Choice of Category
2) Research study in progress

Theme
Design-oriented research vs. design – theoretical and methodological issues

Title of proposal
Between Intervention Designs and Intervention Practices – Theoretical and Methodological Issues related to a new type of Intervention Study

Authors
Stefan Ting Graf, Læremiddel.dk, University College Lillebælt, stgr@ucl.dk
Marianne Georgsen, VIA University College, mage@viauc.dk
Charlotte Krog Skott, University College Capital, cksk@ucc.dk

Keywords
Intervention designs, theory of change, research methodology, digital learning resources

Research questions, project aims and theoretical framework
Introduction
In this paper we present and discuss the intervention designs and their realizations of three national development and research projects in a comparative way. These “Demonstrationsskoleprojekter” are part of a national strategy for digitization of the public welfare and are supported by the Ministry of Education and the Common Local Authorities (Government, Denmark, & Regions, 2013). The projects run from June 2013 to December 2015, while the realizations of the interventions take place from January 2014 to June 2015. The three projects are carried out by groups of researchers and consultants within a consortium of six University Colleges, Aarhus University and the Alexandra Institute. Each project involves 4 to 6 primary and lower secondary schools, geographically spread across Denmark, which have applied for participation.

Framework
The commissioning of the Ministry is to “create new, generalizable and practice-oriented knowledge of how IT supports pupils’ learning; how IT can free time for more teaching; and how teachers develop knowledge about integration of IT in their teaching” (Ministeriet for Børn og Undervisning, 2013). These goals are both part of a national educational policy and as such they contain certain concepts of change and knowledge. For the purpose of the intervention designs, these concepts have been translated into a theoretical framework and a common theory of change (theoryofchange.org) across the three projects. On the one hand, the theory of change takes on the challenge of measuring ‘effects’ and of creating ‘generalizable’ knowledge. On the other hand, the assumptions about freed time and IT as isolated factors need to be modified. The common theory of change is based on the concept of multi-dimensional intervention, complex school contexts and multi-dimensional outcomes (Bundsgaard & Hansen 2014). When talking about ‘effect’, we do not adopt simple or linear concepts as in classic effect studies or in natural science (e.g. experimental study, randomized control study), on the contrary we apply a concept of causal complexity. Our concept of causality claims that authentic and new ways of organizing teaching, while at the same time applying IT in a pupil-involving, inclusive, differentiated and qualified way, lead to a range of
positive effects for subject-relevant learning, the schools pedagogy and resources (AUUC, 2013). In other words, there will be effects on the organizational level and in relation to the development of teachers’ and pupils’ competences as well.

Very briefly, the measurement of effects consists of two types of instruments which frame the projects by a baseline and a final measurement as well as some selected measures midway. First, a new way of testing the pupils’ 21st century skills was developed. Second, the school and learning context is evaluated through a survey of the leaders, local IT-consultants, teachers and pupils, through standardized observations of teaching, and through rating of the pupils’ products/performance.

Our assumption is that recognized changes from baseline to end measurement can be explained by two sets of indicators. Preliminary indicators of the school context are socio-economic school background, school culture, infrastructure and organizational structure. Preliminary indicators of the learning context are teacher type, teaching characteristics, teachers’ educational preconceptions, and types of pupils.

Common Intervention design
Per Dalin’s review of school development projects points out strongly that “a lot of reforms either stay unproven, strongly change during the process or simply are being counteracted” (Dalin, 1994: 215, our translation). In order to prevent such outcome, the projects are first and foremost framed by the above mentioned effect study. Secondly, the form and structure of the interventions are fully designed and developed in advance and, unlike the iterations of design based research, not changed during the process. Unlike action research, there will be a distance between the intervention practice and the research effort studying it. The interventions are carried out by a group of consultants from the University Colleges and regional Centers for Educational Resources. The third issue, the three dimensions of the intervention program, will be one of the central issues in the study in question.

The key characteristic of the intervention design is a multi-dimensional approach. There is plenty of evidence indicating that interventions which are purely technological-driven do not lead to the intended changes in a sufficient way (e.g. Hattie, 2009). Similar documentation can be found for isolated organizational or pedagogical interventions. Our multi-dimensional approach applies a design of the following three, interwoven dimensions: pedagogical, technological and organizational.

The three interventions consist of two elements. On one hand there is a specific set of materials such as digital learning tools, learning designs, technologies, reflection models, resources, etc. On the other hand, there is a certain amount of work done by the consultants in interaction with the teachers, local resource persons, head teachers, and managers. However, when it comes to the specific intervention designs of the three projects, they are – despite the common framework – quite different.

Research study on intervention designs and intervention practices
Within this setting, we will carry out a study on the three different intervention designs in relation to their realizations by the consultants and with the professionals at the 15 participating schools.
The overall research questions are:
In which ways do the realizations of the three intervention designs play a critical role in developing the schools in the intended way?
1. Which critical relations can be found between the types of schools participating in the program, and the degrees of success of the interventions?
2. Which critical relations can be found between the intervention practices of the consultants and the degrees of success of the intervention?

The overall aim is to identify critical issues for the generalization of the three intervention designs in order to complete a robust intervention design. In order to do this, we need to identify which indicators or characteristics of the schools and learning contexts facilitate or hinder the success of the interventions. Generalization of the intervention design can be seen within schools, across to other schools, or in a scale-up perspective.

**Methods/methodology**

We distinguish between the intervention design and the intervention practice. We define the actual intervention design as the pre-intervention description of the program, including a set of materials to be used by the consultants. The intervention practice is defined as what happens during the process. In this process there will be a field of different critical interpretations. First, we have just the written description of the intervention design with is intentions, content, methodology and materials/media (Graf, 2009, 2012). Second, there is the intervention material which represents an interpretation of the intervention design. Third, we have the consultants who through their practice realize an interpretation of the intervention materials as well as of the intervention design. Fourth, the professionals in the schools make interpretations of the design, the materials and the consultants’ work in various ways. We expect this field of critical interpretations to be vital to the success of the interventions.

In order to answer the first research question, we produce elaborate ‘profiles’ of each of the 15 schools at three different stages during the projects. First, a descriptive pre-profile of a school is developed containing facts and figures, an estimation of the school’s readiness for change, its use of technology, and the teachers’ ways of collaboration. The profiles are produced before the start of the interventions. After the baseline and the post measurements, these profiles are further elaborated on with findings from the quantitative measurements. The data consist of documents such as the schools’ applications for participating in the projects, the schools’ webpages, along with the quantitative data from the measurements. We expect to be able to identify significant changes between the baseline and the post profiles for the majority of the schools. We also expect to find correlations between schools with similar profiles and the degree of the success of the interventions.

In order to answer the second research question we study mainly qualitative data collected in relation to the consultants’ work with teachers and staff at the schools. We conduct semi-structured individual and focus group interviews with the consultants about their interpretations of and experiences with the intervention designs and their realizations, and we observe workshops etc. for groups of teachers, planned and conducted by the consultants. These data are collected at significant times during the realizations. Another source of data is the consultants’ personal reflections on the realization of the interventions recorded in emails; audiotaped sessions, and virtual meetings.
Results/expected results
We expect to develop a typology of schools, which maps schools according to different conditions, general characteristics and identified challenges. The typology mapping will be multi-dimensional with overlapping categories. We will use the topology to describe the participating schools in order to make general claims about correlations between different school types and the degree of success different intervention designs. To sum up, one expected result is a general typology to characterize schools on a general level. Another expected outcome is a prediction or generalization about the expected success of a realization of each of the interventions in light of the typology of a school.

In relation to the second research question, we expect to identify different kinds of challenges in the consultant-teacher collaborations which can be said to contribute in a positive or negative way to the success of an intervention.

References
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