1.   Practitioner inquiry

1.1.   Prelude

> *The teachers have started their professional learning community and have been working together in it for some months now. What started out as basic ideas in the first meeting, evolved into actual inquiry projects.*
>
> *Rik:*   *"So last time I told you about the start of my experiment with giving my students relatively easy homework to stimulate them to actually do it. Maybe you still remember that initially I planned to count how many students actually did their homework, in order to get a sense of how successful my approach was. I did this for a while and found out that in the beginning the numbers did go up, but they started to drop again after a few weeks. Here, this graph summarizes what happened."*
>
> *Willem:*   *"That's odd. Did you change anything in between that could have caused this?"*
>
> *Rik:*   *"I don't think I did. It looks like I temporarily raised their interest by changing the type of homework, but lost it again when they got used to it."*
>
> *Cristina:*   *"Can you say something about the students that – temporarily – were more conscientious in doing their homework?"*
>
> *Rik:*   *"Not yet. But I'll look into it right away!"*
>
> *Barbara:*   *" Maybe I can help. As we discussed last time, I interviewed small groups of my students on why they didn't do their homework. The things students stressed when talking about this are that homework has to be feasible and challenging: If it's too difficult, they'll give up, but if it's too easy, or if they don't feel they're learning anything from it, they'll also stop.*
>
> *Rik:*   *"So maybe the homework I gave them was too easy?"*
>
> *Willem:*   *"Could be, but maybe this means that the 'sweet spot' of home work difficulty is different for every student. How would you manage that?"*

1.2.   Introduction

Establishing a professional learning community provides an excellent foundation for collective professional learning. As pointed out in the previous chapter, PLC's can be regarded as platforms within or between schools that facilitate participating teachers in reflecting on their own practices. These platforms contribute to their professional learning by reducing isolation, supporting a shared purpose, sparking professional (i.e. collegial) conversations, and connecting school data with daily practice.

Practice cannot be considered effective unless it is responsive to the participating students and promotes their learning. The worth of the co-constructed criteria in practice, therefore, needs to be judged in terms of how students are responding and learning (Timperley, 2011). Teacher inquiry

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and the knowledge-building cycle to promote valued student outcomes (Timperley, 2011) shows the connections between student and teacher learning: What knowledge and skills do our students need? - What knowledge and skills do *we* as teachers need? What has been the impact of our changed actions?

Students' involvement in inquiry makes teacher learning immediate, relevant, differentiated, self-directed, collaborative, active, and engaging, therefore it makes sense to share it with the students they teach (Dana et al., 2011). Teaching students through inquiry has the potential to help the cultivation of their critical-thinking skills.

> *The conversation in the prelude, gives us a nice example of how learning occurs through inquiry: Teaching experiences are captured with data, and these data lead to new questions and ideas. Furthermore, Barbara's approach of questioning students, shows the value of involving students in teacher inquiry.*

Timperley (2011) emphasized four principles of teacher-student cooperation as follows: 1) engaging with prior conceptions of practice; 2) developing a deep foundation of knowledge in the context of a conceptual framework; 3) that knowledge construction occurs through the processes of interaction, negotiation and co-operation; 4) learners being pro-active and developing ownership and responsibility for learning and improvement through meta-cognitive and self-regulated learning processes. Self-directed (regulated) learning can be defined as the challenge to promote self-regulated learning requires the effectiveness of practice to be monitored in terms of learning goals. Goals on their own, however, are insufficient to ensure the learning of adaptive experts. The conversations, therefore, need also to promote monitoring of the goals and to help the teacher judge whether any changes in practice are more effective than what they were doing before (*ibid*).

Teacher learning - Teachers should experiment in teaching and try to explain the results of their experiments: "It is not enough to know what works, you need to know why!" (Petty, 2014). The importance of learning goals for students is well established; less so for teachers. The teachers themselves, therefore, need professional learning goals, linked to student achievement, against which to monitor the effectiveness of their practice (*ibid*).

1.3.   The inquiry cycle

Inquiry has not to be understood as a linear process but more as a circle. The process is ongoing because as soon as we reach a provisional point where the educator feels the situation is satisfactory, that point itself raises new questions and it is time to begin again (McNiff and Whitehead, 2006). Dana (2013) describes the process as follows: develop a wondering – collect data – analyse data – take action – share. "Although one's particular action research project might appear to culminate with the presentation of it, one's inquiry stance continues to be a powerful

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force and source of knowledge for self and others throughout the professional lifetime – just like a circle, it has no end" (*ibid*: 82-83).

Defining a research question begins simply with careful and critical reflection about a teacher's teaching process. Practitioner inquiry is about improving practice within the context of the school's development plan.

Planning - cover aspects as:
- The purpose of the inquiry;

- The right question;

- How you will collect data;

- How you will analyse data;

- A timeline for your study

Questions - PI should deal with real questions, not the questions a teacher has already got answers to. It's about an approach of a researcher; an approach of challenging one's self and one's own practice; not an approach of being an external expert. Real questions articulate the passions of a teacher. Real questions connected to the context of the school, country and to literature. Real questions are focused on learning and they are genuine which means that it is about improving and changing an educator's practice.

5.4   Data and data collection

Educators must become comfortable with the process of practitioner inquiry as a means of using data and evidence in routinely and critically examining their own practice. Data should provide new lenses for thinking and present opportunities for examining and challenging existing beliefs. Data, however, is not synonymous with statistics. Data is an essential part of educators' work: educators collect data; they interrogate data; they transform data into information; they utilise the emerging knowledge as a stimulus to constructive action. Data must be used in a learning-oriented manner in order to realize any valuable improvement in the learning; mistakes have to be seen as a vital part of the improvement process. Data leads to an ongoing process of collecting, analysing, establishing new learning and bringing about changes in practice.

> *The prelude gives examples of numerical data (Rik's approach) and qualitative data (Barbara's approach). As the conversation fragment in the prelude shows, they both have their advantages and disadvantages.*

Data collection - data capture the action, learning, and thinking that is occurring in the teacher's classroom and/or school. There will and should be a variety of data, both quantitative and qualitative: the data should closely reflect to the students and their learning experiences in the classroom. The rule is to look to the students for the data first.

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There are numerous strategies for collecting data: student work, test scores, notes, interviews, focus groups, pictures, journals. The teacher should begin by articulating what 'it' means to his/her, then use the tools to enable to explore the issue.

5.5 Different models for engaging in teacher inquiry

5.5.1 Data wise

This model is structured for towards establishing a priority question, a learner-centred problem or a problem of practice thereby narrowing the focus for data collection. In doing so, the model can be used for collaborative practitioner inquiry. The work starts by developing a collaborative culture to achieve a shared commitment on action. A system of teams, facilitated by strong leaders, are established and an inventory of all types of data available in the school is created. Different working styles are taken into account in building assessment literacy by negotiating key concepts and fundamental principles, ways of reporting performance and strategies for the interpretation of data. The focus area is found by analysing available data and identifying and formulating a priority question. The observation and analysis of teaching will become the focus of the inquiry action plan.

5.5.2 Lesson Study

Lesson Study works because it helps teachers to:
- See student learning occurring in much sharper detail than is usually possible.
- See the gaps between what they had assumed was happening when students learned and what it is actually happening.
- Find out how to plan learning which is better matched to the students' needs as a result.
- Do all this in the context of a supportive teaching and learning community which is strongly committed to helping students to learn and to the professional learning of the members of the group.
- Change their teaching to better support learning as a result.

The research lessons are jointly planned by the group of teachers and case study students are chosen for observation during the lesson and interviewed afterwards. Because the research lesson is jointly planned, it is owned by the group. This means the focus for the observers is less on the teacher and more on the learners – the case study students. They should alternate in the research lesson by spending some time as if 'zoomed-in' on a case study student while on other occasions panning back to allow a bigger group or the whole class to come into frame.

1.1.3. 'Prototyping'
Over the last few decades, teacher inquiry (e.g. action research) has been established as a legitimate approach to both curriculum innovation and teacher professionalization. Its potential

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lies in the fact that teachers' professional concerns are taken as a starting point of self-directed learning and innovation. Some teachers seem to struggle however with embedding inquiry activities into their daily practice. The teaching profession is traditionally dominated by programmed activities (teaching classes, staff meetings, etc.) and activities that require swift or even immediate response (grading tests, answering student questions, etc.). Fitting in inquiry-like activities, such as reflection and data collection, (however organic they are set up) that are not about dealing with 'right here right now', is certainly not an easy task for teachers.

Inspired by the fields of industrial design, architecture and software development a model for teacher inquiry is being developed at Fontys University of Applied Sciences in the Netherlands (one of the Linpilcare partners) that is trying to reshape teacher inquiry into a way of working that feels even more native to teachers: 'prototyping'. The basic idea behind this approach is that in some fields, design is considered a form of inquiry ('design as research').

Prototyping as a more or less formal design strategy sprouted several decades ago in the fields of design, technology, and engineering. From these fields, Warfel (2009) defines a prototype as "a representative model or simulation of the final system" that can be further characterized as being "different from other works of the imagination, because it's real. [...] This means that it can be tested [...]. Without a prototype, you can't test your product until you have built it". Prototyping is subsequently described as "practice for people who design and make things. It's not simply another tool for your design toolkit – it's a design philosophy." Warfel considers the prototyping process "an iterative process. You generate design concepts. You prototype them. You test them. You discover what works, what needs to be refined, and opportunities for new ideas." It is contrasted with design approaches that are largely separated from practice: "[Prototyping is] in direct opposition to 'design in a vacuum' or 'design in an ivory tower'."

The main advantage of prototyping over most other forms of practitioner inquiry seems to be that it promotes teachers to try out new ideas relatively quickly in their teaching practice, thereby gathering user (i.e. student) feedback that helps them develop new ideas: "Prototyping helps you get ideas out of your head and into something more tangible". Moreover, "one of the fundamental values of prototyping is that it's generative, which means as you work through the prototyping process, you're going to generate ideas." (*ibid*).

Table: Comparing inquiry models

	Data wise model	*Lesson Study*	*Prototyping*

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Goal	Promoting students' learning by collecting data and analyse one's own and other colleagues' practice to redesign and implement innovations.	Promoting students' learning through an individual approach to teaching and learning	Promoting student learning by trying out ('prototyping') new ideas and building experience and gathering feedback while doing this
Involvement/ size of group	The whole pedagogical staff of the school	A pair or a small group of teachers	Teachers, collaborating and delivering critique of each other's work in a 'design studio'
Starting point of the inquiry cycle	Create a collaborative culture to achieve a shared commitment on action, assessment and adjustment by focussing on evidence.	Determine what the LS group wants to improve.	There's no real cycle; prototyping can be considered an iterative process where teachers decide on how to proceed after each activity.
The process	1)choose focus area 2) dig into multiple data sources; identify a learner-centred problem 3) examine instruction 4) develop an action plan 5) assess the action plan 6) act and assess the progress	1) jointly plan the research lesson and select the focus students to observe 2) teach/observe research lesson 3) interview focus students 4) discuss the research lesson and plan next stage 5) after a series of research lessons and post-lesson discussions writing up and presenting the findings to other colleagues.	Possible activities: - Coming up with teaching approaches ('sketching') - Developing a prototype - Gathering and discussing a source of inspiration ('trigger') - Gathering 'critique' from colleagues - Experimenting in practice - Reflecting on experiment

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Next steps	Continuing the inquiry cycle emanating from the results of the previous inquiry.	Establish a larger group or whole class to apply the results of inquiry.	Enhancing the prototype.

1.7.   References

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