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Chapter 3

Teachers’ Educational Design as a Process of Reflection-in-Action

The lessons we can learn from Donald Schön’s The Reflective Practitioner when studying the professional practice of teachers as educational designers

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Abstract

This chapter combines a review of Donald Schön’s *The Reflective Practitioner* (1983), with an analysis of the lesson design process of Richard, one of the teachers who participated to the study which was described in chapter 2. The question is asked how Schön’s concept of reflective practice could be used to further clarify the relation between a teacher’s practical knowledge and the decisions he takes while designing innovative lessons. Schön argues that a practitioner’s practical knowledge, or knowledge-in-action, is applied, tested, and developed during the process of reflection-in-action, which is essentially a design process.

During the process, a practitioner’s knowledge takes the form of *rules*, *types* (images of past situations, that help to recognize and understand the current situation), and *appreciative systems* (which determine how a practitioner assesses expected outcomes of design moves). We used these concepts to analyse the lesson design process of Richard, one of the teachers who took part in the study described in chapter two. Richard, an experienced biology teacher, designed a context-based lesson for his own students while thinking aloud. Richard’s case shows how his knowledge-in-action became activated and transformed during reflection-in-action while preparing his lesson. Framing Richard’s decision process as a process of reflection-in-action clarifies the relation between his knowledge and his design of this lesson. This perspective helps to understand why teachers, in general, and Richard in particular, tend not to implement innovations in the exact way they were envisioned. We identify rules, types and appreciations, as active entities of Richard’s knowledge. Further analysis will also reveal that Richard’s rules are hierarchically related, and that his decision-making during the design of the lesson can be represented as a trajectory through his personal hierarchical system of rules and goals. Goals that are higher in the hierarchical system give a new meaning to Schön’s concept of “appreciative systems”, a concept which in Schön’s book was rather vaguely defined. Therefore, we postulate that the use of hierarchical goal systems could add to Schön’s understandings of reflective practice by understanding better how rules, types, and appreciations influence decision-making and are interrelated.
3.1 Introduction

The world of educational research is a strange one for a teacher to enter. This was very true for me as a biology teacher, having my origins in the “harder” sciences and trained to measure trees, not people. Naively, when I started my PhD study I expected to find a clear set of methods for investigating teacher knowledge and behavior. What a shock to find myself in this hazy environment full of conceptualizations and constructs, overlapping but disconnected, with names such as beliefs, intentions, cognitions, principles, orientations, and knowledge that could be formal, situated, personal, or practical. I was interested in knowing what teachers do when designing lessons, how this relates to their knowledge base, and how lesson design can be learnt, which seem straightforward questions, but satisfying answers proved difficult to find. A study of the literature taught me that until the 1970s the main aim of studies on teacher planning was to describe teacher behavior and to assess whether teachers follow formal planning models. The conclusion was that they usually do not plan according to goal-oriented models (Yinger & Hendricks-Lee, 1994). From the 1970s onward, attention shifted to teachers’ cognitions. Lesson planning was considered a process of either solving problems or of decision-making, with teachers generating alternatives and choosing between them (Shavelson, 1973). Later, Shavelson himself criticized this perspective because it underestimated the role of routines and the influence of classroom materials (Clark & Dunn, 1991; Shavelson & Stern, 1981). More recently Maher Hashweh, who has played an important role in developing the concept of Pedagogical Content Knowledge, could not but observe that there is still limited knowledge on the interplay between teacher knowledge and educational design (Hashweh, 2005), that is to say: we lack answers to the questions about how teachers’ knowledge develops during the design of lessons, and how this knowledge guides the design process.

While searching the literature for answers every once in a while I ran into quotations from the influential book The Reflective Practitioner by Donald Schön (1983), in which I recognized my own experiences as a teacher. Could Schön’s ideas help me understand how teachers know what decisions to make when designing their curriculum, and how they learn throughout this design process? It took a while before I finally started reading the book, mainly because of the negative associations with the word “reflection” I had built up during my year of teacher education, but also because Schön’s work is often associated with reflection in the sense of “looking back” on something, and is not often cited in the context of educational design by teachers. Not only did it take me a while to start reading the book, it also took me some time to finish it. The book proved not to be that fine collection of crystal-clear sentences like the ones I had read in the quotations of his work by others. I had, I think, the kind of experience described by Donald Schön himself in an article he wrote for Curriculum Inquiry in 1992, about him reading Dewey’s work: “…I found him muddy
and unintelligible. Later on … I saw that Dewey’s was a generative muddiness: he was trying to say new things that were bound to seem muddy to anyone trained as I had been in the logical empiricism fashionable at the time” (Schön, 1992). In spite of this, I found many interesting parallels between Schön’s ideas and the things I myself had discovered when studying teachers’ design of lessons. The aim of the review presented here is not to give a detailed summary of the book, as there have been enough of that kind since 1983, but to see if the book still tells us “new things” (to use Schön’s words) that can aid the study of teachers as educational designers.

3.2 The Reflective Practitioner

Donald Schön was Ford Professor of Planning and Education at the Massachusetts Institute of Technology from 1972 until his death in 1997. He was inspired by the work of John Dewey, about whose theory of inquiry Schön wrote his doctoral thesis. As Schmidt (2000) notes, Schön was not only an inspiring lecturer, advisor, and musician, but also a very productive author. His sixth book, The Reflective Practitioner (1983) has become his best-known work, together with its sequel, Educating the Reflective Practitioner (1987). The Reflective Practitioner is considered of particular importance because it was the first one in which he comprehensively unfolded his overall epistemology of professional practice, based on the concepts of knowledge-in-action and reflection-in-action. In 1983 the book was innovative in two aspects. First, it represented a recognition of the importance of practitioners’ special kind of knowing. Second, it gave an enlightening view of how we, real people, solve problems in the real world and how we simultaneously apply and create our knowledge in the process.

The book starts with a critical discussion of the view of professional knowledge dominant at the time (and in many regards prevailing still): the paradigm of Technical Rationality. According to this view valid, research-based knowledge is solely generated by academics, only to be applied by practitioners as they solve well-defined problems. This view, as Schön argues, can no longer be maintained. In real life, problems are usually not so well-defined that they can be solved by the straightforward application of academic knowledge. Instead, practitioners constantly need to define the problems by naming the things they will concentrate on and framing the context in which they will attend to them. The world is governed not by academic, formal knowledge, but by the knowing-in-action and reflection-in-action of practitioners. Their knowing-in-action is revealed by everyday routines of action. This is a type of knowing practitioners will not readily be able to explicate. Also, practitioners think about what they are doing while doing it in the process of reflection-in-action. Schön draws on his own experiences as a jazz pianist and clarinetist
when he illuminates the process of reflection-in-action in his portrayal of a jazz musician in the midst of improvisation, responding to the musical moves of a colleague. We can also think of a teacher in the midst of action responding to a student's unexpected behavior. Reflection-in-action is about “finding your groove”; “studying those winning habits and trying to repeat them every time you perform” (p. 54). Then, there is also such a thing as reflection-on-action, a term that is reserved for the looking back one does after the situation when new insights, although they can be very useful, can no longer have any influence.

After the introduction of his main concepts Schön sets out to describe the knowledge-in-action, reflection-in-action, and reflection-on-action of different practitioners: an architect, a psychotherapist, a civil engineer, a town planner and a manager. During his rich descriptions of these different cases, in which the processes of reflection-in-action and reflection-on-action seem to take many different forms, it becomes obvious that, however appealing the image of the reflective practitioner, it may be rather difficult to distinguish between the different processes in practice. Eraut (1995) even concludes that “most of his examples fail to provide evidence of reflection-in-action. … Indeed it is difficult to distinguish reflection-in-action from reflection-on-action” (p. 9).

Schön ends his book with a chapter in which suggestions are made for the education of professionals and for the organization of professional institutions, in order to create places where conversations between professionals and clients, between managers and their employees, and between colleagues can take the form of reflective conversations in which professional knowledge is explicated and developed. Although Schön gives a clear presentation of his model in which a practitioner's knowledge is simultaneously used and created during the process of reflection-in-action, he does not describe what this knowledge is, exactly. Still, during his elaborate descriptions of the process of reflection-in-action it becomes clear that a practitioner's knowledge base consists of at least three entities: (1) images of past situations, or types: prototypical buildings or parts of buildings in the case of an architect, or former lessons or lesson elements or structures in the case of a teacher; (2) theories-in-action, consisting of rules, often linked to types: again, an architect might feel that a cathedral (type) must always have a cross shape or a teacher could be convinced that a lesson with a particular group of students should always start with a personal story; and (3) appreciative systems. In his discussion of appreciative systems Schön compares the normative scientific hypothesis-based method of experimenting to reflection-in-action, which is also a way of experimenting: “when someone reflects-in-action, he becomes a researcher in the practice context” (p. 68). Whereas in scientific experimentation the objective is to discriminate between competing hypotheses, in the experimental process of reflection-in-action the objective is to change a situation into one that the practitioner likes better. This is done through taking actions or, as Schön often calls it, making moves, which can be either imaginative or real. The moves and underlying rules are affirmed if a practitioner
likes what she gets, which is not necessarily the same thing as getting what she expected. Both the assessment of the initial situation and whether or not a move will be affirmed are determined by a practitioner’s appreciative system, including personal experience, values, and beliefs, while the process in turn influences a practitioner’s appreciations.

Many of Schön’s ideas fell on fertile ground, not only because the book put forward the right things at the right time, when people had begun to feel uncomfortable with the dominant positivist approach to knowledge, but also because of Schön’s persuasive writing style and abundant use of examples. The concept of knowing-in-action has largely influenced our way of thinking about what teachers know and how they know it (Fenstermacher, 1994). Munby and Russell did important work building upon the conceptualizations of Schön, for example by elaborating on the role of metaphors (Munby & Russell, 1990). Reflection-on-action has become a basic concept in teacher education and research on teaching worldwide (Korthagen, Kessels, Koster, & Lagerwerf, 2001; Lyons, 2010).

Along with the embracement of his concepts came the criticism. Remarks have been made, for example, about Schön’s favorite example of reflection-in-action. This example, that has become almost mythical, is situated in a design studio where a master architect, Quist, coaches a student, Petra, working on the design of a school on a difficult terrain. In choosing this practice to illustrate his concepts Schön chose a situation in which the practitioners have the time and some distance to make virtual moves by means of a sketch book and to contemplate on them (Carlgren, 1999; Eraut, 1995). This situation is not only different from a normal design situation, but also considerably different from the situation of a teacher in a classroom, who needs to act and think at the same time, who cannot “sketch and erase”, try something and rewind the time to try something else. Teachers don’t spend all their time in front of classrooms, however. There are important instances where a teacher’s practice resembles that of the work in a design studio, and the design of lessons is one of them.

### 3.3 Reflection-in-action in lesson design

Considering the fact that the process of reflection-in-action has been described as essentially a design process, in which knowledge-in-action is applied, tested and developed with the aim of finding satisfying answers to more or less problematic situations (Schön, 1983, 1992), using Schön’s image of the reflective practitioner when studying the interplay between teacher knowledge and teachers’ daily lesson design seems to be a promising undertaking. Let us therefore try to put Schön’s ideas about reflection-in-action into practice in the context of lesson design. For simplicity’s sake I will focus on the three elements of practical
knowledge described before: types, rules and appreciations. In a recent study six biology teachers designed lessons while thinking aloud (Wieringa, Janssen, & Van Driel, 2009). As Schön would have predicted, the design problems (intended outcomes for the lesson, etc.) and possible solutions were not clear from the beginning, but instead were constantly defined and redefined during the process of designing the lesson. Analysis showed that these teachers' knowledge influenced the design process mainly through the application of rules, and secondly through the appreciation of the expected outcomes of design decisions. One teacher, for example, had the rule always to start with a personal story, and then decided to let her students work on the computer, because she expected that this would lead to higher student motivation than having them work on a pencil-and-paper assignment. Types, for example in the form of fragments of former lessons, also played a role, as Richard’s case will demonstrate.

Richard is an experienced biology teacher, and one of the teachers who participated in the afore-mentioned study. The study took place in the context of a (still ongoing) reform of the biology curriculum in The Netherlands, aimed at making the curriculum more relevant and more coherent. As a part of this reform, teachers are stimulated to use realistic situations from students’ own lives, from society or from professional or scientific practices when introducing biological concepts to their students. Richard had not been trained to use this so-called context-based approach to teach and to design his lessons, but he had heard about it and wanted to give the approach a try to address his main concern: a lack of student motivation. He chose to design a lesson about the central nervous system for a group of 16- to 17-year-olds, to be implemented the week after.

Figure 3.1 gives a representation of the rules, types and appreciations used by Richard during the design of his lesson. This figure, although it is only a fragment of a larger whole, provides a diagram of Richard’s knowing-in-action and how this changed during reflection-in-action. Richard started by checking the year plan and determining the concepts to be learnt: the structure and function of the two parts of the autonomic nervous system, namely, the part that controls the bodily functions in situations of stress, and the part that does the same for situations of relaxation. These we could call his most important rules: the lesson should cover the concepts as stated in the year plan (rule 1), and hence he would need a context that covered the entire concept (rule 2). He then searched the internet for situations in which people use knowledge about the autonomic nervous system, which automatically led him to medical contexts (rule 3), such as asthma and bowel diseases: diseases that might be caused by a disturbance of the equilibrium between the two parts

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2 I use the term “practical knowledge” to refer to the knowledge teachers themselves generate as a result of their experiences as teachers and their reflections on these experiences Fenstermacher, G. (1994). The knower and the known: The nature of knowledge in research on teaching. Review of Research in Education, 20(1), 3-56.
of the nervous system. This is when Richard realized that such situations would not cover
the concepts as planned in his yearly plan: he found it particularly important that students
would realize that one part of the nervous system intervenes all the organs simultaneously,
while in the asthma context for example only the lungs have a part. Also, Richard feared
that using a medical context would give students the erroneous impression that things go
wrong in their body all the time. He became quite frustrated at this point, sighing “if we
wouldn’t try so hard to make some context-based thing, I would have stopped a long time
ago…”. In Schön’s terms, the internet search leading to asthma and bowel diseases could be
considered a first experiment as part of Richard’s reflection-in-action, which ended with his
disapproval of the outcome (his appreciation). It led him to the formulation of a new rule, or
more probably, an already existing rule that yet had to be made explicit: the lesson should
help students to experience the beauty of biology when their body works as it should (rule
4). He further clarified that as a general rule he aimed at leaving his students with a positive
image of biology (rule 5). Richard believed that such an experience could be better achieved
through the use of a more appealing context, where the body functions as it should (6). He

Figure 3.1 Schematic representation of the rules, types and appreciations Richard used while
designing a lesson about the central nervous system. Rules are in the boxes, numbers refer to the order
in which the rules appeared during the design process, as explained in the text. The arrows indicate
the relationship between the different rules, which are defined by either a type or an appreciation.
Rules that are positioned at a higher level refer to expected outcomes of the lesson, while rules at a
lower level refer to concrete attributes of the lesson.
recalled a fragment of an earlier lesson (a type) in which he used the analogies of a lion (when a lion jumps forward, your nervous system is in a state of arousal) and a cake-eating event, when the system is in a state of rest (rule 7). Richard had been pleased with these analogies (appreciation), because they had helped students to remember the things they learnt (rule 8), which, he hoped, would lead to better grades (rule 9). Now his lesson plan unfolded itself quickly: the lesson would start with a story about the class being on a safari trip together, taking a break, eating cake, when suddenly a lion jumps forward. Then, the students would be asked to predict what the organs would be doing during both the cake-eating- and the lion scenes. This last part of the lesson design process is not included in figure 3.1. Richard was contented with his lesson plan, one that he considered better than his regular ones.

The example the elements of reflection-in-action are present. We have seen how Richard, while designing, reflects on his rules, performing mental experiments to predict their outcomes, appreciating some and discarding others. In the process, he defines the means and ends of his lesson interactively. From a research point of view, framing Richard’s design activities as an example of reflection-in-action seems to clarify the relation between his knowledge and his design of this lesson, and, more particularly, demonstrates how an innovative idea (namely, context-based education) is put into practice by this teacher.

3.4 Conclusions

As argued in the beginning of this review, the relation between teachers’ practical knowledge and their educational design has so far remained relatively unexplored. How does rereading Schön’s classic help us? To revert to the title of this review: what lessons can we learn from Donald Schön’s *The Reflective Practitioner* when studying the professional practice of teachers as educational designers?

I would say there are three main lessons to be learnt. First, reading Donald Schön’s book directs the attention to the process of lesson design as a source of knowledge for the teacher, who is in the middle of reflecting-in-action while designing, and as a source of knowledge about a teacher’s knowledge for the educational researcher, a promising perspective that has also been advocated by Hashweh (2005). Second, in his book, Schön argues that, in the design process, the problem and possible solutions constantly co-evolve, contrary to a still prevailing view according to which knowledge is something that is generated by researchers and is to be applied in a straightforward manner by teachers when planning their lessons. A “Schön-like” way of looking at educational design helps us understand why teachers tend not to use design models and not to enact innovations exactly the way they were envisioned.
(Verloop et al., 2001), and can lead us to a better appreciation of the value of teachers’ practical knowledge: knowledge that has been tested in teachers’ own specific contexts, with their own groups of students. A third reason why rereading Schön’s book can help the study of lesson design by teachers is his introduction of the concepts of “rules”, “types” and “appreciations” as entities of practical knowledge (although he might not have liked my phrasing if I say “entities” of knowledge). These are concepts that can be studied, and that we can communicate about.

In summary, it is productive to consider lesson design by teachers as an example of reflection-in-action. There are, however, two aspects deserving more attention than they get in Schön’s conceptualization of the reflective practitioner, the first of which is the relationship between “formal” knowledge and a teacher’s practical knowledge. Schön, in his enthusiasm to challenge the positivistic thinking from the school of Technical Rationality at times seems to forget that the role of formal academic knowledge is not negligible, however important the role of practical knowledge (Eraut, 1995). This is an important issue in the context of teacher education and professional development, but the matter also calls for our attention when studying Richard’s case. Richard learnt about the principles of context-based teaching through a formal publication by the Dutch innovation committee of biology education, and wished to try it in practice, designing a lesson that was different from his regular lessons. It could be expected that formal knowledge somehow finds its way into a teacher’s knowledge in action, first by influencing the whole of rules, types and appreciations a teacher uses, and by consecutive rounds of reflection. “Enriching” Schön’s concept of knowledge-in-action and reflection-in-action by including formal knowledge in the knowledge base of teaching, giving special attention to the relation between formal and practical knowledge (Verloop et al., 2001).

A second aspect deserving more attention is the mutual relationship between a teacher’s rules, and the relationship between rules and appreciations. In Schön’s book the exact meaning of “appreciative systems” is somewhat vague; in some of his examples they appear to be very personal, while in others they seem to be part of a larger social system. In any case, appreciative systems determine whether or not the outcome of an experiment, real or virtual, is considered successful. Figure 3.1 shows that in the case of Richard appreciations are linked to certain rules: rules defined at a higher hierarchical level than other rules. Richard’s rule “the lesson should help students to experience the beauty of biology” for example caused Richard to reject the asthma context and to embrace the safari context. Hypothetically, all the rules a teacher uses in a certain session of reflection-in-action are hierarchically related. Such an images reminds one of both the concept of goal hierarchies in the field of cognitive psychology (Carver & Scheier, 2001) and the idea of hierarchically related design steps in the field of design research (Kazakçı & Tsoukias, 2003). If this is true, such a hierarchy of rules and its relation to types and appreciative systems deserves further study.