



Local curriculum development as object construction: A sociomaterial analysis

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HIGHLIGHTS

- Teachers develop local curricula by constructing a series of intermediate objects.
- These intermediate objects act back on the planning process in important ways.
- The plan emerges as an unfolding object with multiple connections in time and space.
- Teachers' curriculum work is situated in local and extended knowledge networks.
- Local curriculum development requires extended epistemic responsibilities.

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ABSTRACT

This paper examines teachers' local curriculum development by analyzing such development as a process of object construction. One team of lower secondary school teachers, mandated to develop a subject curriculum for their school, was followed closely over a year through an ethnographic approach. Data from six team meetings were analyzed to trace how the curriculum was developed through a series of object instantiations that also worked on the construction process. This process required various forms of epistemic engagement, which should be acknowledged in current discussions of teachers' work and their extended professional responsibilities.

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1. Introduction

The role of teachers as co-producers of professional knowledge, rather than as practitioners who merely put given knowledge to work in educational practices, is increasingly being recognized. Teaching is situated in a complex landscape of standards and templates, a myriad of research contributions, practitioner-developed resources that are shared within and across schools, and expectations from different stakeholders that often generate conflicting concerns (Fransson & Grannäs, 2013; Jonasson, Mäkitalo, & Nielsen, 2015). Navigating in this landscape and making relevant use of the resources provided requires analytical skills, as well as the capacity to adapt and construct knowledge and tools

to support the school's local needs. Such forms of engagement entail extended responsibilities for developing and safeguarding knowledge for local use, which brings a stronger epistemic dimension to professional work (Nerland & Jensen, 2012). Moreover, these extended responsibilities brings collaborative knowledge work to the fore as a way of fostering collective, rather than personal, autonomy in the profession (Hermansen, 2017).

One of the instances where these extended responsibilities are at play is in local curriculum development; as such work is intersected between general standards and local needs and involves a range of epistemic and social concerns. Several researchers have examined how curricular reforms are worked on in schools and local teacher communities and shown, for instance, how such work requires extensive organizational sense-making (Coburn, 2001), how it requires a shared professional language to focus on the same problems (Horn & Little, 2010), how the route to new teaching practices often involves a reconstruction of existing practices and

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actor relations (Hermansen & Nerland, 2014), and how it affords and requires new forms of agency among the teachers (Priestley, Edwards, Priestley, & Miller, 2012; Pyhältö, Pietarinen, & Soini, 2015). Studies have also highlighted the essential material dimension of curriculum development, in the sense that it involves the construction, adaptation, and redesign of curriculum materials, such as written plans, assessment rubrics, activity templates, and so forth (Voogt, Westbroek; Handelzalts, Walraven, McKenney, Pieters & DeVries, 2011). As a consequence, increased attention is given to teachers as curriculum designers and to how these processes provide learning opportunities in teachers' work (Voogt et al., 2015). This research has resulted in a strand of literature that has focused on how teachers design instructional environments, often also related to technology use (Goodyear, 2015; Vestøl & Lund, 2017). However, we do not have a good understanding of the way teachers actually go about constructing a local curriculum that spans several grade levels or what these epistemic responsibilities entails. To investigate these issues, it is necessary to follow design processes in depth and over time, investigating how they evolve in specific epistemic and material environments. In short, we argue that a threefold focus is needed on what is constructed, how it is constructed, and the implications of the temporary constructions for the further design process.

This article contributes to this focus by employing a socio-material perspective on local curriculum development by analyzing such development as processes of object construction. More specifically, we draw on Knorr Cetina's notion of "Knowledge objects" as open-ended and unfolding. By regarding the curriculum-in-the-making as an evolving knowledge object, we analyze the development process in a team of lower secondary school teachers in Norway who are mandated to develop a subject curriculum (in our analysis referred to as "the plan") for their school. This analytical approach has been used to reveal design processes and collaborative knowledge construction in other professional areas, such as in architectural design (Comi & Whyte, 2017; Ewenstein & Whyte, 2009), construction design (Miettinen & Paavola, 2016), and in the development of clinical procedures for nurses' work (Nerland & Jensen, 2012); however, this approach has not been employed much in studies of the teaching profession. The analysis shows how the teachers construct a series of intermediary objects through which the plan evolves and how these intermediary objects become consequential for the planning process, as well as for the epistemic engagement the process entails. We discuss how the object construction allows teachers to juggle different concerns and to navigate in multiple timescapes and conclude by pointing to possible implications for the teaching profession. Such implications may entail to challenge schools and teacher education programs to prepare teachers for types of design work in complex settings. Before presenting the study and its findings, we commence with a brief review of research on teachers' engagement in curriculum development.

2. Teachers' engagement in curriculum development: A brief review

Recent research on teachers' engagements in curriculum development have investigated various aspects of teachers' design processes. One strand of literature has looked at the merits of work in teacher design teams (TDT's). Here, TDT's have been described and investigated in terms of their benefits for school improvement (Handelzalts, 2009; Law & Nieveen, 2010) and school change (Huizinga, Handelzalts, Nieveen, & Voogt, 2014), and of enhancing specific topics and subjects (i.e., Pepin, Xu, Trouche, & Wang, 2017; Voogt et al., 2011). Other reported merits of team engagement in curriculum development are professional learning (Lewis, Perry, &

Hurd, 2009; Shaver, 2010; Vescio, Ross, & Adams, 2008; Voogt et al., 2011, 2015). In this regard, learning is related to teachers' collaborative work on developing resources for practical teaching and experimenting with new instructional strategies for their subjects, as described by Binkhorst, Handelzalts, Poortman, and Van Joolingen (2015). They investigated networked TDT's in the Netherlands and found that TDT's promote teacher professional development, especially in cases where a team coach contributes to defining a shared goal. Another strand of literature has looked at what it entails to engage in these designs, showing how teachers work with and on different kinds of representation e.g. abstract ideas and concrete materials. Some researchers have conceptualized this as prototyping (McKenney, Nieveen & Van den Akker, 2006; Plomp, 2013; Van den Akker & Kuiper, 2008) which refers to the systematic process of revision of design products in iterative cycles during the design process.

In a study of 12 teacher design teams in the Netherlands during their effort to redesign their curriculum, Handelzalts (2009) found that the most conducive activities in teacher design teams were those that 'forced' the teams to define their rationale and their goals while the teams collaborated on concrete materials. Setting abstract ideas on paper made them tangible and accessible for discussion and assisted teachers in creating concrete images of possible future practice. Also, in an ethnographic study of curriculum making in Scotland, Priestley and Drew (2017) reported that teachers' space and repertoires for maneuvering were shaped by material and social configurations of the context. Development conducted by the teachers acted as a translator of externally and internally initiated ideas in ways that implied reconstruction of existing practice. Baker-Doyle and Gustavson (2016) showed in their study in the U.S. context how cultural tools are influenced by and influence teacher agency and point to the complexity and different concerns that are embedded in what they call the "small moments" of micro-level interactions during collaborative curriculum design.

In sum, what all these studies illustrate is that teachers gain increased responsibility for constructing, adapting, and redesigning instructional resources. As explicitly discussed by McKenney, Kali, Markusaite, & Voogt (2015) these studies have provided valuable insight into the complexity of collaborative curriculum development and expanded our understanding of how teachers as curriculum designers work at many levels in parallel while creating and interacting with external representations. However, most of these studies have conceptualized design as the detailed process of imagining and constructing specific artefacts for instructional use (McKenney, Kali, Markauskaite, & Voogt, 2015). Although teachers' extended responsibilities are illuminated in the literature, we need more insights into the epistemic dimensions of such responsibilities. That is, how teachers handle various knowledge forms and concerns, how they explore new and established practices across time and space, and how they justify decisions made in the construction process.

In what follows, we examined the epistemic facets of teachers' work in a case study of how a team of lower secondary school teachers in Norway construct a subject curriculum for their school. This work takes place at what Van den Akker, Gravemeijer, McKenney, and Nieveen (2006) describes as 'the meso level', between classroom practice and guidelines from national level and the school itself. Norway is an interesting context in which to examine such processes, as teachers are given responsibility for local curriculum development. There are national regulations, but these are not very fine grained and more specific plans for the school needs to be developed locally (Hatch, 2013). Therefore, tensions between external regulation and professional maneuver are present, however, to a lesser extent than in England or the US,

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