

Using Semantic Pathways to Reveal the “Depth” of Pre-Service Teachers’ Reflections

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Abstract

During teacher preparation programmes, pre-service teachers need to reflect meaningfully on their classroom experiences. However, some pre-service teachers tend to provide narrative accounts of classroom events and interactions. Mentors and assessors urge them to “probe more deeply” but give little guidance about what this entails. This study reports on an intervention in which reflection guidelines were changed after noticing how guidelines asked questions that limited professional learning. The revised set of guidelines prompted pre-service teachers to make iterative links between the theoretical insights gleaned from coursework and their experiential learning in classroom settings. The Semantics dimension from Legitimation Code Theory is used to compare the reflections written in response to the original and revised guidelines. Using the revised guidelines, two thirds of participants drew more intentionally on theoretical insights to interpret and explain their classroom experiences. The article concludes by suggesting several conditions for enabling pre-service teachers to write “deeper” reflections that are both theoretically informed and contextually responsive. These conditions include access to relevant concepts, guidelines that make expectations visible and access to a language of practice for providing feedback about what “probing more deeply” looks like. I argue that the concepts from Legitimation Code Theory offer such a language.

Keywords: reflective practice; pre-service teachers; initial teacher education; Legitimation Code Theory; semantic waves; work-integrated learning; practicum

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Introduction

During work-integrated learning (WIL), pre-service teachers are expected to reflect on their observations and experiences in the classroom. Reflecting in and on action is widely regarded as a mechanism for learning in practice (Schön 1987). However, not all responses advance the professional development of pre-service teachers as intended. The reflective entries written by a cohort of pre-service teachers in their final year of a four-year initial teacher education (ITE) programme showed that not all recruited concepts learnt in university-based coursework to make meaning of noteworthy classroom observations or experiences. Many wrote diligently albeit in a narrative recount genre (Nesi and Gardner 2012). For many, it was not self-evident that a descriptive account of classroom happenings was inadequate to fulfil expectations of a professional preparation programme. Even when their university lecturers urged them to “probe more deeply”, many responded by writing more extensively. The structure and complexity of their reflections remained unchanged, circumventing potential spaces for deepening insight into their teaching practices. Interrogating this observation, we noticed how the prompts guided students to focus their attention entirely on their experiential learning (Walton and Rusznyak 2020). The prompts were not sufficiently explicit in directing them to recruit conceptual knowledge to identify incidents worthy of deeper consideration or to use them to interpret their observations and experiences in schools. Furthermore, neither did the prompts encourage students to further interrogate their university-based coursework regarding what they observed or experienced in the classrooms.

The guidelines needed to be changed to ensure that pre-service teachers’ reflections on classroom experiences offer the potential for strengthening their teaching practices (see Walton and Rusznyak 2020). While retaining the focus on the classroom context, the revised prompts made it clearer to pre-service teachers that a conceptually informed analysis of their observations and experiences is expected in a professional preparation programme. This article reports on a transformative intervention that seeks to deepen and strengthen the reflective practices of pre-service teachers. The study uses analytic tools from the Semantics dimension of Legitimation Code Theory (LCT) to compare the reflections written by pre-service teachers in response to the original and revised prompts. Two thirds of participants used concepts more intentionally to make sense of their observations and experiences in the classroom. The analysis suggests several conditions for enabling pre-service teachers to write conceptually informed and contextually responsive reflections.

Reflection Prompts and How They Shape Professional Reasoning of Pre-Service Teachers

Developing pre-service teachers’ capacity for reflection is highly valued in the “learning to teach” literature (e.g., Lee 2007; Pedro 2005). Handbooks and manuals for pre-service teachers routinely include a chapter on developing their reflective practices (e.g., Criticos et al. 2009; Gravett and De Beer 2010; Pugach 2006). The seminal work of

Donald Schön (1987) influenced approaches to reflective practice in teacher education. Through reflection, student teachers should begin to make sense of classroom life, as they “construct and test new understandings, strategies of action and ways of framing the problem” (Schön 1987, 39). Their reflection journals provide evidence of their work in school-based contexts. They can also be grounds for assessing the cognitive dimensions of their teaching (Rusznyak 2012). Becoming aware of their inner intentions and feelings may usefully guide their discovery of themselves as teachers and their classroom reflections (Gravett and De Beer 2010). Given all these potential benefits, it is unsurprising that an expectation that students reflect on their teaching is a standard part of work-based learning requirements. It is required by the legislation governing the provision of teacher education (e.g., Department of Higher Education and Training [DHET] 2015) and expressed in international and national knowledge and practice standards (e.g., Australian Institute for Teaching and School Leadership [AITSL] 2011; Namibia Ministry of Education 2006; National Board for Professional Teaching Standards 2015; South African Council for Educators [SACE] 2018).

Learning to See Classroom Practice with a Specialised Gaze

In this study, I take the view that teaching is “intricate and unnatural work” where appropriate pedagogic choices are not “rooted in personal preferences or experiences but are instead based on professionally justified knowledge and on the moral imperatives of the role” (Loewenberg Ball and Forzani 2009, 500). During their initial teacher education, pre-service teachers should become acquainted with these moral imperatives and professionally justified knowledge. Knowledge is necessary but insufficient for developing competence in practice. The bodies of knowledge they have learnt in their coursework could potentially remain a collection of inert, discrete ideas until they themselves bring them to bear on their experiences in the classroom. As Maton (2016, 9) observes, “concepts do nothing by themselves; their potential for knowledge-building is realized by actors”. Pre-service teachers need to learn to recruit insights from their growing knowledge base to interpret their observations and experiences in the classroom.

As they develop as knowers, pre-service teachers acquire a “gaze” that enables specialised ways of recognising and responding to that which matters (Bernstein 2000, 165). The gaze is made possible through internalised criteria about effective practice that support principled decision-making, situational appreciation and contextual responsiveness (Morrow 2007; Shalem 2014). For pre-service teachers completing an ITE programme, a specialised gaze on teaching develops through their interactions with theoretical ideas, practising teachers, readings, tutorial discussions, assessment tasks, and formative and summative feedback offered by more knowledgeable others. Through carefully considered interactions, prospective teachers receive messages that enable them to discern what is significant and what is peripheral in practice. Guidelines for reflections in/on practice contribute messages that enable pre-service teachers to develop a more specialised gaze on teaching. Typically, pre-service teachers are given

guidelines for reflections they write in response to their classroom observations and experiences. Used repeatedly over time in different contexts, reflection guidelines prompt pre-service teachers to think about and respond to practice in particular ways. Reflecting gives pre-service teachers, as developing knowers, opportunities to draw on their developing gaze to select aspects of classroom life they deem worthy of reflection. They use it as they weigh up what matters most given the competing priorities and complexities in their context. They also enact their developing gaze when articulating the reasoning that informs the choices they make in practice (Rusznyak and Bertram 2021). Written or spoken reflections provide a glimpse into the developing gaze of pre-service teachers. Mentor teachers and lecturers can provide feedback on the legitimacy of their articulated reflections and the logics informing their reasoning. Such feedback develops the gaze further. Reflections can therefore be an important mechanism for prompting novices to observe beyond the superficial and to develop their capacity to articulate their reasoning grounded within the complexity of contexts in which practices are enacted (Walkington 2005).

Focus of Guidelines that Prompt Reflection on Practice

The reflection guidelines provided to pre-service teachers in our institution over the past decade included the following prompts:

- How did the lessons you taught/observed work out? What made them successful? What did not turn out the way you had planned? Why was this?
- To what extent did learners achieve the lesson purpose/s? How do you know?
- If you needed to adjust your lesson while it was in progress, what were your reasons?

Similarly worded prompts are proposed in numerous student teacher handbooks (e.g., Bassot 2015; Criticos et al. 2009; Evans 2019; Rembe et al. 2016). Guidelines of this sort direct the attention of the pre-service teacher towards their personal experiences of classroom life, an appraisal of what happened, and urge them to consider any implications. Essentially, these questions invite narrative-type responses that could be coherently answered independently of insights gleaned from theoretically focused coursework. The prompts thus miss a valuable opportunity to encourage prospective teachers to activate their more specialised gaze by looking for articulations between concepts from university-based coursework and what they observe and experience in the classroom. Effectively, such reflective guidelines potentially perpetuate a theory-practice divide and encourage prospective teachers to respond from a common-sense perspective of teaching. It was necessary to change the guidelines to prompts that support the development of a more specialised gaze on practice.

The guidelines were revised to make it clear to pre-service teachers that their reflections should move beyond detailed descriptions of their direct observations and experiences. They were prompted to look for possible connections between their university-based

coursework and their classroom-based observations and experiences (see Walton and Rusznyak 2020). The prompts were revised to encourage reflection on the following questions:

- What concepts or theories help me to understand incidents, successes or failures that occurred in the lesson?
- How is my conceptual knowledge of this topic, learning theory and diversity, and this pedagogical approach, extended by what I have observed and experienced in the classroom?
- What aspects of teaching and learning in this context require further research, observation or discussion with others?
- How is what I learned while reflecting on this lesson related to what I learned from previous lessons, and how will it influence my planning and teaching of future lessons?

The revised prompts make it clear that simply giving narrative accounts of classroom incidents alone is insufficient. Students are prompted to use insights gleaned from their coursework and previous classroom experiences to make sense of the dilemmas, struggles and tensions they encounter. The questions do not only promote a one-way application of theory to practice. They also prompt pre-service teachers to ask probing questions about their coursework in light of what they observe and experience in classroom settings.

Context-Dependence and Complexity in Pre-Service Teachers' Reflections

To analyse whether the revised prompts led to increased “depth” of pre-service teachers' reflection entries, I draw on conceptual and analytic tools provided by Legitimation Code Theory (henceforth, LCT) (Maton 2009, 2014). LCT is a sociological approach used to reveal the organising principles of knowledge practices, to make the basis of legitimation visible and to transform them if needs be. Many empirical studies have used semantic codes to analyse shifts in how students work with both context-dependent and abstracted meaning in increasingly complex ways. These include how chemistry knowledge is represented and assessed (Blackie 2014), the quality of student writing in nursing (Brooke 2019), as a means of developing students' academic literacy (Kirk 2017), and in planning essay responses in literature analyses (Christie 2016). The use of LCT is appropriate in this study as writing reflections present opportunities for pre-service teachers to select events and interactions worthy of study, and to use principled, experiential and contextual knowledges to make sense of them.

The concepts of semantic gravity and semantic density from LCT's Semantics dimension are of relevance in this study. They enable the analysis of how pre-service teachers' reflections demonstrate differing levels of complexity as they move between context-bound classroom observations/experiences and theoretical insights obtained

from coursework (Maton 2013). This next section will explain the concepts of semantic gravity and semantic density, and how together they enable the “depth” of reflective writing to be analysed and compared.

Semantic Gravity

The first concept, semantic gravity (SG), describes how easily meaning can be lifted out of the context in which it was created. The more context-dependent the meaning is, the stronger its semantic gravity. In the context of this study, stronger levels of semantic gravity would characterise reflections that focus on the details of a particular lesson. A weakening of semantic gravity manifests when entries draw on or generate generalised patterns of teaching that can be transferred across contexts or time. In this study, semantic gravity allows analysis of the extent to which students confine their reflections to the visible events in a particular lesson, consider intangible aspects of the lesson, and whether they bring patterns or principles to bear on the lesson at hand. When undertaking an LCT analysis, it is necessary to use a *translation device* that enables articulation between its analytic concepts and a coding system for how these concepts manifest in the empirical data of this study (Maton and Chen 2016). In this article, four levels of semantic gravity are defined, ranging from stronger (SG++) to weaker (SG--), as shown in Table 1.

Table 1: A translation device for coding four strengths of semantic gravity in pre-service teachers’ reflections

| Semantic gravity | First level | Indicators | Code | Illustrative example from data |
|---|---|--|------|--|
| weaker  stronger | Less context-dependent insight or perspectives | Generalised principle about teaching/learning. | SG-- | “It is easier to manage the class when you are confident with your content knowledge.” |
| | | General patterns or inferences drawn from classroom observations/experiences. | SG- | “The teacher didn’t waste time and that’s why the learners kept their focus during the lesson.” |
| | More context-dependent observations/experiences | Entry focuses on the management of knowledge, learners, learning or the classroom environment. | SG+ | “My teaching aids were not large enough to accommodate learners sitting at the back of a large classroom.” |
| | | Entry focuses on specific events, learners, actions or interactions that happened during a lesson. | SG++ | “A learner kept disrupting the teacher, and I asked her if there was something bothering her.” |

Semantic Density

The second concept, semantic density (SD), indicates the degree of complexity expressed within the reflection. A straightforward description of a classroom event would have simpler meaning, indicated by a weaker semantic density. When pre-service teachers interpret and explain classroom events, they add meaning to a description, strengthening semantic density. In addition, when they draw on formal concepts to explain classroom events, the reflection becomes connected to a wider body of theoretical knowledge. Their reflection becomes more complex, strengthening its semantic density. Table 2 shows a translation device that defines four strengths of semantic density, which manifest in the empirical data of this study.

Table 2: A translation device for coding four strengths of semantic density in participants' reflections

| Semantic density | First level | Indicators | Code | Illustrative example from data |
|---|--|---|-------|---|
| stronger  | More complex, conceptually informed accounts of teaching/ learning | Uses a specialised concept or procedure to explain or interpret their observations or experiences of classroom practices. | SD++ | “During the lesson misunderstandings and mistakes were ignored. How do learners gain <i>epistemological access</i> if they don’t receive <i>formative feedback</i> on incorrect responses?” |
| | | Identifies a specialised concept or procedure to inform their observations or experiences of classroom practice. | SD+ | “I made use of <i>Skinner’s positive reinforcement</i> by praising learners after asking and answering questions, also thanked them for the effort.” |
| | Less complex reporting on classroom activities  weaker | Makes links between teaching and learning events, observations or experiences. | SD– | “Learners paid attention and their answers showed that they understood the explanation.” |
| | | Describes classroom events, actions or interactions. | SD– – | “My supervising teacher was doing revision. She revised a past paper with the Grade 8 and then she gave them homework.” |

Semantic Codes

To reveal how the reflective entries shift between context-dependence and more generalisable principles and demonstrate increasing complexity, changes in their strengths of semantic gravity and semantic density can be plotted on the axes of a Cartesian plane (see Figure 1). Every point on the plane is a composite of the strengths of its semantic gravity and its semantic density.

| | | | | |
|------|--|------|---|------|
| | | SG-- | | |
| | rarefied code: <i>less context-dependent with simpler meanings</i> | | rhizomatic code: <i>less context-dependent with more complex meanings</i> | |
| | | SG- | | |
| SD-- | SD- | | SD+ | SD++ |
| | prosaic code: <i>more context-dependent with simpler meanings</i> | SG+ | worldly code: <i>more context-dependent with more complex meanings</i> | |
| | | SG++ | | |

Figure 1: The semantic plane where various strengths of semantic gravity and semantic density intersect, generating four codes that indicate how meaning differs with respect to its context-dependence and complexity (adapted from Maton 2014, 131)

By considering the strengths of semantic gravity and semantic density together, Maton (2016, 16) defines four analytically distinct semantic codes, which are used in this study, as follows:

- *rarefied code:* Where the reflection is more context-independent or abstract (weaker semantic gravity), and simpler in meaning (weaker semantic density).
- *prosaic code:* Where the reflection is more context-dependent (stronger semantic gravity), and simpler in meaning (weaker semantic density).
- *rhizomatic code:* Where the reflection is more context-independent (weaker semantic gravity), and reveals more complexity in the interpretation (stronger semantic density).

- *worldly code*: Where the reflection is more context-dependent (stronger semantic gravity), and reveals more conceptual complexity (stronger semantic density).

Because this study defines four strengths of semantic gravity and four strengths of semantic density, there are 16 positions on the semantic plane on which shifts within and between semantic codes can be traced.

This article uses semantic codes to analyse semantic differences in pre-service teachers' reflections using the original and revised reflection prompts. Their position and movements over the semantic plane (Figure 1) are coded, plotted and compared. The original reflection prompts could have been satisfactorily answered with a reflection remaining in the prosaic code. The revised prompts, on the other hand, required pre-service teachers to take "semantic tours" that move between codes across the semantic plane. The revised prompts encourage them to retain a focus on the context-bound nature of classroom events (stronger semantic gravity), and shift to draw on concepts (weakening semantic gravity) to interpret and explain classroom events with a specialised gaze (a strengthening of semantic density). If reflections remain within the prosaic code, they retain both simplicity and context-boundedness. Pre-service teachers do not draw from specialised knowledge in ways that enact a specialised gaze on teaching in their reflections. When students reflect on tips for teaching, they shift between experiential learning (prosaic code) and meaning that is transferable between contexts (a rarefied code). The revised prompts encourage them to use abstract concepts to provide more complex reflections (legitimated by a worldly code). Semantic pathways that move between the prosaic, rarefied and worldly codes are evident as pre-service teachers make connections between theoretical insights, policy requirements, and their observations and experiences in the classroom.

Methodology

This study uses a qualitative research methodology with an intervention design. The reflections written by a group of pre-service teachers during their teaching practicum guided by the original prompts are compared to their responses using the revised prompts. Participants in this study were a cohort of 560 final-year pre-service teachers completing a four-year Bachelor of Education degree at a university in South Africa. In every year of study, they undertake six weeks of work-integrated learning in a school. They teach under the supervision of a mentor teacher and are observed and assessed by a university-appointed tutor. In addition to preparing and teaching a range of lessons, they are also required to keep an observation and reflection journal.

Over four years participants had completed courses to build their subject knowledge and its associated pedagogies. They had also completed modules in psychology, sociology and philosophy, with a focus on how these disciplines enable insight into learning and teaching within the South African education system. Before their final work-integrated learning session, fourth years attended a two-hour lecture introducing them to the revised reflective prompts. Their attention was drawn to the ways in which they are

knowers who develop their specialised gaze when bringing theory and experience together to make sense of classroom practices.

With ethics clearance in place, the cohort completed a survey in which they indicated their agreement or disagreement with 10 statements. A group of 33 pre-service teachers from the cohort agreed to provide the researcher access to the reflective journal entries they had written during work-integrated learning sessions in their third and fourth year of a Bachelor of Education degree. Their daily entries often referred to several incidents. In these cases, the entry was separated so that each unit of data was focused on one incident, lesson or issue. Using the indicators from the translation devices (see Tables 1 and 2), each unit of analysis was coded, first in terms of the relative strength of its semantic gravity, and then in terms of the relative strength of its semantic density. Once strengths of semantic gravity and semantic density were assigned, the semantic shifts in the reflection entry could be plotted as pathways on a semantic plane (see Figure 1). This article presents the analysis of the responses for three participants, purposely chosen as they exemplify the overall shifts revealed in the dataset. In each case, the semantic pathways of pre-service teachers' responses to the original prompts will be compared to the semantic pathways of reflections written in response to the revised set of prompts.

Findings

In responding to a survey about their teacher preparation, over 70% of the cohort agreed with the statement that “theory has taught me to think about my teaching in much deeper ways” and that “theoretical concepts help me to make sense about what is happening in my classroom”. However, their written reflections in response to the original prompts did not reflect this. Only two of 33 (6%) participants incorporated insights from university coursework into their classroom observations and reflections. Both of them had been awarded high marks across all their university courses and went on to achieve distinctions when their teaching competence was evaluated prior to qualifying. Using the original prompts, the other 31 participants had written entries that were largely simple, narrative accounts of what went on in the class, sometimes increasing the complexity by making links between elements in the teaching situation (for example, the quality of their preparation and learner behaviour during the lesson). When the revised prompts were used, 66% of journals analysed showed semantic shifts with a greater range of semantic gravity and increased complexity.

The reflections of three participants will be presented in more detail. Each responded to the intervention in a different way. The first participant, Tebogo, did not attend the briefing lecture, and remained unaware that there had been a change in prompts. He continued to write his journal entries as he had always done. His reflections remained in a prosaic code, showing minor changes in semantic gravity, and a weaker semantic density. The second participant, Mfana, attended the briefing and committed himself to using the revised prompts to guide his reflections. Although quite formulaic, his latter reflections show a significant strengthening of semantic density, resulting in regular

shifts into the worldly code. The third participant, Ntombi, had written reflections that had occasionally shifted from a prosaic code into a worldly code with the original prompts. However, with the revised prompts, her reflections increased their semantic range significantly. They consistently demonstrated a significant increase in complexity while still retaining their context-boundedness.

Semantic Pathways in Tebogo's Reflections

Tebogo specialised as a secondary school teacher of Information Technology and Engineering Graphics and Design. Personal challenges and ill health meant that his studies had been disrupted by extended periods of absences and frequently missing lectures and assessment submissions. He was completing his sixth year of a four-year degree at the time of this study.

Tebogo responded to the original prompts (Figure 2a) by giving accounts of what he did during the day. In many cases, his entries recounted steps in his lesson plans and reported how the lesson panned out. The discussion will show that he ignored changes made to the prompts, and the semantic pathways of his reflections did not change much (as seen in Figure 2b).

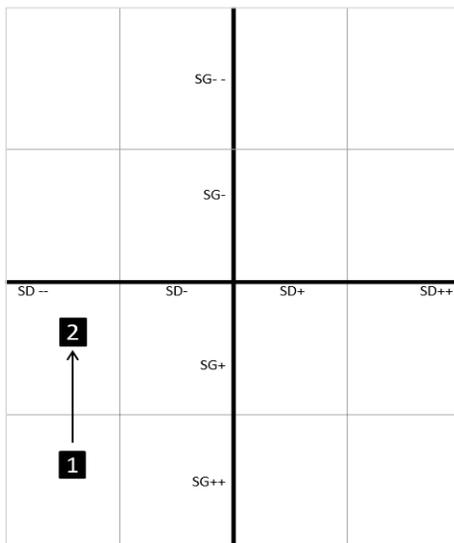


Figure 2a

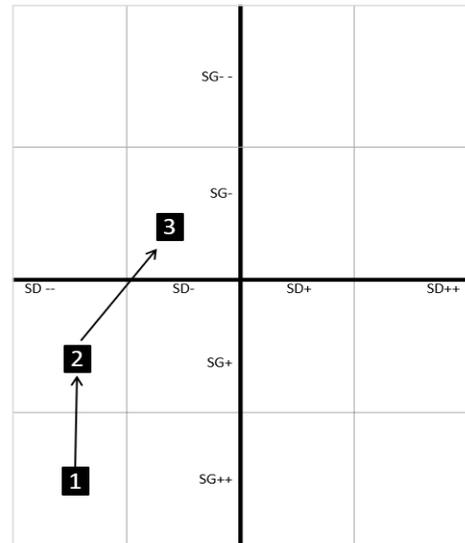


Figure 2b

Figures 2a and 2b: Semantic pathways showing shifts in the abstraction and complexity of Tebogo's reflections in response to the original prompts (Figure 2a) and the revised set (Figure 2b)

A typical entry taken from his journal (see Figure 2a, left-hand side) starts at position 1 in the prosaic code:

The Grade 10 class was busy with introduction to the query interface. Many struggled with the query wizard. I taught them that first you need data in the table. I then taught them which steps to take to create a query. I told them to read the instructions. Most managed and I assisted the ones that did it incorrectly.

Tebogo's reflection entries provide an account of classroom happenings (coded as having stronger semantic gravity). His reflection shifts to position 2 when he notes that most managed the task, but he offers no interpretation or explanation about why some learners struggled. As such, his reflections remain simple (weaker semantic density). His reflections remain in the prosaic code.

Tebogo was not present for the lecture introducing the revised prompts to the student cohort. After the WIL session, Tebogo conceded that he had not read the revised guidelines and continued "reflecting" as he had always done, as shown in Figure 2b. In short, he wrote descriptions of classroom happenings, rarely referring to concepts learnt during university-based coursework. Occasionally he mentioned the lesson's target knowledge. In three different places in Tebogo's reflective journal the university tutor addressed the depth of his journal entries. In one example, the tutor wrote:

It's good to see you write regularly. It gives me a sense of what you are doing on a daily basis. However, try to reflect more deeply on pedagogical issues.

However, his reflections remained largely within the prosaic code, occasionally weakening its semantic gravity. The substance of his entries remained unchanged: a straightforward narrative account of classroom events with stronger semantic gravity and weaker semantic density. An example (see Figure 2b) shows one of the very few entries where Tebogo went slightly beyond a descriptive account of his day. In position 1, he describes the lesson:

Today I had to teach my Grade 10 class about perspective drawing. I first defined what a perspective drawing is, 6 techniques to draw it and how to draw a perspective drawing to reach a single vanishing point. Many learners struggled with drawing it. One learner even told me they felt like giving up. But we kept trying until the bell rang and then I told them to finish it at home.

Although this entry stays within the semantic dimension's prosaic code, he then reflects on learner motivation as an aspect that is not directly observable (weakening SG slightly). In position 3, he explains his perception of learners' lack of motivation, stating:

One of the most challenging parts about teaching is the lack of self-motivation from the learners. They do not even take their schoolwork seriously. It is sad because some of them have potential.

Potentially, he could have drawn on concepts from his university-based coursework to strengthen the semantic density of his entry. For example, it could have been

complexified by considering structural barriers to learning that could be hindering learners’ epistemological access. Instead, he attributes the challenge encountered to learners’ lack of motivation. He misses an opportunity for shifting his reflection from a prosaic code into a worldly code. The theoretical ideas from university coursework and his experiences in the classroom remained insulated from one another. In doing so, he regards “problems” in his lesson as ones that lie beyond his professional responsibility and capacity to address.

Semantic Pathways in Mfana’s Reflections

Mfana completed his Bachelor of Education degree within four years, maintaining an overall aggregate of above 60%. In his reflective journal prior to the intervention, two university tutors had urged him to “reflect more deeply” and “focus more on pedagogical issues”. Despite their feedback, Mfana’s entries continued to give a descriptive account of what had transpired during his lessons. Mfana’s journal entries rarely offered an interpretation or appraisal of the classroom activity he observed. Nor did he refer to concepts from university-based coursework in reflecting on the lessons he taught.

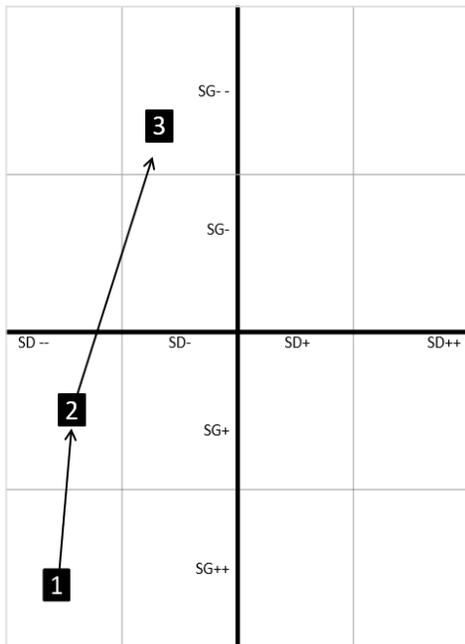


Figure 3a

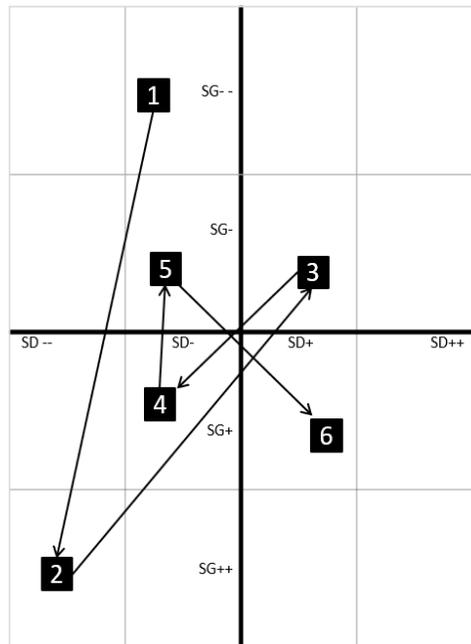


Figure 3b

Figures 3a and 3b: Shifts in the semantic structure of Mfana’s reflections with the previous prompts (Figure 3a on left) and a typical response to the revised set (Figure 3b on right)

In responding to the first prompts, Mfana’s reflections are almost entirely characterised by a prosaic code (see Figure 3a). One of only two examples where his writing shifts

out of a prosaic code will be analysed here. In position 1, he begins the reflection with a simple, context-bound observation. He writes:

The supervising teacher was not at the school, and I reported to the deputy principal. At first I was happy to face the class all by myself although there were challenges.

His entry remains in the prosaic code (position 2) as he refers to his previous experience: “Some lessons are more enjoyable because I taught them last year.” Mfana’s entry then shifts to position 3 as he makes a simple link between class management and teachers’ content knowledge, saying, “It is much easier to manage the class if you are confident with your content knowledge.” There is a weakening of semantic gravity as he derives a pattern, and a slight strengthening of the semantic density. His reflective entry shifts briefly into a rarefied code as he connects teachers’ knowledge and their class management.

When responding to the revised prompts, Mfana’s writing reveals a more complex semantic structure, with repeated shifts into the worldly code. Fifteen entries from his journal display a similar semantic pathway to the entry shown in Figure 3b. They all begin in the rarefied code (position 1) with a generalised statement about teaching. In the example that will be discussed here, he writes, “Pre-empting learners’ misconceptions before a lesson is very important.” He then strengthens semantic gravity to describe some classroom observation/experience that elaborates his beginning statement, shifting to a prosaic code. In position 2, he describes his lesson: “Today I taught a lesson on population fluctuation and regulation.” In position 3, he goes into detail about a concept that learners found difficult to understand, moving briefly into the rhizomatic code: “Learners had a misconception about environmental resistance. They thought it is the environment resisting change because of pressure.” In position 4, he considers the impact of ignoring misunderstandings, writing, “Had I not asked them what it is about it would have carried on through the lesson.” In position 5, he then abstracts a principle: “Misconceptions do not only hinder learners’ understanding, they also confuse the teacher when you find them at a later stage”, returning to a rarefied code. He concludes (position 6) by considering what the relationship between teacher actions and learners’ access to knowledge means for his practice going forward:

When I mark, and I see that learners are giving wrong answers, I then start questioning my teaching only to realise that my mistake made was neglecting the learners’ misconceptions. In future, I will consider misconceptions before introducing the content of the day.

Over the six-week period, similarly structured reflections made links between his classroom observations and concepts from coursework including learner prior knowledge, misunderstandings, the importance of content knowledge and pedagogical content knowledge (PCK) (Shulman 1987), pedagogical link-making (Scott, Mortimer, and Ametller 2011), inclusive pedagogies (Black-Hawkins and Florian 2012), and epistemological access (Morrow 2007). In responding to the revised prompts, Mfana

looks for transferable patterns more extensively and intentionally than he had done in response to the original prompts. His writing had a greater semantic range incorporating different semantic codes than was previously the case.

Semantic Pathways in Ntombi's Reflections

Teaching was Ntombi's first choice of career. She describes herself as a "future agent of social change and educational justice". Ntombi said that she used her journal as a place to "reflect honestly" even though at times her reflections on her own teaching were "uncomfortable". Across all years of study, she had written in more personal ways than either Mfana or Tebogo had done. With the previous prompts, the semantic structure of Ntombi's reflections were located mainly in the prosaic, rhizomatic and rarefied codes, as shown in Figure 4.

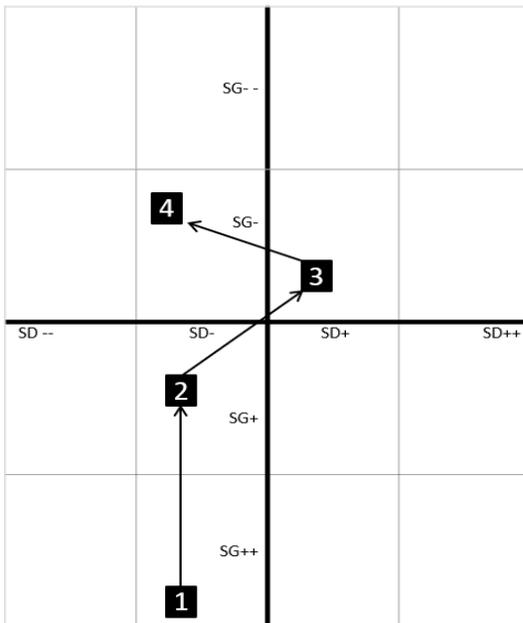


Figure 4: Semantic shifts in Ntombi's reflections using the original set of prompts

In a typical entry, she starts deep in the prosaic code (position 1) with a description of the lesson: "Today I had the opportunity to present a lesson on entrepreneurship." She weakens semantic gravity slightly (position 2) by noticing that compared to others, "this lesson evoked unexpected responses and questions". In position 3, she considers aspects of the lesson's content knowledge, moving briefly into the rhizomatic code: "Learners raised questions about issues faced by South African citizens and how entrepreneurship can play a role in helping resolve these issues." She then makes a generalisable claim (position 4) from her experience, in this case about the need to read widely to cope with unanticipated interactions during lessons. She writes, "It is important to read beyond the textbook, because it helps us to answer unexpected questions from the learners." This

is not linked to any particular specialised pedagogic concept, resulting in a shift into the rarefied code (SG–, SD–).

After attending the lecture about the revised prompts, Ntombi committed herself to intentionally using them to guide her reflections. She continued writing regularly but there was a notable change in the semantic structure of her entries. Nearly all her subsequent entries' semantic pathways shifted between prosaic, rarefied and worldly codes, as shown in examples 1 and 2 in Figure 5. Ntombi recruits specialised concepts from university-based coursework, including scaffolding, diversity, barriers to learning, and code-switching. Two entries will illustrate the way her reflection became more and less context-bound, while using theoretical insights to complexify the interpretation of her teaching.

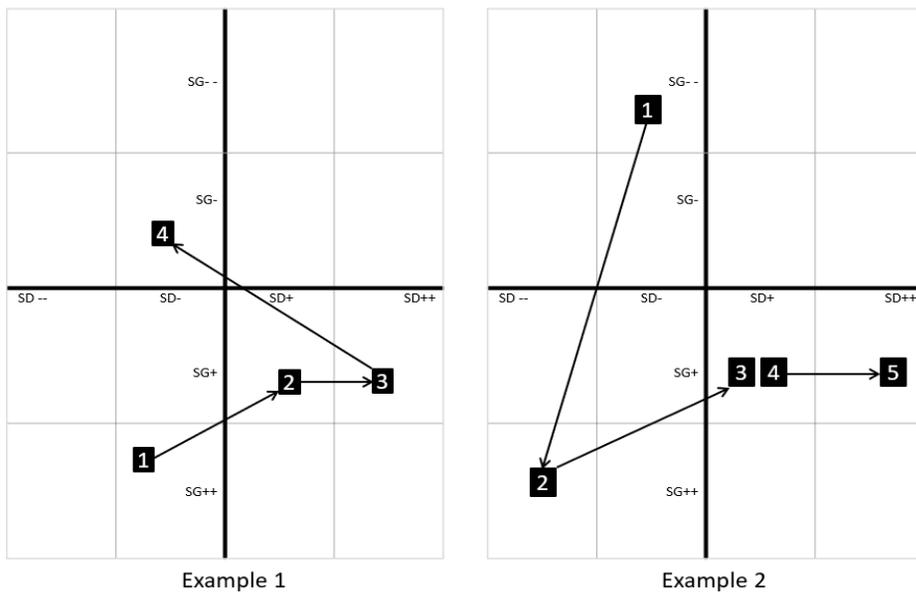


Figure 5: The semantic shifts of Ntombi's reflection from two examples in response to the revised prompts

In Figure 5 (Example 1 on left), Ntombi starts off in position 1 with a description of her lesson in the prosaic code (SG+, SD–), stating:

I think my maths lesson on percentages was well prepared: the activity was slightly difficult for the learners; the explanations were clear and learners seemed to understand the concepts.

She implies an awareness that the task was pitched at a slightly higher level than learners were capable of doing independently, alluding to Vygotsky's concept of the Zone of Proximal Development. Moving to position 2, her reflection draws on socially mediated problem-solving through scaffolding (Wood, Bruner, and Ross 1976). She attributes the

difficulties learners experienced to her inadequate provision of the necessary scaffolding, adding, “If sufficient scaffolding was provided, then most of the learners would have been able to solve the problems posed in this math lesson.” Her focus remains on the context of the lesson, and she draws on a network of theoretical ideas that significantly strengthen the semantic density of her reflection, moving it to a worldly code. Drawing on Morrow’s (2007) distinction between formal access and epistemological access, she appraises the quality of her lesson in position 3: “I can conclude by saying insufficient scaffolding constrained epistemological access in this particular lesson.” She notes that although learners were present in her class (i.e., they have formal access), the inadequate provision of scaffolding acted to constrain their access to the knowledge that was supposed to have been offered through the lesson. In position 4, she states that she is “not discouraged by this but challenged to change my approach” and takes up the difficulties experienced by learners as a professional challenge to transform her teaching practices (Black-Hawkins and Florian 2012).

In the second example (see Figure 5, Example 2), Ntombi draws on her knowledge of inclusive teaching to consider the challenges of working in a context where many learners do not understand the languages she speaks. She begins in position 1, stating that it is “important to be mindful of diversity at all times” (SG–, SD–, a rarefied code). She describes the context in which she teaches, writing that the “majority of the kids are from [other] African countries” (position 2 SG+, SD–, a prosaic code). In position 3, Ntombi’s reflection shifts into the worldly code as she draws on terminology from White Paper 6 (Department of Education [DoE] 2001) to surmise that “it becomes a ‘barrier to their learning’ when I can’t think of relevant examples on the spot”. In position 4, she concedes that although she is multilingual, the learners do not speak black South African languages and so it is sometimes difficult for her to “use strategic code switching to explain a concept”. In position 5, she draws on Lewin’s (2009) zones of exclusion to evaluate the effectiveness of her teaching. She concludes that although physically present, for the reasons discussed, some learners were “probably ‘silently excluded’ from the lesson” (SG+, SD++, a worldly code). In seamlessly drawing together her observations and experiences in the classroom, her knowledge of policy and concepts from university-based coursework, Ntombi’s reflections both weaken and strengthen semantic gravity and semantic density.

Like 66% of the participants in this study, Ntombi draws on conceptual insights to inform her interpretation of her classroom observations and experiences. The entries in Ntombi’s journal reveal a more sophisticated use of her developing gaze to make sense of classroom experiences. Her reflections move between simple and complex, context-bound and abstract, and in so doing, she brings together different types of knowledge to inform her developing teaching practices. Her reflections are characterised by regular trips into a worldly code, demonstrating increased conceptual complexity yet retaining their context-boundedness. Using the revised prompts, she is more intentional about drawing on conceptual and contextual knowledge to inform her reflections on her observations and experiences in the classroom. Her reflections contribute meaningfully

to her development as a knower and her capacity to “draw on different kinds of knowledge and fuse them together in the moment of practice” (DHET 2015, 9).

Ways in which the Revised Prompts Constrained Reflections

Prior to the intervention, 6% of participants (2 of 33) actively used concepts to frame and interpret their classroom experiences, whereas semantic touring was evident in 66% when responding to the revised prompts. The data analysis also showed three ways in which pre-service teachers responded inappropriately to the revised prompts.

First, two participants misunderstood the concepts they drew on and the insights were consequently misapplied in their reflections. A condition for conceptually informed reflection is a good understanding of the theory.

Second, another two participants merely tacked a list of concepts onto their reflections that otherwise maintained an unchanged semantic structure. For example, one recounted the details of a lesson, and then added, “So, reflecting on this lesson, I was reminded of Vygotsky’s concept of the ZPD and principles of inclusive education.” In these cases, the reflections shifted from a prosaic code (SG++, SD-) to a rarefied one (SG-, SD-) where concepts are named, but without enabling insight into teaching-learning interactions. As mere jargon, the naming of concepts adds very little value to the reflection when not used to provide specialised insight into classroom experiences.

Third, instead of using the context of the lesson as the focus for reflection, a student wrote extensively explaining theoretical concepts. Instead of taking semantic tours between the prosaic, rarefied and worldly codes as Mfana and Ntombi had done, this participant wrote in the rhizomatic code (SG-, SD+) without recruiting concepts to make sense of his classroom-based observations and experiences.

Discussion

The findings reveal two conditions for pre-service teachers to use insights from coursework to make sense of their experiences in the classroom. The first condition is that pre-service teachers need powerful and relevant conceptual tools with which to think systematically about their classroom observations and experiences. The reflections of those who ignored the concepts or simply listed them did not fulfil this condition.

The second condition is that the pre-service teachers are made aware that they are expected to draw on appropriate concepts to make sense of their classroom experience. This study shows that even when participants had access to potentially powerful concepts, many did not spontaneously recruit them to inform their classroom observations and reflections. Few changes in the semantic shifts were observed in the reflection of pre-service teachers who had not been aware of the change in focus (like Tebogo). Pre-service teachers such as Mfana used the idea of semantic pathways to

structure their reflection. He repeatedly wrote reflections starting with a generalised statement, then provided specifics of an incident, finally considering the implications for future practice. Despite the rigidity of his reflections, they became more personal, more contextually bound, and more complex than they had been previously. Mfana's entries illustrate the value of making the "rules of the game" more explicit to those who had neither recognised nor realised the basis of achievement (Clarence 2016; Kirk 2017). Ntombi, who had been intuitively, but only occasionally, making code shifts, made them more deliberately and with more rigour.

Once aware that semantic tours across the plane were required for knowledge-building, two thirds of the participants in this study (including Mfana and Ntombi) intentionally and consistently drew on their university-based coursework to make sense of what they observed and experienced in the classroom. Indeed, some also used their classroom experiences to question and interrogate aspects of theory. In short, their reflections revealed a different semantic structure, becoming emphatically more transferable (by moving between stronger and weaker semantic gravity) and more complex (by strengthening semantic density). The revised prompts set up better conditions for pre-service teachers to intentionally enact a more specialised gaze as they reflected on their classroom experiences.

Implications for WIL in Teacher Education Programmes

Experientially directed prompts assume that student teachers already have the conceptual tools that enable them to distinguish between significant and peripheral moments in their classroom experiences. It is assumed that from the outset they can identify the weaknesses in their own lessons and have already developed an imagination for pedagogic alternatives. This may be possible for established teachers who have a specialised gaze with internalised criteria that enables them to discern what really matters for effective practice. However, for novices whose practices are still in a formative stage, these criteria are not always self-evident. Prompts that guide the reflections of practising teachers (who have well-established criteria for noticing, observing and evaluating the impact of their teaching practices on learning) are not the same as required by pre-service teachers who are still acquiring criteria for recognising and enacting exemplary practice. While prompts that direct a focus on reporting experience and observation may be wholly appropriate for experienced teachers whose understanding of teaching has become integrated into a coherent practice, this integration cannot be assumed from the outset.

When urged to "deepen their reflections", many pre-service teachers in this study could not imagine that this deepening necessitated a code shift within the semantic structure of their reflections. The ability to deconstruct practice depends on the existence of concepts and a language for describing practice (Grossman et al. 2009, 2075). Concepts and language enable a naming of the parts of practice and empower those in mentor roles to provide targeted feedback on pre-service teachers' efforts. The findings of this study suggest that the Semantics dimension of Legitimation Code Theory provides

useful concepts and a language of description to make expectations more explicit to pre-service teachers. In the next phase of this study, pre-service teachers will use the semantic plane to analyse the semantic shifts in reflections from their own journal. Many will see for themselves how their reflections stayed within the prosaic code. Pre-service teachers will consider how examples of their own reflections could become “deeper” by traversing several codes across the semantic plane.

Conclusion

This article investigated the impact of a change in the focus of the prompts on the depth of pre-service teachers’ reflections during work-integrated learning. Using the previous set of reflective prompts, pre-service teachers tended to report on their experiences and observations. In contrast, the revised guidelines prompted pre-service teachers to draw on conceptual insights to make sense of their classroom experiences. They also encouraged them to ask questions of their theoretical learning in light of their work-based learning. The analysis of the data shows that two thirds of the pre-service teachers in this study wrote more complex, conceptually informed reflections than they had in response to experientially focused prompts. Their ability to do so depended on several conditions. First, the guidelines had to make explicit the expectation that theoretical insights are relevant for understanding and interpreting classroom practices. Second, pre-service teachers needed a clear understanding of relevant concepts to make sense of practice. Third, pre-service teachers needed to maintain the contextual focus of their reflections, without being tempted to replace reflections with lengthy conceptual explanations. Fourth, the ability of university lecturers to elaborate on what they mean by “probing more deeply” supported pre-service teachers in making these shifts. With these conditions in place, the potential for the revised reflection prompts as a mechanism that supports pre-service teachers’ professional learning is greatly enhanced. The revised set of reflection guidelines prompted pre-service teachers in this study to take more sophisticated semantic pathways around the semantic plane. They more intentionally drew together insights from their conceptual and policy knowledge and their observations and experiences in the classroom context.

The developmental needs of pre-service teachers are fundamentally different to those of teachers who reflect as a means of continuing professional learning. Pre-service teachers are still in the process of acquiring a more specialised gaze that enables them to notice significant incidents, interpret them and evaluate the impact of their teaching on learning. Ideally, university coursework provides pre-service teachers with conceptual tools that empower them to analyse and interpret their observations and experiences in the classroom. The reflective prompts that pre-service teachers write without the insights provided by these conceptual tools miss opportunities for them to engage in conceptually informed reasoning in context. For reflections to offer transformative learning opportunities, developing teachers need to recognise and articulate significant moments in the busyness of classroom life, interpret them and deduce patterns or implications that transcend the particularities of that lesson. The guidelines used with

pre-service teachers can variously enable or constrain the development of meaningful reflective practice.

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