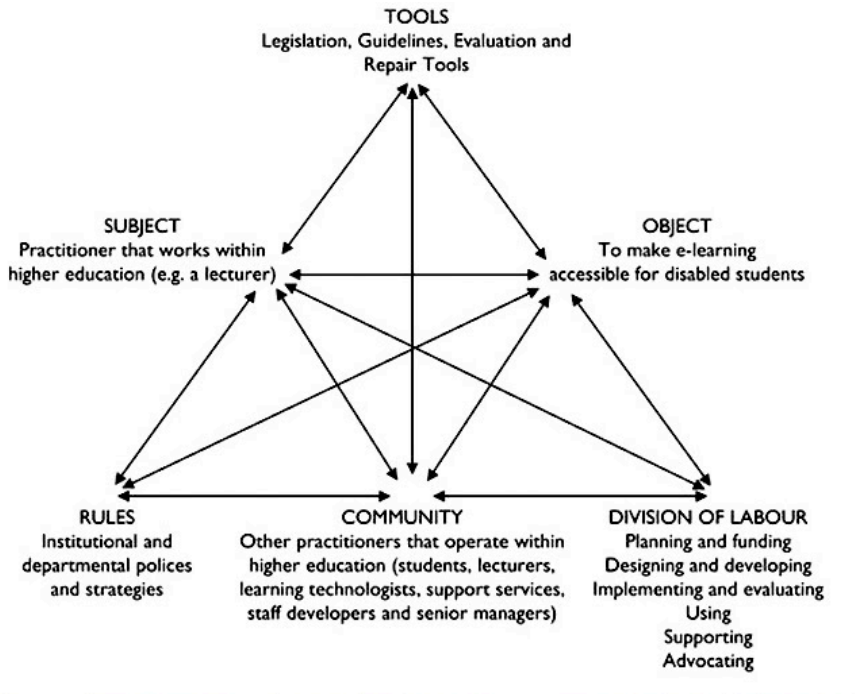

Figure 4. Application of Engeström's (1987) systemic model of activity to the accessible e-learning practice of a higher education practitioner (based on Seale, 2006a, 165).

This is practical also for us, because our objective in Aalto University is to develop inclusive blended learning and teaching accessible for diverse

students. Figure 4 depicts the activity system of all the involved stakeholders, where rules and practical issues presented by PDCA cycle (Figure 1) have to be taken into account. We seek merging the principle for continuous improvement with the systemic model of activity to augment the formation of the active academic communities of accessibility practice as a positive outcome.

The PDCA cycle is slightly further modified (Figure 5) when the activities of the academic year and challenges of the personal epistemology with the evolving knowledge about the academic knowledge building are taken into account.

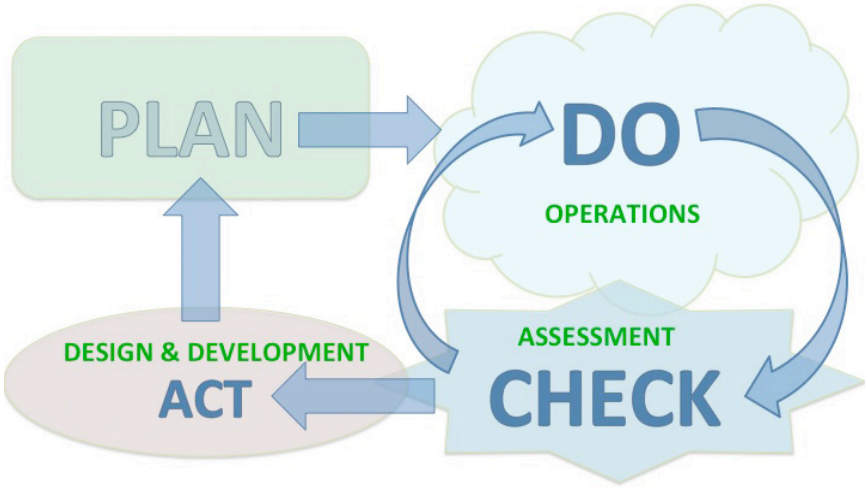

Figure 5. The modified PDCA cycle for students and staff facing every-day challenges on the campus

The sub-iteration in Do-Check cycle includes the systemic model of activity presented in Figure 4. The inner Do-Check cycle should be supported by the university management and organized promptly and lightly inside the academic year. This would give a real opportunity for stakeholders to propose improvements and innovations for the next design and development round.

Taking into account the sub-iteration cycle and the more general PDCA-cycle, our recommendations for creating inclusive teaching and learning in higher education are the following:

1. PLAN: Analyse what types of academic tasks might be the most conducive to fostering intellectual development. Prepare the syllabus with teachers so that a flexible personal study plan is easy and possible to construct. Contact staff organising first year activities and faculty in schools in order to define the zone of proximal development.

2. DO: Support field-based research to obtain data on the diversity of the student body especially within technologically enhanced learning environments. Collaborate with researchers at your own university. Collaborate also with different service organizations (library, campus and facilities, IT and communication) in order to solve practical issues.
3. CHECK: Evaluate how the earlier experiences and syllabus affect learning within the university. Check and follow how personal study plans work.
4. ACT: Practice co-design methods with students to reveal the social, cultural, and political character of the design process for learning tools.

These rather simple administrative modifications can give voice to the expertise of students and staff and turn student motivation into academic activity with the support of faculty and staff.

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