

Article

Bridging Theory and Practice: Using Goal Systems to Spark Professional Dialogue and Develop Personal Theories

Hanna Westbroek ^{1,*}, Bregje de Vries ¹, Anna Kaal ¹ and Michelle McDonnell ²

¹ LEARN! Research Institute, Vrije Universiteit Amsterdam, de Boelelaan 1105, 1081 HV Amsterdam, The Netherlands; b.de.vries@vu.nl (B.d.V.); aa.kaal@vu.nl (A.K.)

² Regius College, Wilhelminalaan 4, 1741 CN Schagen, The Netherlands; mcd@regiuscollege.nl

* Correspondence: h.b.westbroek@vu.nl

Abstract: School-based mentors play a key role in the learning processes of student teachers. Ideally, they facilitate student teachers to scrutinize their approaches and underlying assumptions, and link these to theoretical notions. In this study we investigated how three mentors used a goal-system representation (GSR) tool in their mentoring conversations. The GSR tool is essentially a visual reflection of the student teacher's *personal theory* regarding classroom practice. It was developed at our teacher training institute to help our students see the personal relevance of research literature and theory and apply it to their lesson plans, to bridge the gap between educational theory, their vision of good teaching and their educational practice. In three explorative case studies, we show how mentors use the GSR tool and to what extent they support three levels of personal theory development: sharing, investigating and transforming. In all cases, student teachers could relate their practices to theoretical notions, giving access to their mentors for further questioning of their sense-making of the situation. Mentors successfully use these opportunities for personal theory development in various ways. We conclude that the GSR tool functions as a boundary object between theory and practice and between institute-based and school-based teacher education.

Keywords: teacher education; personal theory development; goal-system representation tool; school-based mentoring; professional dialogue



Citation: Westbroek, H.; de Vries, B.; Kaal, A.; McDonnell, M. Bridging Theory and Practice: Using Goal Systems to Spark Professional Dialogue and Develop Personal Theories. *Educ. Sci.* **2024**, *14*, 458. <https://doi.org/10.3390/educsci14050458>

Academic Editors: Ainat Guberman and Vasileios Symeonidis

Received: 5 April 2024

Revised: 21 April 2024

Accepted: 23 April 2024

Published: 25 April 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Good quality teaching needs both practical experiences and theoretical underpinnings. For this reason, teacher education programs always seek to combine and balance learning *by* doing (practice) with learning *about* doing (theory). Ideally, student teachers productively connect theory with practice and develop their own *personal theory*, the theory they actually work with. Buitink, who refers to this as *practical theory*, states: 'Practical theory is the fairly integrated sum total of experiential knowledge (as a person and as a teacher), academic or theoretical knowledge and knowledge acquired through interaction with others' [1] (p.119). A personal theory develops continuously and is therefore dynamic [2,3].

Making productive connections between theory and practice is not self-evident, however [4]. It ideally requires that student teachers are willing and able to understand and interpret theoretical frameworks and research outcomes and experiment with new perspectives in their classrooms. Such a top-down reference is needed to broaden student teachers' perspectives on 'good teaching' and invite them to look beyond their own experience [5]. For example, at the beginning of their education many student teachers perceive 'building a positive relationship with students by showing interest' as the main contributor to their students' experience of connectedness. Later on, for instance, autonomy supportive teaching [6] may provide them with other options on how to connect with their students. This top-down learning process is generally often accommodated at teacher education institutes. What is challenging, however, is that student teachers tend to conceptualize

theory and practice as opposites and often perceive strong theory as being too abstract and generic [7]. This seems to be caused by a misleading expectation that strong and descriptive theory should be able to prescribe ready-to-use guidelines for practice. From her research, Sjölie concluded that starting a meta-dialogue with student teachers about the relationship between theory and practice is essential to overcome such misleading conceptualizations and to truly develop a personal theory instead.

Besides the ability to critically evaluate research findings and theoretical frameworks and understand their potential, student teachers also need to be able to understand and assess their own practice and personal theory through critical reflection. Such 'bottom-up' learning processes are generally organized in internships. Made explicit, student teachers can scrutinize their approaches, underlying motives and assumptions, also referred to as their 'knowledge in action' or 'tacit knowledge', and link these to theoretical notions [8,9]. This is needed to further the process of dialogue and critical reflection that is essential to their professional development [3,10]. Acquiring such awareness is not an easy feat. It requires a positive and safe environment to ensure an open mindset and room for professional vulnerability [11–13]. Student teachers, therefore, need effective tools to explicate and evaluate the reasoning behind their design and enactment of lessons during their training [14].

In our teacher education program, we have addressed these conceptual and methodological issues in two ways. Firstly, we have organized our curriculum around core practices that steer both theoretical exploration and practical skill learning at the same time [10,15,16]. Secondly, and most important to this article, we have developed a tool that helps our students to bridge the, at times, frustrating gap between educational theory, their vision of good teaching and their educational practice. The tool was originally developed to study implementation processes of innovative teaching practices [17–20]. It invites student teachers to explicate which goals they hope to achieve at different stages of their lessons in a schematic overview or visual 'goal-system representation' (GSR). The goal-system representation is essentially a reflection of the student teachers' personal theory regarding classroom practice [21].

So far, we have explored working with the GSR tool in several contexts of the teacher education program we run. First and foremost, it has been used, for several years now, at our institute as part of a learning trajectory towards a professional investigative attitude (or 'inquiry as stance') [16]. In light of becoming consumers of research and becoming evidence-informed professionals, student teachers individually construct a visual image (GSR) of building blocks that represents how their lessons generally tend to unfold; they then connect the building blocks to corresponding goals. They subsequently read and discuss research literature and theory, based on which they devise potential next steps in their development. Finally, they adapt their GSR based on these ideas (*modular redesign*) [16,22]. In this context, the GSR tool has proved effective in two ways: it helps student teachers see the personal relevance of research literature and theory and apply it to their lesson plans; it has also stimulated group talk and learning to have meaningful professional dialogues with peers [23]. For some students, their GSR has formed the basis for a small-scale action research conducted in their schools [24].

Besides being used at the institute, the GSR tool has also found its way to the schools that our TE institute works with. During the internships, school-based mentors play a key role in the student teachers' development [25,26]. They are expected to help student teachers learn how to connect what they learn from their program courses at the institute with what they do in their classrooms [27]. In the study presented here, we show how the GSR tool functions in the context of the internship, where the focus is more on learning *by doing*.

Given their influential role, we wanted to know how the GSR tool supports school-based mentors in their coaching practices. The goal of our research was to explore if and how the GSR tool supports a professional dialogue of personal theory between student teachers and their mentors.

2. Theoretical Background

Primarily, school-based mentors possess practical knowledge about mentoring and the process of learning how to teach [28]. They are experienced teachers who can be an example to student teachers. At the same time, they are expected to assist student teachers with developing their personal theory by making connections between theoretical frameworks and their teaching experiences, and to help them integrate pedagogical content knowledge into their teaching practice within a dynamic and demanding learning environment [29]. The mentoring task is not an easy one. Mentors often mention how they struggle to bring their students' underlying assumptions to the surface and to resist teacher students' longing for immediate bite-sized practical tips and tricks [30,31]. Berry also described mentoring as dominated by tensions between conflicting purposes which mentors learn to master through professional self study [32]. Similar to their students, school-based mentors need support to help their students' questioning and theorizing about their practical experiences.

Goal-system representations are personal constructs that show how people connect hierarchies of goals to actions in pursuit of tasks [33]. The GSR tool is based on the idea that goals are the most proximate determinant for behavior, mediating at the same time the effects of work context, as well as knowledge and beliefs on practical decision-making [34]. The tool was originally developed for the educational context of studying implementation processes of innovative teaching practices [17,35]. It aims to help student teachers to explicate which goals they hope to achieve at different stages of their lessons in a schematic overview or visual goal-system representation. The GSR tool centers around the following activities (see Table 1 for the questions that are central to the activity): student teachers first identify the building blocks of a representative lesson (i.e., a scenario of how their lessons generally unfold in practice). Then, they describe how they prepare for each lesson component (preparation). Finally, they identify the underlying goals they wish to attain or the underlying beliefs and principles they aspire to with each of the building blocks. These goals may vary from highly practical goals or principle goals, to more abstract identity goals that reflect the kind of teacher they want to be. The relatedness between the three layers is expressed through arrows. This generates a visual overview of representative lesson patterns and connected goals, the GSR that student teachers have developed over time in interaction with their pupils (see Figure 1). They are then asked to evaluate each of the building blocks, preparation steps and goals. Are they satisfied with the way this part of the lesson unfolds? Do they think they succeed in achieving a specific goal? Is there anything they would like to develop? Based on this evaluation the student teachers formulate their own starting points for further professional development.

Table 1. Overview of the guiding questions for constructing a GSR activity.

Creating the WHAT row ('recreating the lesson scenario')	
<i>Step 1</i>	Think of a typical lesson that is representative of your teaching approach
<i>Step 2</i>	What do you first in your lesson? What do you do after that? And after that? Divide the lesson into activities (building blocks) and put them into chronological order. Write each activity on a separate piece of paper to make a row.
Creating the HOW row ('looking at the preparation')	
<i>Step 1</i>	How do you prepare for each activity? Write each action on a separate piece of paper and create a new row underneath.
<i>Step 2</i>	Connect each action (how) with an activity (what) or activities by drawing a line between them.
Creating the WHY row ('looking at the underlying goals')	
<i>Step 1</i>	What do you hope to achieve with each activity? Why do you do it like that? Write down each goal you identify on a new piece of paper. Create a new row above the activities.

Table 1. Cont.

Step 2	Connect these goals by drawing lines between the relevant action (how) or activity (what).
Step 3	Look at your goals. Why do you find these important? Write down each reason or higher goal on a separate piece of paper and create a top row of higher order goals
Step 4	Connect the higher order goals with the other relevant goals, building blocks or preparation by drawing lines between them.

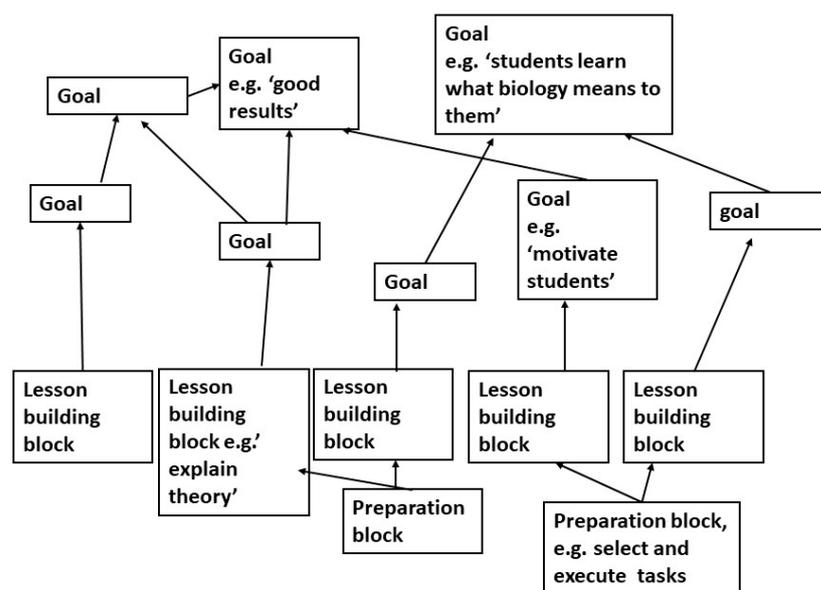


Figure 1. A GSR shows an hierarchical structure of means–ends relationships. A representative lesson is visualized as a sequence of lesson building blocks (e.g., ‘explain theory’). Below the building blocks, the preparation blocks show how the student teacher prepares for the lesson (e.g., ‘select and execute tasks’). Above the building blocks, underlying goals are represented such as practical goals, principle goals and/or identity goals.

The GSR tool assists student teachers in recognizing the detailed goal–means relationships that underlie their developing practice and that are inherent to their lesson designs. Such goal–means relations integrate specific parts of a teacher’s personal theory [35]. Besides the focus on goal–means relations, the GSR tool pictures a complete representative lesson and how it unfolds in practice to work with in coaching sessions, instead of working with very specific instances of in-class experiences (e.g., a classroom-management situation or an instruction) which then tend to be discussed decontextualized. These building blocks are meaningful units of analysis that are relatively easy to identify [33], while at the same time the student teacher is able to keep a holistic view of the lesson, affording an understanding of the interconnectedness of different goals and means. Furthermore, it provides an immediate visual overview of the student teacher’s rationale behind the sequence of building blocks in terms of perceived goal achievement, a part of personal theory which often proves difficult to tap into.

Finally, the GSR tool places the (development of) personal theory explicitly in the practical work context. It builds on recent theories of how people make decisions about tasks in complex practices and therefore integrates vision and personal theories about teaching and learning with perceptions of practical constraints and affordances of the classroom context [36]; all these factors may translate as goals that need to be achieved [37].

In sum, the idea behind the GSR tool is that it helps student teachers to explicate and visualize ideals and assumptions, to identify successful and less successful realizations of their goals in practice and to help them think about possible adjustments that might work in their specific context. We anticipated that the GSR tool would support school-based

mentors in having professional dialogues with their students on the level of patterns in their thinking and acting, so that students are invited to develop their personal theory. Based on previous experience with GSR at our institute, we expected students to develop their personal theories on three levels of development: a better and explicit understanding of their own goal–means relations (level 1), a more thorough awareness of the theoretical notions that may explain or underly these goal–means relations (level 2) and a more transformative use of theory in professional dialogues about these goal–means relations to foresee and hypothesize potential new practices (level 3).

In line with these expectations this research set out to find answers to the following research questions. To what extent do the data reflect the following:

1. A better and explicit understanding of the student teacher, with respect to their own goal–means relations (level 1)?
2. A more thorough awareness of the theoretical notions that may explain or underly these goal–means relations (level 2)?
3. A more transformative use of theory in professional dialogues about these goal–means relations to foresee and hypothesize potential new practices (level 3)?

3. Methods

This study concerned a small-scale qualitative and explorative study into how three school-based mentors used the GSR tool in their mentoring conversations. In this study, we compared and contrasted cases to identify themes that helped characterize the mentoring conversations that emerged in terms of level of development of personal theory.

3.1. Context and Cases

We present three cases in which school-based mentors coach their student teachers using the GSR tool. The mentors involved in this study work at the same school in a rural area of the Netherlands. At the school, general professional development activities are organized for all the student teachers in the school. Constructing and discussing a GSR amongst peers is a standard professional development group activity in this program. Up until this study, the GSR tool had not been part of mentoring conversations, however. This means that all three mentors were familiar with the tool, but they had not worked with it themselves in their one-to-one mentoring practices.

The mentors serve as daily mentors to student teachers and play a key role in their development by inviting reflection on their practice and by assessing their practice. Despite their efforts, all three mentors find it challenging to help their student teachers uncover patterns in their thinking and actions to help them develop a personal theory. On entering this study, the mentors formulated their own learning objectives for working with the GSR tool. Overall, they expected the GSR tool to facilitate the improvements they sought in conversations with their students.

Case 1: Mentor1 (M1) is an English teacher, in her first year as a mentor. She wants to practice with an inquiry-based approach to coaching. The student teacher (ST1) is in the first year of a 4-year teacher education program to become a teacher in lower secondary school in pre-vocational higher and pre-academic education. She is in the first phase of her internship. Her GSR pertains to lower secondary school pre-academic education.

Case 2: Mentor2 (M2) is a Dutch language teacher who has been a mentor for 6 years. She was curious about how the GSR tool would help guide the conversation towards the student's personal theory and what outcomes it would produce. The student teacher (ST2) is an experienced primary teacher who is in her third year of a 4-year second career teacher education program to become a teacher in lower secondary school in pre-vocational higher and pre-academic education. Her GSR pertains to lower secondary school pre-vocational education.

Case 3: Mentor3 (M3) is a physical education teacher who is in his first year as a mentor. He wants to practice adopting an open attitude and asking open-ended questions to invite the student to think and openly express her thoughts. The student teacher (ST3) is

in her last year of a 4-year teacher education program to become a lower secondary school teacher to students in pre-vocational education. Her GSR pertains to vocational training class; she prepares her students for the job market.

3.2. Data Collection

For each case, the following data were collected:

1. GSRs and mentor notes: the GSRs made by the student teachers were collected and digitalized as well as the mentors' notes about the GSRs of their students in preparation for their mentoring conversations;
2. Video recordings and transcripts: the mentor–student teacher conversations were videorecorded (case 1: 19'; case2: 16'; case3: 15') and all relevant parts of the recordings were transcribed;
3. Reflections of student teachers: the student teachers were asked to reflect on creating the GSR and on the mentoring conversations. Written reflections of ST2 and ST3 were collected in the week after the mentoring conversation took place (digital, Google Form). They were asked to score three short statements on the perceived usefulness of the GSR in the mentoring situation (1–5, certainly not–definitely) and to explain their scores. ST1 reflected briefly with her mentor on the mentor conversation at the end of the conversation in response to an open question (audio).
4. Reflections of mentors: M2's written reflection was collected the week after the conversation took place (digital, Word doc). She was asked to score 3 short statements on the usefulness of the GSR tool (1–4, certainly not–definitely) and to explain her scores. M1 and M3 reflected on the conversation and their mentoring practices when they analyzed the videotapes of each other's conversation. They discussed this with the researchers (author 1, 3 and 4), who made notes (researchers notes). M3 additionally made notes in a log he kept. In the analysis, we examined how the mentors perceived the GSR as either facilitating or hindering the reflection process of their student teachers.

3.3. Data Analysis

The question to what extent the GSR tool supports a professional dialogue between student teachers and their mentors in terms of level of development of personal theory is an explorative question. The data were analyzed as follows. First, the videotapes of the conversations were watched and analyzed in relation to the GSR of the student teachers and the respective results of the mentors' analysis. At least two researchers discussed a case. Based on these discussions, the three levels of development of personal theories were established. In this first round, the primary focus was on the extent to which the mentors' questions about the student teachers' GSR sparked a dialogue reflecting instances of level 1, 2 or 3 development of the student teachers' personal theory. In this explorative study we were merely interested in finding indications of the levels of personal theory development in these conversations. Through an iterative process of data analyses, indicative themes were located and defined in the conversations and essential parts of the conversations that illustrate such themes were identified by the first author [38]. The student teachers' reflections were analyzed to see whether or not they matched the findings in the conversations. Finally, the mentors' reflections provided information about how they experienced using the GSR tool. All authors checked the consistency of the analyses.

4. Results

In this section the three cases are presented. For each case we show the GSR and represent the conversation that took place between the student and the mentor with two fragments which illustrate specific turns in the conversation and indicate the levels of development of personal theory.

4.1. Case 1: How the Urge to ‘Control’ Shapes Practice (Level 2)

M1 interprets ST1’s GSR (see Figure 2), based on the GSR and on M1’s experience with the student, as follows: it reveals a pattern of control elements, that could very well point towards ST1’s insecurities about her professional functioning. M1 feels that it is important that ST1 becomes aware of this pattern, and how her personal insecurities influence her practice, potentially impeding a focus on what her students need. M1 decides to take this as a topic for their mentoring conversation. She always starts with something positive as it is her deep-felt belief that this is important for a safe learning environment. She uses the GSR to point at positive aspects of the student teacher’s personal theory. For example, in view of ST1’s developmental phase (at the start of the TE program), her personal theory is already rather elaborate. The following conversation ensued (Fragment 1).

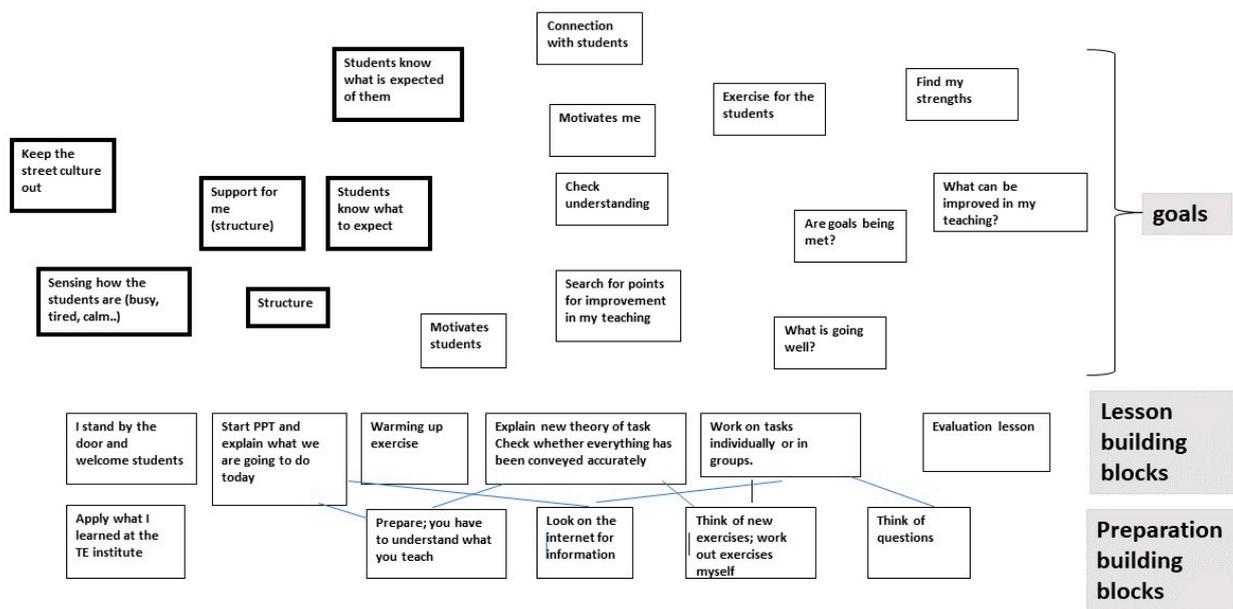


Figure 2. The GSR contains many goals pertaining to ‘teacher control’ (bold). Many building blocks are not yet connected to goals.

Fragment 1 [emphasizing positive aspects reveal perfectionism; level 1?]:

M1: Well, I’ve studied it [points at GSR] a bit and formulated some questions. What I actually liked is that you immediately dig deep.
 ST1: Really? (surprised)
 M1: Yes, quite. Well, you might be able to go even deeper, but for a first-year, your analysis is quite in-depth.
 ST1: Okay (a bit bewildered), I actually found it quite superficial.
 M1: Why did you find it superficial?
 ST1: Because I really have the feeling that I can dig deeper into the material. But, of course, I haven’t covered everything yet at the institute.
 M1: Do you find that challenging?
 ST1: What?
 M1: Find it challenging to go that extra layer deeper.
 ST1: Yes.
 M1: Well, I think, [reads aloud from the GSR] ‘it motivates me’; ‘it motivates the students’; ‘building a relationship with the students’, that you already go quite in-depth into why you do it this way. Of course, you can still think about it further.
 ST1: Yes.
 M1: I notice that you really want to do everything perfectly. Do you recognize that yourself?
 ST1: I am extremely? perfectionistic, yes [laughs] and very strict with myself.

Fragment 1 reveals ST1's perfectionistic nature and an awareness of or felt need for input from the institute (theory feeds practice). M1 highlights ST1's focus on her students' motivation and shows her how she relates her practice to theoretical underpinnings. Next, M1 continues the conversation by pointing out many structural and control elements in the student teacher's GSR and mentions that she generally often sees this in student teachers' development. The specific 'why is that important to you' inquiry from M1's first utterance prompts a reflective professional dialogue about control goals (Fragment 2).

Fragment 2 [control goals as a pattern; (level 2):

M1: So, what I hear as well, you mentioned being perfectionistic, [reads aloud from the GSR] 'keeping street culture out', and what I also see is [reads aloud] 'what is going well, support, structure'. I see these things a lot. Apparently, structure and control are important to you. Do you also know why this is so important for you?

ST1: For me?

M1: For you, yes

ST1: Um, I don't know, I think it has a bit to do with myself. I am really a control freak in everything I do.

M1: smiles

ST1: I just really want to have control because, if I do not have control, then. . . I was. . .let's say, hurt quite a bit outside of school, things in the past.

M1: Yes

ST1: So I am afraid—yeah, they won't hurt me here, I think—but if I just have control, then I do what I do, and no one can hurt me.

M1: At least you've done what is right?

ST1: Yes, yes

M1: Because you're afraid of being hurt

ST1: Yes, I cannot deal with that very well [*laughs shyly*]

M1: Yes, but it's good that you know that about yourself.

Fragment 2 shows ST1 starting to realize how her practice is influenced by an urge for control. She also reflects on this urge by being open about negative emotions that may cause this search for control. M1 does not inquire any further into the potential effect this may have on ST1's students. M1 focuses the rest of the conversation on how ST1 herself may deal with her perfectionism and need for control, as this is clearly rather emotional to her. For example, ST1 could try to focus on what went well, even small things (cf. learning from success) [13].

In response to M2's question about how ST1 feels about the outcome of the conversation, that her perfectionism is central to her practice, ST1 responds that it does not really surprise her. ST1 states: 'I knew this about myself'. In her reflections, M1 was very pleased with how the GSR helped her to quickly get to the core of ST1's learning need. Furthermore, it made her realize how important it is to create a safe environment for this type of mentoring conversation.

To conclude, in this case the GSR tool made visible how ST1's practice was shaped by goals revealing a personal need for control, which triggered a professional dialogue around this emotional urge. Although the mentor did not include a general reference to this in the conversation, the dialogue did lead to the important insight that a teacher's emotional state is of influence on teaching practice and consequently the learning processes of students. We categorized this labeling of goals as a 'level 2' awareness.

4.2. Case 2 about the Importance of Explicating Implicit Routines (Level 1) and Underlying Beliefs (Level 20)

ST2 is an experienced primary teacher who is educated to become a teacher in secondary education; however, her GSR is not very elaborate (see Figure 3). M2 wonders what ST2's professional vision is, and why higher identity goals are lacking in ST2's GSR (see Figure 3). M2 wonders why ST2 considers certain goals important, and whether ST2 sees relations between certain goals? The mentor notices in the student teacher's GSR that

“seeing every student” is listed as a goal only at the beginning of the lesson. She uses her knowledge of the student teacher’s practice from lesson observations to confront her that she actually works on her relationship with her students throughout her lesson in different ways. The dialogue revolves around the question: where else do you do that? The student teacher realizes that she works on the relationship at many moments. She is no longer consciously aware of it. The conversation also touches on the importance of being aware of routines:

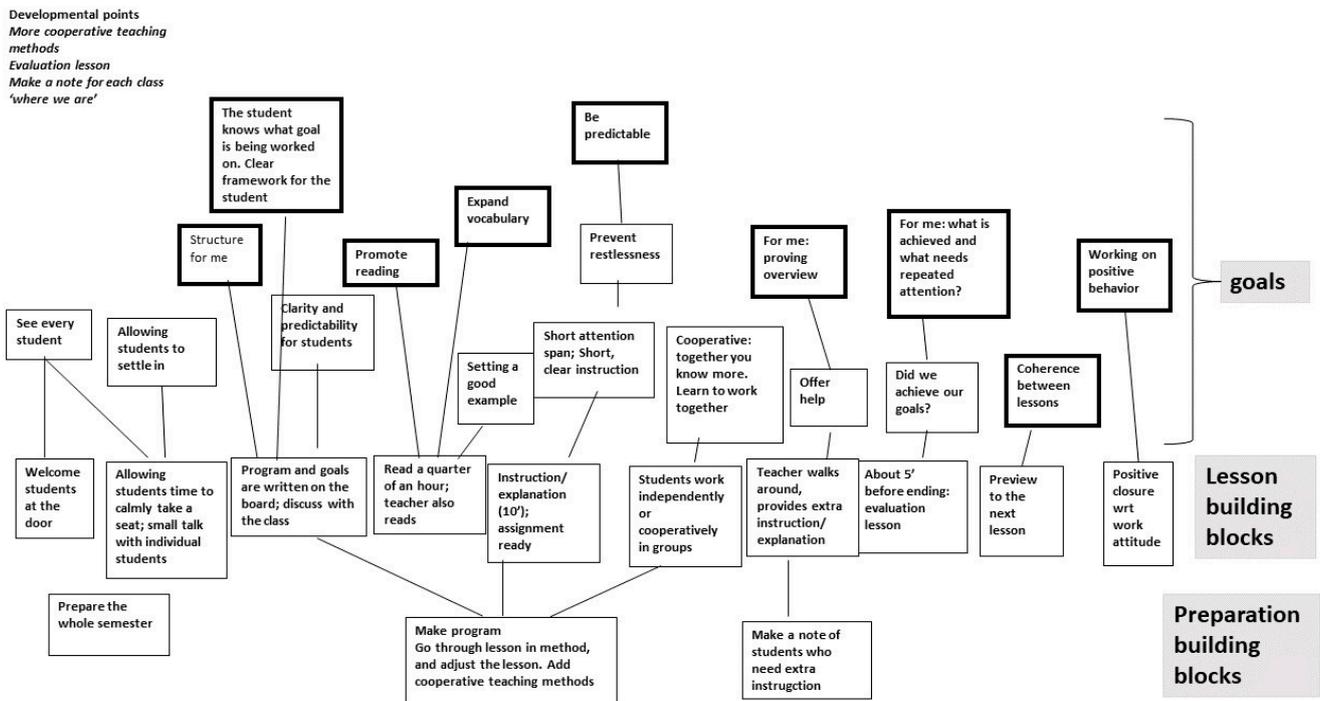


Figure 3. The GSR of student teacher 2, who is a second career teacher. Her GSR is not very elaborate and contains rather instrumental goals that pertain to structure and instrumental learning outcomes (bold) and no higher identity goals that pertain to ‘what type of teacher I want to be’.

Fragment 1 [explicate implicit routine goals; level 1]:

- M2: I find it so nice that this comes out. Because what was on my mind when I saw the picture of your lesson, and now I’m going to grab mine [grabs GSR]. For example, I see here in your GSR ‘seeing every student’ under relationship, and then I think, hey, I think you do that not only by standing at the door and giving students time to settle, but you do that much more often in your lesson.
- ST2: Yes.
- M2: But I don’t see it [in the GSR picture].
- ST2: No, no. It happens naturally.
- M2: So basically, you’re saying it happens naturally.
- ST2: It’s almost like stating the obvious, that you see a student.
- M2: Yes, for you it’s stating the obvious. But someone who sees this [points at GSR] and doesn’t know you, what might they think then?
- ST2: Yes, yes. They might think that everything is very [gestures delimited parts] this is it.
- M2: Yes, I think someone who doesn’t know you might think, oh, does she only think to work on the relationship here, while I’ve seen your lessons and I know that you work on the relationship at many moments. So basically, I would like to ask you, could you consider on which other moments you also work on the relationship, and could you make those connections? And I’ve noticed that with several post-its, that you work on it at many more moments but that you’re not consciously aware of it anymore

ST2: Yes, I even found that in mentoring interns, where with some you'd say, 'yes, they have that so naturally in their interactions with students.' And then with others, I sometimes found it quite difficult to offer guidance like, 'try it this way or that way.'

M2: And how important is it for an intern, in this case, you being my intern, how important is it for someone who is learning to be aware of that?

ST2: Yes, um, it is important that you also know it.

Next, similar to case 1, the specific 'why is that important to you' inquiry in the first utterance of M2 prompts a reflective professional dialogue that helps ST2 connect seeing every student to creating a safe environment for learning.

Fragment 2 [explicate underlying beliefs; level 2]

M2: And then I become curious. From which standpoint do you set certain goals? For example, 'seeing every student', now that comes from your belief that safety is important. But there's something there again, Why is that important?

ST2: Because I think that if you feel safe, that's when you start to learn. Because that's how it works for me too.

M2: Okay.

ST2: And of course, I'm new here in the team. I feel very safe here, So then I can also move forward. If that's not the case, I think it's very unpleasant.

M2: So you're saying safety is important for students to learn. You're also saying safety is important for myself to work well.

ST2: Yes, yes.

ST2's written reflections show instances of level 1 and 2 development of her personal theory. She evaluates creating the GSR as positive. ST2 explained the working of the GSR tool in the mentoring conversation as follows: 'We mainly discovered that I do many things unconsciously because of my extensive teaching experience. Through our conversation, we did eventually delve into my motives. It's a great tool to sharpen again what I consider important during teaching'.

In her written reflections, M2 scores working with the GSR as very positive. The main reason is that the GSR gave her an overview of ST2's not very elaborate beliefs underlying her practice, and that it helped her to ask about this. She stated: 'I could clearly see that underlying beliefs and vision were completely absent, but the student had indeed thought about them in the past (as revealed in the conversation), but was no longer consciously aware of them'.

To conclude, this case shows how routines can be 'hidden' and implicit, and not show up in a GSR. M2 used her knowledge of ST2 to make her aware of routines, that all connect to her goal that students are seen. The case also showed how a GSR invites the mentor to ask 'why is that important for you?', prompting the student teacher to reflect on more general beliefs about 'good teaching' (level 2).

4.3. Case 3 about Central Beliefs and Implicit Higher Identity Goals

It strikes M3 that ST3 places 'relation' and 'structure' at the center of her GSR (Figure 4). M3 is curious how this manifests in ST3's practice, how she thinks about the relationship between 'relation' and 'structure', and why she considers these goals important? M3 also wants to know more about ST3's goal 'outside school', what it means and why she thinks it is important. He intended to ask open questions, to explore with ST3 her personal theory. M3 asks ST3 to reflect on constructing her GSR and what she learned about herself as a teacher. This way ST3 becomes aware of goals that are central to her practice:

M3: So, that's actually quite an insightful observation. So, that structure is actually a 'prerequisite for teaching for me'

ST3: Yes exactly

[a similar dialogue around ST3's central goal 'reflection' unfolds]

After ST3 and M3 have identified that structure and relationships are crucial for ST3, M3 further explores another goal in ST3's GSR: '(pupils apply what they learn) outside school'. Now, the specific 'why is that important to you' inquiry also prompts a reflective professional dialogue about ST3's vision regarding the purposes of the subject she teaches, and her theoretical notions of the formative aspect of physical education.

Fragment 3 [identity goals: who do I want to be as a physics education teacher? Level 2].

M3: You indicate you don't have much idea about the pupils outside school.

ST3: Yes that's true

M3: You have placed it in your GSR as important. Can you describe the ideal situation outside school? And the second question: what is your role in this?

ST3: What I see as an idea situation, is that they (the pupils) do something in the lesson and then they go and do it with their friends when they leave school. Actually, especially that, that they take something from the PE lesson which they can also do at home or with friends. What was your second question?

M3: What is your role in this?

ST3: mm I don't really know, that's why I've drawn a question mark. How can I, really. . . Show them that they can do it (at home or with friends).

M3: Yes, but if I refer back to my first question, why is it so important that the pupils take something from your lesson which they can do in their own time?

ST3: eerrrr that's about exercising for your whole life.

M3: Really? Is that something important to you?

ST3: Yes, yes. It would be nice if they could do something in the lesson and think oh that was really cool. And then you speak to them later and they say oh yeah that's what we did in that lesson

M3: And what more does it mean to you exercising for life, what do you hope to achieve with it?

ST3: Yeah that they move and exercise!

M3: Yes, and why?

ST3: Because its good for you, it's healthy!

M3: Yes, yes so you want to create healthy people in the world.

ST3: Yes

M3: And apart from being healthy, are there any other things? Apart from health?

ST3: Well, yes, its also about how you treat each other, taken others into consideration. How you deal with winning and losing.

M3: Yes exactly. All those skills, you hope because you teach that during the lessons, that they take that away from the lessons, because it's good or them.

ST3: Yes, and that's its not just in the PE lesson.

The conversation now turns to ST3 being unsure about these formative goals. She does not know whether she achieves these goals in her lessons. She plans to make it the focus of her action research project that she needs to do for the institute.

In her reflections, ST3 states that she has experienced creating the GSR as very positive; she assessed the mentoring conversation very much as an inquiring professional dialogue that provided her with a lot of self-insight. She explained: *'Because of the GSR, we could have a more purposeful conversation, whereas normally it's more general, like "how was the class?" That's very open-ended, but now we were consistently pulling out specific segments from the lesson. There were many questions asked and M3 didn't fill in much himself. I had to think for myself.'*

M3 looks back positively on the GSR tool and how it helped to focus the mentoring conversation about the teacher ST3 wants to be [logbook]. M3 wrote: *'When I think back to the conversation, I am quite satisfied. When I first saw her GSR I found her goals quite superficial. Of*

course I adapted my questions to meet her learning needs. My expectation though was that if I asked the correct questions the overlying goals would become apparent. At the end of the conversation ST3 explained that she would like to be remembered as the teacher who 'saw the pupils for who they are'. By using the GS she has now got something to help her in achieving this goal. She can now see where she needs to make adjustments'.

To conclude, case 3 illustrates—similar to cases 1 and 2—how the GSR tool stimulates inquiry into patterns and motives. In this case, it leads to ST3's awareness of central goals that shape her practices, and of what she considers the formative learning objectives of her subject (e.g., dealing with winning and losing; level 2). She also realizes that she does not know how she achieves these formative learning objectives. Hence, the dialogue about her GSR seems to trigger the awareness of a need for further information to underpin her practices in order to be able to develop practice. This indicates a starting point for the level 3 development of her personal theory.

5. Discussion

The GSR tool helps articulate implicit knowledge regarding both teaching practice (lesson building blocks) and preparation, as well as underlying pedagogical motives (as goal hierarchies), thus making it shareable, investigable and transformational.

The shareable level (level 1) implies explicating and understanding goal–means connections as part of the student teacher's personal theory. The GSR tool initiated professional dialogue on this level in all three cases.

The investigable level (level 2) implies that goal–means relationships are explicitly questioned, elaborated, and connected to general theoretical concepts. All three cases showed instances of this level, although they made connections to more general concepts. The transformational level (level 3) pertains to hypothesizing about possible new actions, and why such actions might lead to new learning processes and learning experiences. Theory is used in the professional dialogue to bring up ideas about possible new practices. This level of development of the student teacher's personal theory was not yet apparent in the three cases.

We aim to conclude by offering reflections on our findings. Given the exploratory nature of this study, it is crucial to approach interpretations and generalizations of the results with caution. Therefore, we also propose directions for future research.

Overall, we can conclude that within the internship context, the GSR tool can facilitate a professional dialogue between school-based mentors and their student teachers regarding the latter's personal theories. By doing so, the GSR tool addressed in these three cases a persisting challenge in teacher education: how to help student teachers to bridge the theory with their practical experiences. As noted by Sjölie [7], student teachers often have unrealistic expectations of educational theories, expecting them to provide prescriptive solutions for their practices rather than descriptive insights. Through the use of the GSR tool, the student teacher begins to grasp and experience that both theory and practice only exist through the eye of the beholder. Following from that, it starts to become clear that every theory needs contextualization. This insight puts the student teacher in control of the theory, taking away their feeling of being controlled by practice only and misled by the theories. Exploring such shifts in the attitudes of student teachers toward theory was not within the scope of this study and should be a focus of future research. Furthermore, mentors typically are not engaged daily with the theory behind the practice and do not operate in a research-based environment. They seem to be in need of further support, next to the GSR tool, to help them question and deepen the underlying theoretical issues. This finding is in line with a recent survey on school-based teacher educators' professional development needs showing their need for support on research-related aspects of their work [39]. Future research should focus on this type of support.

Besides contributing to a more realistic expectation of theory in practice, the data highlight the critical role of professional dialogue in utilizing the GSR tool. It is in the interaction between the student and the mentor that perceptions, underlying motivations

and theoretical notions become apparent. The dialogue could be viewed as taking place between the student teachers' inner selves and the explication of their performances and motives in the GSR tool. Next, the interaction takes place between two (or more) people: a new and an experienced teacher, the mentee and mentor. Both interactions contribute to explicating the implicit and making it shareable and negotiable, and providing food for thought and transformation. Viewing the GSR tool through the lens of its dialogical effect aligns with a hermeneutic view on teaching and learning as inherently enactivistic, which states that cognitive growth does not occur in the individual's mind but in the shared interaction between people and between peoples and their cultural tools [40,41]. To strengthen the function of the GSR tool, the quality of the dialogue that emerges from it while being used is crucial for enlarging its potential in developing personal theory with (student) teachers.

To conclude, the GSR tool has functioned as a tool for sparking a professional dialogue about personal theories of teachers in the context of pre-service teacher education, professional development of teachers and now mentoring practices as well. This demonstrates that the GSR tool has the potential to function as a boundary object [42] between learning at the institute and at the workplace, and, as such, contribute to the development of a shared language, a shared idea of how theory can serve practice, and a collective professional dialogue between all teacher educators involved in pre-service teacher education. This conclusion aligns with extensive research on the role of reflection in teacher education, which has pointed out the necessity of including theory in the process of reflection, in addition to intrapersonal matters, and the importance of the quality of the dialogue [43]. As the research on reflection shows, both matters are not easy to fulfill and often lack behind, leading to unsatisfying reflective loops [44]. The GSR tool can help reflection to become double-looped or even triple-looped [45].

Building on these case studies, we continue exploring if and how the GSR tool can support both students and their mentors to spark their professional dialogues about practice with helpful theory.

Author Contributions: Conceptualization, H.W., A.K., B.d.V. and M.M.; methodology, H.W., A.K., B.d.V. and M.M.; validation, H.W., A.K. and M.M.; formal analysis, H.W., A.K., B.d.V. and M.M.; investigation, H.W., A.K. and M.M.; data curation, H.W.; writing—original draft preparation, H.W.; writing—review and editing H.W., A.K., B.d.V. and M.M. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Academische Opleidingschool Noord-Holland West [Academic Teacher Training School North Holland West], Mandenmakerstraat 11, 1825 BB Alkmaar, The Netherlands.

Institutional Review Board Statement: The protocol was approved by the Ethics Committee of the Faculty of Pedagogical and Learning sciences of the Vrije Universiteit (VVWE-2022-162).

Informed Consent Statement: All subjects gave their informed consent for inclusion before they participated in the study.

Data Availability Statement: Data can be requested from the first author.

Conflicts of Interest: There are no conflicts of interest.

References

1. Buitink, J. What and How Do Student Teachers Learn during School-Based Teacher Education. *Teach. Teach. Educ.* **2009**, *25*, 118–127. [[CrossRef](#)]
2. Beijaard, D.; Verloop, N. Assessing Teachers' Practical Knowledge. *Stud. Educ. Eval.* **1996**, *22*, 275–286. [[CrossRef](#)]
3. Maaranen, K.; Pitkaniemi, H.; Stenberg, K.; Karlsson, L. An idealistic view of teaching: Teacher students' personal practical theories. *J. Educ. Teach.* **2016**, *42*, 80–92. [[CrossRef](#)]
4. McIntyre, D. Bridging the gap between research and practice. *Camb. J. Educ.* **2005**, *35*, 357–382. [[CrossRef](#)]
5. Jang, H.; Reeve, J.; Deci, E.L. Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *J. Educ. Psych.* **2010**, *102*, 588–600. [[CrossRef](#)]

6. Vansteenkiste, M.; Sierens, E.; Goossens, L.; Soenens, B.; Dochy, F.; Mouratidis, A.; Aelterman, N.; Haerens, L.; Beyers, W. Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learn. Instruct.* **2012**, *22*, 431–439. [[CrossRef](#)]
7. Sjölie, E. The role of theory in teacher education: Reconsidered from a student teacher perspective. *J. Curr. Stud.* **2014**, *46*, 729–750. [[CrossRef](#)]
8. Korthagen, F.; Kessels, J. Linking theory and practice: Changing the pedagogy of teacher education. *Edu. Res.* **1999**, *28*, 4–17. [[CrossRef](#)]
9. Pols, W. Wijsheid van de praktijk: Over het stille weten in de onderwijspraktijk. Practical wisdom: About tacit knowledge in educational practice. *Tijd. Voor Lerarenop.* **2009**, *30*, 28–35.
10. McDonald, M.; Kazemi, E.; Schneider Kavanagh, S. Core Practices and Pedagogies of Teacher Education A Call for a Common Language and Collective Activity. *J. Teach. Educ.* **2013**, *64*, 378–386. [[CrossRef](#)]
11. Fredrickson, B.L. Positive emotions. In *Handbook of Positive Psychology*, 2nd ed.; Snyder, C.R., Lopez, S.J., Eds.; Oxford University Press: Oxford, UK, 2002; pp. 120–134.
12. Isen, A.M. Positive affect, cognitive processes, and social behavior. *Adv. Exp. Soc. Psychol.* **1987**, *47*, 1206–1217.
13. Janssen, F.; de Hullu, E.; Tigelaar, D. Positive experiences as input for reflection by student teachers. *Teach. Teach.* **2008**, *14*, 115–127. [[CrossRef](#)]
14. Darling-Hammond, L. Constructing 21st-century teacher education. *J. Teach. Educ.* **2006**, *57*, 300–314. [[CrossRef](#)]
15. Grossman, P.; Hammerness, K.; McDonald, M. Redefining teaching, re-imagining teacher education. *Teach. Teach. Theory Pract.* **2009**, *15*, 273–289. [[CrossRef](#)]
16. Westbroek, H.B.; Kaal, A.A.; Dönszelmann, S. A motivational perspective on learning core practices. The case of a Dutch Teaching Education program. In *Core Practices in Teacher Education: A Global Perspective*; Grossmann, P., Fraefel, U., Eds.; Harvard Educational Publishing Group: Cambridge, MA, USA, 2024; pp. 27–45.
17. Westbroek, H.B.; Janssen, F.; Doyle, W. Perfectly Reasonable in a Practical World: Understanding Chemistry Teacher Responses to a Change Proposal. *Res. Sci. Educ.* **2017**, *47*, 1403–1423. [[CrossRef](#)]
18. Janssen, F.J.J.M.; Westbroek, H.B.; Doyle, W.; van Driel, J.H. How to Make Innovations Practical. *Teach. Col. Rec.* **2013**, *115*, 1–42. [[CrossRef](#)]
19. Janssen, F.; Westbroek, H.B.; Doyle, W. Practicality studies: How to move from what works in principle to what works in practice. *J. Learn. Sci.* **2015**, *24*, 176–186. [[CrossRef](#)]
20. Wieringa, N.; Janssen, F.J.J.M.; Van Driel, J.H. Het Gebruik van doelsystemen om de interpretatie en implementatie van contextonderwijs door biologiedocenten te begrijpen [using goal systems for understanding how biology teachers interpret and implement context-based biology education. *Ped. Stud.* **2013**, *90*, 37–55.
21. Westbroek, H.B.; Jongejan, W.; Kaal, A.A.; de Vries, B. Research Literacy in Initial Teacher Education: The Development of Personal Theories. In *Developing Teachers' Research Literacy: International Perspectives*; Boyd, P., Szplit, A., Zbróg, Z., Eds.; Libron: Kraków, Poland, 2021; pp. 113–137.
22. Janssen, F.J.J.M.; Grossman, P.; Westbroek, H.B. Facilitating Decomposition and Recomposition in Practice-Based Teacher Education: The Power of Modularity. *Teach. Teach. Educ.* **2015**, *51*, 137–146. [[CrossRef](#)]
23. Westbroek, H.; de Vries, B.; Jongejan, W.; Kaal, A.; Pauw, I. Opleiden voor de toekomst: Hoe praten over onderzoek professionele ruimte creëert [Educating for the future: How critical dialogue about educational research enhances student teachers' professional space]. *Tijd. Voor Lerarenopleid.* **2018**, *39*, 51–66.
24. Westbroek, H.B.; Kaal, A.A. Het Maken van een Doelsysteem Representatie als Basis Voor Reflectie [Creating a Goal System Representation as a Starting Point for Reflection]. Paper Presented at the Annual Onderwijs Research Dagen, Antwerpen, Belgium, 28–30 June 2017. Available online: <https://www.uantwerpen.be/nl/overuantwerpen/faculteiten/antwerp-school-of-education/projecten-en-studiedagen/onderwijs-research-d/> (accessed on 4 April 2024).
25. Clarke, A.; Triggs, V.; Nielsen, W. Cooperating teacher participation in teacher education: A review of the literature. *Rev. Educ. Res.* **2014**, *84*, 163–202. [[CrossRef](#)]
26. Duffield, S. Safety net or free fall: The impact of cooperating teachers. *Teach. Devel.* **2006**, *10*, 167–178. [[CrossRef](#)]
27. Zeichner, K. Rethinking the connections between campus courses and field experiences in college-and university-based teacher education. *J. Teach. Educ.* **2010**, *61*, 89–99. [[CrossRef](#)]
28. Van Ginkel, G.; Van Drie, J.; Verloop, N. Mentor teachers' views of their mentees. *Ment. Tut. Partner. Learn.* **2018**, *16*, 122–147. [[CrossRef](#)]
29. Orland-Barak, L.; Wang, J. Teacher mentoring in service of preservice teachers' learning to teach: Conceptual bases, characteristics, and challenges for teacher education reform. *J. Teach. Educ.* **2021**, *72*, 86e99. [[CrossRef](#)]
30. Wang, J.; Odell, S.J. Mentored learning to teach according to standards based reform: A critical review. *Rev. Educ. Res.* **2002**, *72*, 481–546. [[CrossRef](#)]
31. Gardiner, W.; Weisling, N. Challenges and complexities of developing mentors' practice: Insights from new mentors. *Int. J. Mentor. Coach. Educ.* **2018**, *7*, 329–342. [[CrossRef](#)]
32. Berry, A. Professional self-understanding as expertise in teaching about teaching. *Teach. Teach.* **2009**, *15*, 305–318. [[CrossRef](#)]
33. Janssen, F.; Westbroek, H.B.; Borko, H. The indispensable role of the goal construct in understanding and improving teaching practice. *Prof. Dev. Educ.* **2023**, 1–15. [[CrossRef](#)]

34. Carver, C.S. Self-awareness. In *Handbook of Self and Identity*; Leary, M.R., Tangney, J.P., Eds.; The Guilford Press: New York, NY, USA, 2012; pp. 50–69.
35. Wieringa, N.; Janssen, F.J.J.M.; Van Driel, J.H. Biology teachers designing context-based lessons for their classroom practice—The importance of rules-of-thumb. *Inter. J. Sci. Educ.* **2011**, *34*, 2437–2462. [[CrossRef](#)]
36. Kennedy, M.M. Attribution Error and the Quest for Teacher Quality. *Educ. Res.* **2010**, *39*, 591–598. [[CrossRef](#)]
37. Simon, H.A. *The Sciences of the Artificial*, 3rd ed.; MIT Press: Cambridge, MA, USA, 1996.
38. Miles, M.B.; Huberman, A.M.; Saldaña, J. *Qualitative Data Analysis: A Methods Sourcebook*, 3rd ed.; Salmon, H., Perry, K., Koscielak, K., Barrett, L., Hutchinson, A., Eds.; SAGE Publications, Inc.: Los Angeles, CA, USA, 2014.
39. Czerniawski, G.; Guberman, A.; MacPhail, A.; Vanassche, E. Identifying school-based teacher educators' professional learning needs: An international survey. *Eur. J. Teach. Educ.* **2023**, *1*–16. [[CrossRef](#)]
40. Davis, B.; Sumara, D.J. Cognition, complexity, and teacher education. *Harv. Educ. Rev.* **1997**, *67*, 105–125. [[CrossRef](#)]
41. Niessen, T.; Abma, T.; Widdershoen, G.; Van der Vleuten, C. Contemporary epistemological research in education. *Theory Psych.* **2009**, *18*, 27–45. [[CrossRef](#)]
42. Wenger, E. *Communities of Practice. Learning, Meaning and Identity*; Cambridge University Press: Cambridge, UK, 1998.
43. Akkerman, S.F.; Meijer, P.C. A dialogical approach to conceptualizing teacher identity. *Teach. Teach. Educ.* **2011**, *27*, 308–319. [[CrossRef](#)]
44. Korthagen, F.A.J. Een softe benadering van reflectie helpt niet [a soft approach to reflection does not help]. *Tijd. Voor Lerarenop.* **2014**, *35*, 5–14.
45. Argyris, C. Double-loop learning: A concept and process for leadership educators. *J. Lead. Educ.* **2002**, *1*, 68–71.

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.