The quest for usable knowledge: the delicate balance between research, design and change

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Abstract: To bridge the gap between educational research and practice, a methodological approach known as educational design research (EDR) has gained influence. In our view, carrying out EDR necessitates balancing three processes: (1) research, (2) design, and (3) change. Using Activity theory as theoretical foundation, we will clarify the processes and the potential tension between these processes.

Introduction

Over ten years ago, researchers introduced a new methodological approach under the name of 'design experiments' (Brown, 1992) and 'design science' (Collins, 1992). In this approach, designing is proposed as a core activity in the research process, and research is intended to critically evaluate designs (Sandoval & Bell, 2004). Since then, this approach has gained influence and is still known under different names, such as design experimentation, design-oriented research and design-based research (The Design-Based Research Collective, 2003). We will use the term 'educational design research' (EDR) (Van den Akker, Gravemeijer, McKenney & Nieveen, 2006). We content that carrying out EDR necessitates balancing the following *three* processes: (1) research, (2) design, and (3) change. Moreover, as each of the processes point to different aims and criteria, tension is likely to arise. Our main research questions are: How can we characterise the processes of research, design and change in EDR; and what kind of potential tension between these processes can be identified?

To illustrate how the three processes are intertwined in EDR, we will use a case concerned with researching, designing and implementing change in Dutch education. The case covers three years of in-depth EDR, including a number of separate EDR-studies. Specifically, this research deals with the design and evaluation of ICT-supported, authentic learning environments in higher education.

Characterising research, design and change

'Up till the last decade most of research methodology in the social sciences is primarily concerned with theory-oriented research' (Verschuren & Hartog, 2005). By contrast, EDR aims at designing an intervention in the real world, using a cyclic approach of design, evaluation and revision (Van den Akker et al., 2006). Designing is considered to be a complex activity, grappling to accommodate apparently conflicting requirements (Norman, 2002). The practice of design has its own scientific domain, namely design science, with as mission the development of knowledge to solve construction problems (Van Aken, 2004). Implementing a learning environment requires the participating teachers and students to change their current practice. Change processes can be characterized as occurring as a consequence of deliberate management action, but also takes place as a result of local initiatives, improvisations, and modifications of individuals (Tsoukas & Chia, 2002).

Using Activity theory to clarify the three processes

To pinpoint the differences between the processes of research design and change, it is relevant to clarify these processes. Activity theory (Engeström, 1987) explains how human actions do not merely follow from individual intentions, but from larger activity systems. According to activity theory, a subject acts as part of a community which is aimed at an object, or a problem space, to produce outcomes, using material and conceptual tools when acting, and governed by specific rules and a division of labour. We use activity space as analytical tool (Halloran, Rogers & Scaife, 2002). The choice for activity space was made because the representation is suitable to clarify potential tension, while at the same time being solidly founded by Activity theory. Activity space consists of four nodes: subject, object, mediation and outcome. Between each node, there is potential tension, represented by parallel lines ('=' *see figure 1*). We consider the subjects not as separate agents, but as the dominant role or perspective of the community they represent. Consequently, we distinguish three different roles or perspectives: the researcher, the designer, and the change implementer.

Potential tension between the three processes

Tension may arise because of the different objects, namely, the research question, the design problem and the local educational setting. Traditionally, researchers tend to study single aspects at the time, while educational settings form a systemic whole (Brown, 1992). Additionally, the object of the change process, the local educational setting, is a rich and complex setting. There is a trade-off between the rich reality and the

experimental control that might be preferred from a research perspective (Brown, 1992). In our research, for example, the concept of the ‘ authentic task’ was the focus from the research perspective. However, in the educational setting, there were also problems with the self-reflection activities of students and with the currently used, main book. Therefore, to account for the experienced problems, redesigned self-reflection tasks were introduced in the second design iteration, and the current book was replaced with a new book. Both aspects were intended to respond to the local educational setting, but were potentially interfering with the research focus.

Tension may also arise from the differences in mediation. The research process is mediated by systematic research methods, while design processes often show ‘zigzag, or even chaotic design activities – especially by expert designers’ (Rowland, 1992, cited in Kirschner, Carr, Van Merriënboer & Sloep, 2002). For example in our research, some crucial decisions were taken much too fast by the collaborating practitioners in the design process, making it hard to verify the consequences thoroughly from a research perspective.

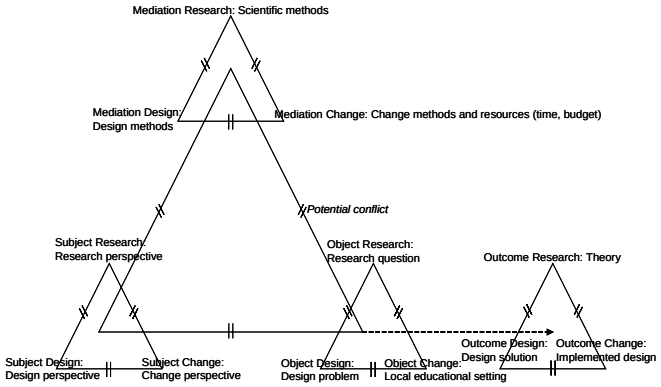

Figure 1. Potential tension represented in Activity Space model (Halloran et al., 2002)

Finding a delicate balance

Experience with our research showed that clarifying the three different perspectives and identifying potential tension, enabled the participants to anticipate and plan accordingly. Additionally, in the separate design iterations, a single perspective was taken as focus. For example, in the first iteration, an explorative research perspective, while in the subsequent iteration, the design perspective was more dominant. By planning and working explicitly from the three different perspectives, understanding between the participants developed and compromises were pursued actively, leading to a delicate balance in our quest to find usable scientific knowledge for educational practice.

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