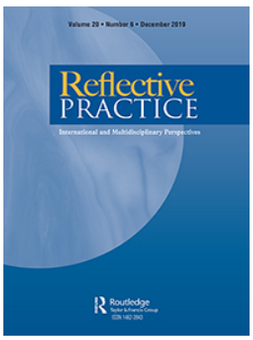

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Using semantic gravity profiling to develop critical reflection

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ABSTRACT

Whether novices can be guided to produce valued critical reflections is a subject widely-discussed in fields of practice where placement is essential. This research enters into this conversation. However, the question is considered with a new framework by deconstructing evidence of successful critical reflection using an increasingly significant social realist framework, Legitimation Code Theory (LCT). Students and teachers involved in fields where critical reflection writing is important can be guided to notice how semantic gravity from Legitimation Code Theory (LCT) makes more visible what is valued by experts evaluating novice critical reflections. The findings discussed in this paper stem from an interdisciplinary collaboration between academic literacy and nursing experts. Over ten months from 2018 to 2019, analyses of 200 first year student nurse critical reflection assignments were conducted. General patterns distinguishing high and low scoring critical reflection assignments were observed. A high and a low scoring paper reflecting these general patterns are discussed in detail in the results. The research seeks to contribute to both research on improving the *practice* of critical reflection in higher education, and approaches exploring Legitimation Code Theory (LCT) in educational research to better understand knowledge practices in applied disciplines.

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Semantic gravity profiling; critical reflection; nursing; practicum; Legitimation Code Theory

Introduction

A significant body of research on critical reflection writing tasks about practicum experiences has identified that, despite the use of reflective guides, students often tend to write reflections that are too 'descriptive' in nature (for teacher education, see Brooke, 2014, and Lee, 2008; for social work, see Fook, 2016; Hickson, 2011; Szenes, Tilakaratna, & Maton, 2015; and for health sciences, see; Fook & Gardner, 2007; Wu, Enskär, Heng, Pua, & Wang, 2016; Wu, Wang, Pua, Heng, & Enskar, 2015). One reason for this is that critical reflection skills are often treated as 'perceptions' rather than as 'practices' (Szenes et al., 2015); and rather than explicitly training novices how to write sound critical reflections, they are left to intuitively produce sound texts (Atkinson, 1997; Moore, 2011). However, a knowledge of how to write valued critical reflections is essential for success in fields such as nursing,

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and frameworks such as Gibb's (1988), may not do enough to scaffold this practice (Chong, Lim, Liu, Lau, & Wu, 2016; Wu, Enskär, et al., 2016; Wu, Wang, et al., 2015).

Evidence from research in the field concludes that reflections can be overly descriptive and appear idiosyncratic. These fail to relate the content to what Sharples et al. (2014) call the 'greater system'. In nursing, this greater system is related to the universal codes of practice that nurses should adhere to (Chong et al., 2016; Wu, Enskär, et al., 2016; Wu, Wang, et al., 2015). The connection to the abstract 'greater system' can be seen to be a characteristic of 'deep learning' associated with 'reflective thinking' (Bourner, 2003). 'Deep learners' draw greatly from practical experiences and convert new knowledge to long term context-independent application; what might be referred to as inter-contextualised knowledge structures. However, without explicit training in how to go about this process of reflection with evidence of what is valued, novices may not be able to produce what is required.

This research seeks to provide an answer to the following research question: What discursive practices are deployed in reflective writing by nursing students when demonstrating their capacity to critically reflect on and learn from past experiences? It sets out to answer the question with a new social realist framework, Legitimation Code Theory (Maton, 2013). Legitimation Code Theory (LCT) is a framework for analysing knowledge practices in environments such as education with the aim of making what counts as valued practice explicitly visible. Visibility of 'rules of the game' (Maton, 2014) is achieved by employing codes to depict the content of what is valued. Legitimation Code Theory (LCT) enables the exploration of the knowledge practices, or legitimation codes, that constitute effective critical reflection valued by experts in the field. The framework of Legitimation Code Theory (LCT) comprises five dimensions which apply organising principles, three of which have been developed: Autonomy; Semantics; and Specialisation.

The aim of this research is to use one of the legitimation codes related to Semantics (semantic gravity) to explore semantic relations in the knowledge practices of critical reflection. Students and teachers involved in fields of practice where critical reflection writing is important can be guided to notice how semantic gravity from Semantics makes what is viewed as evidence of successful critical reflection more visible for teaching and learning. The research therefore contributes to the growing body of inquiry on improving the practice of critical thinking and reflection in higher education. It also seeks to expand upon approaches using Legitimation Code Theory (LCT) to better understand knowledge practices of critical thinking in applied disciplines (Szenes et al., 2015).

Literature review

Clinical practice modules are set up to facilitate the application of knowledge through the practice of nursing skills in multiple patient care settings (Chong et al., 2016; Wu, Enskär, et al., 2016; Wu, Wang, et al., 2015). During practicum, novices receive appropriate guidance from a nurse preceptor or experienced staff nurse/clinical instructor who serves as a role model and point person (Wu, Enskär, et al., 2016). Novices are also mentored by their university faculty lecturers during their studies (Kavoosi, Elman, & Mauch, 1995; Penn, Wilson, & Rosseter, 2008). The objective of this multi-layered structure is to foster clinical professionalism (AACN, 2008). Critical reflection is viewed as an essential part of the novices training in the clinical practice module. Through reflective processes, student

nurses are encouraged to question and learn through their experiences during practicum by applying the theoretical knowledge that they have learned from the university faculty. Additionally, the nursing domain is one of constant change requiring nursing educators to 'constantly review their teaching methodologies in order to enhance learners' knowledge and competency of skills in the clinical settings' (Chong et al., 2016, p. 125). Student nurses need to be prepared to constantly evolve to this change, reinforcing the need to be able to critically reflect on practicum and learn new theories and practices.

This paper seeks to provide a strategy for scaffolding reflective practice by focusing on relations within knowledge. This focus has been brought up by Szenes et al. (2015) who explore successful undergraduate critical reflection writing in the discipline of social work. Social work students are often asked to discuss a critical incident, as are nurses, from their practicum experiences and draw from theory to understand it. An extract of a text pinpointed by these authors from their research follows:

> 'In my incident, the emerging themes that I believe warrant further investigation relate to professional practice, namely the issue of boundaries, gender and power. The irony of my distinction only becomes clear now. While I expect to be able to put on a professional "mask", consisting of the professional skills and knowledge of social work practice when working with clients, I expect clients like Jared to "bare all", to reveal to me their personal problems, issues and insecurities. Sommers-Flanagan and Sommers-Flanagan (2007) refer to this concept as "one-way intimacies" (Sommers-Flanagan & Sommers-Flanagan, 2007, p. 163), and as a necessary component of helping relationships' (pp. 580–581).

The example reflection from Szenes et al. (2015) demonstrates a sound interplay between theory and practice in social work; perhaps a kind of deep learning as this notion of 'one-way intimacies' appears to be context-independent and therefore applicable across contexts. To facilitate sound critical reflection, Szenes et al. (2015) argue for making explicit these relations between context-dependent and context-independent knowledge structures. In this way, knowledge itself becomes an object of study. If there is no explicit focus on knowledge practices, they term this 'knowledge blindness'. It is perhaps not realistic to expect novices to be able to produce sophisticated reflections of this genre without a more explicit focus on knowledge as an object of study. Knowledge tends to only implicitly exist as the object of study in their training as critical reflectors. For Maton (2013) and for Szenes et al. (2015), relations within knowledge can be more explicitly explored using the conceptual framework of 'semantic gravity'. Maton (2013) defines semantic gravity (SG) as 'the degree to which meaning relates to its context' (p. 11).

The next section goes into detail about Legitimation Code Theory and particularly semantic gravity profiles and how this might enable novices to critically reflect by developing their awareness of relations within knowledge.

Theoretical framework

Legitimation Code Theory is a framework for analysing the organizing principles or legitimation codes of practices to reveal the 'rules of the game' in fields such as education. Often these rules lead to achievement but may be only tacitly known. Legitimation Code Theory seeks to make the codes visible so that they made be taught and learned. Semantic gravity from Legitimation Code Theory explores knowledge as semantic codes that may enable knowledge-building. Semantic gravity (SG±) is defined by Maton (2013) as:

> 'The degree to which meaning relates to its context, whether that is social or symbolic. Semantic gravity may be relatively stronger (+) or weaker (–) along a continuum of strengths. The stronger the semantic gravity (SG+), the more closely meaning is related to its context; the weaker the gravity (SG–), the less dependent meaning is on its context' (p. 65).

All meanings relate to context in some way; semantic gravity conceptualizes how much they depend on that context to make sense. Semantic gravity varies on this continuum, moving from stronger to weaker dependence and back again. For example, in Chemistry, as Maton and Doran (2017) outline, gold is a complex chemical element, and a specific type of metal; it also comprises an isotope. These are all characteristics that can be used for other elements also. Thus these characteristics pertain to more generalised context-independent meanings (meanings at the weaker semantic gravity or SG- end of the continuum). However, a gold bracelet is a physical everyday concept. In this usage, it is more context-dependent and can be seen and touched (meanings at the stronger semantic gravity or SG+ end of the continuum). When discussing gold, a scientist might present it by referring to an object as well as the periodic table and other taxonomies of properties of the elements. Thus, the choices in meaning depend on the context of usage but all meanings can be depicted using semantic gravity.

The interplay between these knowledge structures creates semantic gravity waves, which is a process of knowledge building as it enables the accumulation of knowledge across contexts and through time (Maton, 2013). It therefore represents cumulative learning (Maton, 2013), explained as an accumulation of knowledge across contexts and through time (Maton, 2013). This shifting between SG- and SG+ and back to SG- creates semantic gravity waves as in profile B in Figure 1 below.

Analysts can record this process of gravity waving on a graph to construct visual waves as semantic gravity profiles and semantic gravity ranges. In addition to waves, flatlines can be recorded as profiles with very limited range (refer to A1 and A2 in Figure 1). These appear when the meaning of a message remains either consistently abstract or consistently contextualized with little integration of abstract theoretical knowledge structures. Finally, up and down-escalator patterns may be heuristically mapped. If abstract meanings are unpacked using definition or exemplification, but the critical reflection fails to

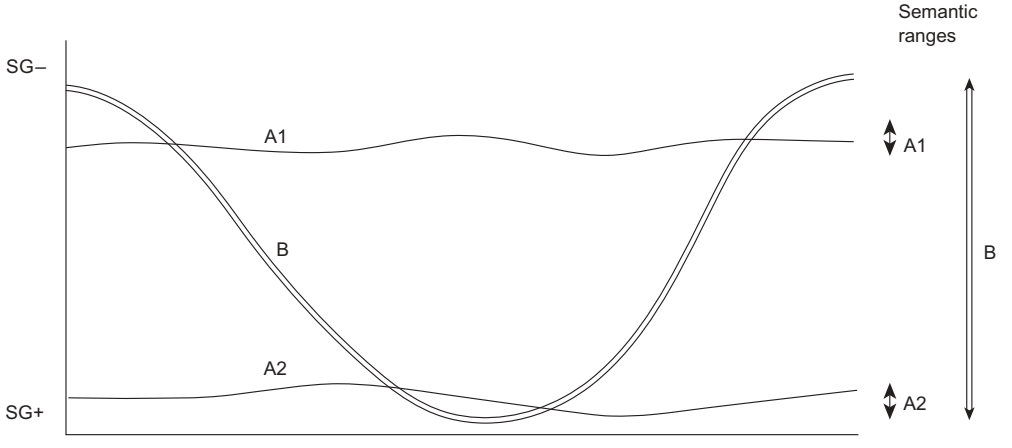

Figure 1. *Illustrative profiles and semantic ranges* (adapted from Maton, 2013, p. 13).

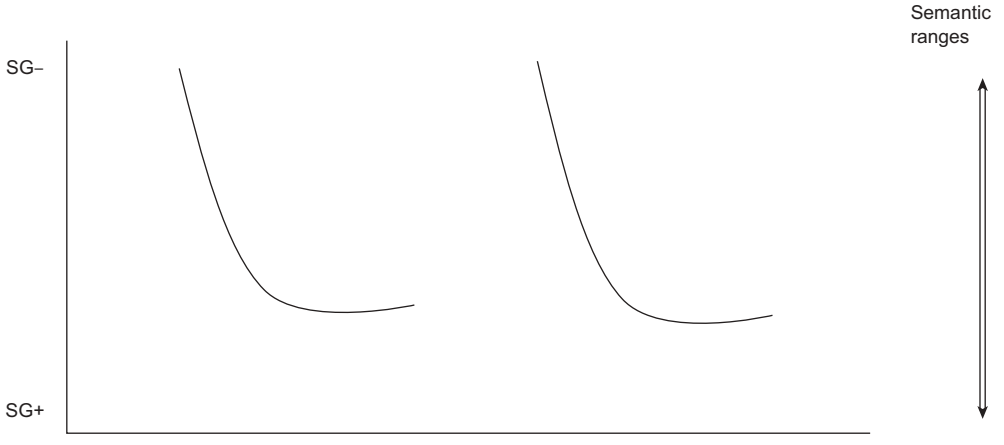

Figure 2. Illustrative profiles of down escalators.

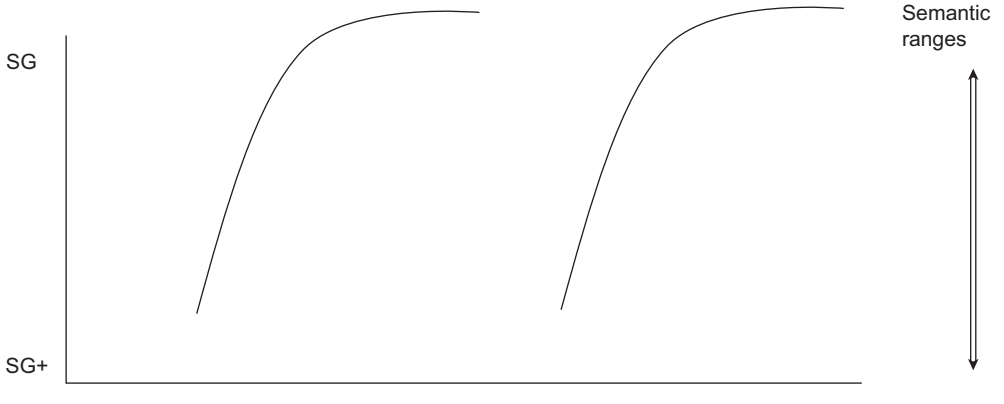

Figure 3. Illustrative profiles of up escalators.

connect these concepts to others effectively, this creates 'down escalators' (Figure 2) as slopes downwards ending at SG+. Alternatively, a reflection might be mapped as 'up-escalators' (Figure 3) if it comprises narratives at the start and then links these to abstract concepts and underlying principles of practice but does not connect to another practical experience to produce a learning point across contexts effectively. If producing up or down escalators, novice reflectors are signalling 'segmented learning' rather than 'cumulative learning' (Maton, 2013) because they are not accumulating knowledge across contexts but rather restricting the learning to one context.

Materials and methods

Context

The findings discussed in this paper stem from an interdisciplinary collaboration between academic literacy experts at National University of Singapore and the Alice Lee Centre of Nursing. The overall aim is to create an intervention for students by embedding face-to-

face and online teaching of critical reflection assignment writing in the first year of the Bachelor of Nursing. To explore what might scaffold more effective critical reflection, the research team drew on the frameworks of Systemic Functional Linguistics (SFL) and semantic gravity from Legitimation Code Theory (LCT). This study presents one of the main components of phase 1 of the project: a semantic gravity-informed analysis of high and low-scoring student-nurse critical reflections.

Student nurses apply Gibbs' (1988) Reflective Cycle to structure their reflections on their practicum experiences. Gibbs (1988) reflective cycle model has a longstanding history in nursing (see for example studies from Burns, Bulman, & Palmer, 2000; Husebø, O'Regan, & Nestel, 2015; Reid, 1993; Wu, Enskär, et al., 2016; Wu, Wang, et al., 2015). It comprises six stages. The critical reflection papers were scored using a rubric based on these stages. The criteria are: (1) Description of the encounter, experience or any problem that arise during the clinical visitation; (2) Feelings and Reflection: Identify your assumptions, values, beliefs, emotions, motives based on your experience; (3) Evaluation of the performance and experience. Analysis of the deeper meanings from different perspective (including feedback from tutor/peer). Research using academic references or literatures (minimum 5). Synthesise and integrate the information to complement a broader discussion; (4) Conclude and integrate how the experience informs nursing practice. Plan of action for future encounters. In addition, papers were assessed for their displays of independent learning, their factual accuracy and the effectiveness of their structuring.

Data collection

To ensure that the research was ethically sound, participants were provided with a summary of the study's objectives and were asked to sign consent forms if they agreed to participate. All personal information was deleted before analyses began. The reflections averaged from 1200 to 1500 words. Internal review board permission for the project was granted. Then, over 10 months from 2018 to 2019, a collection and analysis of first year student nurse critical reflection assignments from 200 first-year student-nurses on a four-year Bachelor of Nursing degree programme took place. These assignments had been formally graded by the nursing faculty during the semester prior to the research start. There were five cut-off points given for scoring by the tutors from the nursing faculty: 41–45%; 46–47%; 48–50%; 50–3%; 53–56%. The low scoring papers contained primarily content related to (1) Description of the encounter, experience or any problem that arise during the clinical visitation of the nursing faculty's descriptors. In contrast, the higher scoring papers included effective content from all 4 criteria as well as independent learning, factual accuracy and an effective structure.

A paper from the 41–45% pool and another from the 53–56% were selected randomly for analysis of their content using semantic gravity. After these initial analyses, a further ten randomly selected papers from the same pools were evaluated to verify that the semantic gravity profiles provided in Figures 4 and 5 were representative of the scoring cut-offs. After this, the entire set of 200 critical reflection assignments were explored and semantic gravity profiles produced. The high and low scoring papers used for analysis in this findings section are representative of the semantic gravity profiles of the 41–45% and the 53–56% data pools. Mid-level scoring assignments were found to produce semantic gravity waves by connecting general learning points (SG-) to different contexts (SG+) but

these reflections demonstrated a much less complex interplay between levels of abstraction. For example, a nurse may connect the same principle of sound hygiene to two practicum experiences. However, the nurse may not explore different levels of analysis such as distinguishing between the 'every-nurse' and the 'nurse-in-person' narrative (see translation device in Table 1 below).

Data analysis

Directed content analysis was carried out of all 200 critical reflection assignments. As Hsieh and Shannon (2005) state, 'the goal of a directed approach to content analysis is to validate or extend conceptually a theoretical framework or theory' (p. 1281). Assignments were analysed for meanings related to semantic gravity or context dependency (SG-/SG+). The evaluation depicts the flow of meanings in the texts to represent whether a strengthening, shifting towards SG+ or weakening, shifting towards SG-, of semantic gravity is occurring. For example, if a student-nurse describes a specific event with a patient as a narrative, that is taken as SG+. In contrast, references to more abstract, general principles or concepts in the form of an academic source or a governing body or a paradigm such as the Entrustable Professional Activities (EPA), is depicted as weaker SG-. This is because Entrustable professional activities (EPAs) are the subject of an array of publications and are used to help guide competency-based medical education programs in many countries (Ten Cate, 2018); and are thus less context-dependent than a particular event or patient.

Critical reflection assignments were subjected to analyst triangulation (Thurmond, 2001). The need for triangulation was considered essential as there is a high degree of subjectivity in the semantic gravity analysis. Thus, an informed rater, with experience exploring texts for semantic gravity, was asked to produce semantic gravity profiles for ten random student nurse reflection samples. Inter-rater reliability was high as agreement was reached for the coding of nine from ten samples. The area of discordance was discussed further leading to complete agreement. This helps to testify to the trustworthiness (Vivar, McQueen, Whyte, & Armayor, 2007) of the study, particularly the 'confirmability' (Vivar et al., 2007), or objectivity of the data.

Results

After the analyses, heuristic semantic gravity profiles were constructed for each reflection. General patterns were observed, distinguishing high and low scoring critical reflections among a significant number of the 200 assignments. There were five cut-off points given for scoring by the tutors from the nursing faculty: 41–45%; 46–47%; 48–50%; 50–3%; 53–56%. The low reflections (41–45%) comprised a great deal of description focusing prevalently on context-dependent knowledge structures. They also often separated events rather than trying to view learning connections between them. In contrast, high scoring reflections demonstrated a sound application of theory across contexts to demonstrate cumulative learning. The samples provided in the findings are representative of these general characteristics with regards to their semantic gravity profiles. These profiles are provided and discussed. Each profile depicts the main subject matter of the entire critical reflection assignment from the students. Additionally, the reflections are provided as appendices. The first profile depicts a typical high scoring paper; the second, a typical low scoring one.

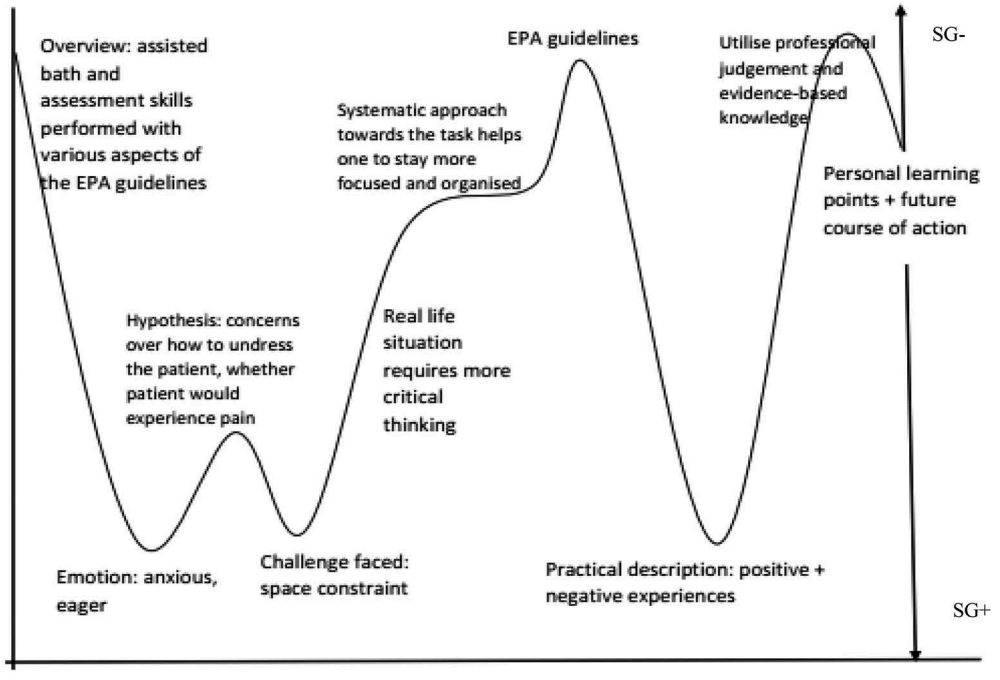

Figure 4. Illustrative semantic gravity profile of a high scoring critical reflection.

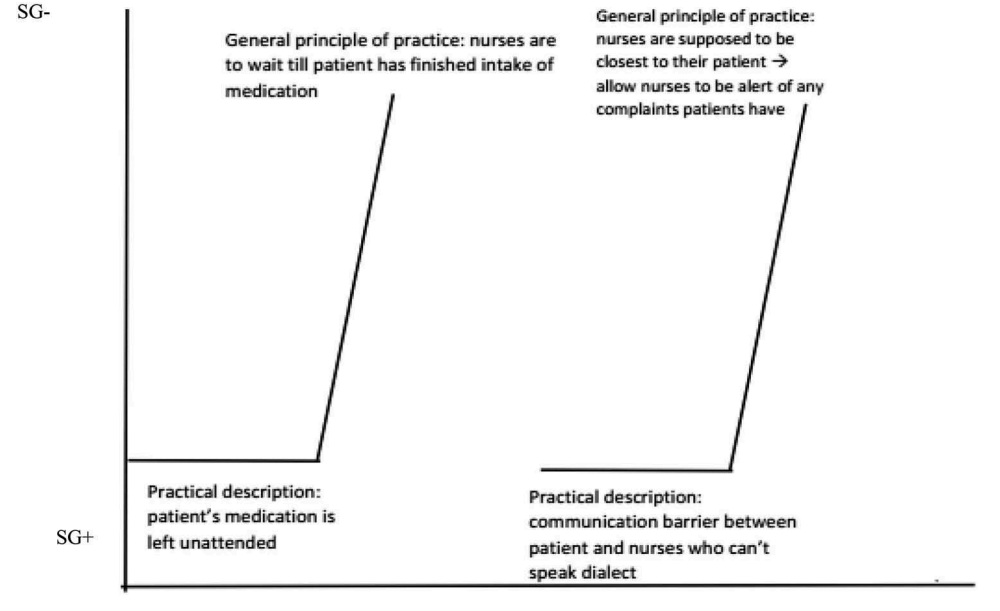

Figure 5. Illustrative semantic gravity profile of a low scoring critical reflection.

Table 1. Translation device for semantic gravity analysis of nurses' critical reflection assignments.

	Indicators	Examples from empirical data
SG-	Generalised content knowledge in the discipline is emphasized (every-nurse narrative)	*Code for Nurses and Midwives (high scoring paper)* *Entrustable Professional Activities (EPA) paradigm (high scoring paper)* *Bed sponging as an alternative method if the patient strongly refuses assisted shower* (Lynn, 2010)*(high scoring paper)* *5 Rights of medication (low scoring paper)* *nurse can either put back the medication (low scoring paper)*
	Generalised content knowledge in the discipline in relation to the reflector (nurse-in-person narrative)	*My first experience in an assisted shower during the attachment (high scoring paper)*
	Generalised content knowledge based on input from clinical instructor	*She (CI) highlighted the areas to look out for during an assisted shower* e.g. *patient's skin integrity (high scoring paper)*
Weakening semantic gravity scale		
SG+	Description of hypothetical reasoning during event	*How would I undress her? Would she experience pain when the leg splint is removed? (high scoring paper)*
	Description of emotions & feelings during event	*I was also anxious about Mdm X's condition (high scoring paper)*
	Description of events	*After the shower, I changed the bedsheet and made her bed (high scoring paper)* *Particular incident that were etched in my mind: the interaction with a demented patient) (low scoring paper)* *We reached the ward, the patients had finished breakfast (low scoring paper)*
Strengthening semantic gravity scale		

High scoring critical reflection paper

In this high scoring (56/60) critical reflection paper, the student-nurse shifts from the more abstract theoretical to the more concrete empirical at several points and for different purposes. These levels of reflection can be seen to provide quite a range of theoretical and practical considerations. At the weakest semantic gravity level (SG-), there is an introduction to how she is relating her experiences to the Entrustable Professional Activities (EPA) paradigm. She states:

> 'I will be focusing my reflection on the assisted bath and assessment skills performed with reference to various aspects of the Entrustable Professional Activities (EPA) guideline'.

The Entrustable Professional Activities (EPA) paradigm will again be mentioned later on in the reflection. The student nurse, following Gibbs (1988) cycle, describes the event (SG+) and her feelings during the event (SG+). She then shifts back up to more generalised theoretical meanings (SG-) when she states that this was her 'first experience in an assisted shower during the attachment' and how 'prior to this attachment, [she] did not realise that a seemingly simple shower could involve so many nursing practices'. She then generalises from this experience about being reflective in situations such as these. However, this is more empirically-oriented (SG+) as it is viewing these 'nursing practices' in light of a specific context (SG+), not across contexts (SG-). This is what might be termed the 'nurse-in-person' narrative.

The student nurse continues to narrate the event and to present how she felt challenged undressing the patient as she did not wish to cause her distress. She then critically considers the problems that might be associated with bathing patients from a more abstract, generalised viewpoint. She cites more generalised advice given to her by the Clinical Instructor's (CI) and how she might have made more of a point of 'encouraging Mdm X to shower and self-dress if possible'. This knowledge structure is then followed with further abstract, theoretical reflections. The student nurse generalises that having systematic approaches to guide practice is essential (SG-). She then further links this experience back to the Entrustable Professional Activities (EPA) paradigm.

From this point, the student nurse returns to the event description by summing up her actions and evaluates them as positive and negative. She does this with evidence from the experience (SG+). For example, she states:

> 'I felt that the negative experiences arose from my lack of knowledge in caring for a patient with limb fractures. For instance, because of my poor preparation, I often found myself thinking of what the next steps are'.

The student nurse then returns to more theoretical knowledge by generalising alternative actions and relates these to an externally-driven academic source: 'I can also consider bed sponging as an alternative method if the patient strongly refuses assisted shower' (Lynn, 2010).

The section is summed up with more general abstract and theoretical considerations based on these practicum experiences. The student argues that it is important for nurses to use 'critical thinking skills and ethical reasonings based on the Code for Nurses and Midwives to provide beneficence to the patients and advocate for their best interests'. The knowledge structure 'Code for Nurses and Midwives' is at the weaker (SG-) end of the semantic gravity continuum as it is a general set of principles across contexts. Also, the

reference to 'nurses' is a generalised term. Following Gibb's (1988) model, the 'action plan' section ends the reflection. For this, the student nurse presents a generalised decontextualised learning point about her practicum experience, thus shifting slightly towards SG+ compared to the Code. She concludes:

> 'This attachment, albeit short, has given me a valuable insight to go beyond being a 'robot nurse' who only performs the tasks but to be a critical thinker so that each patient's specific needs could be met'.

As she refers to her own learning here and not nurses in general, to conclude the critical reflection, it represents stronger semantic gravity (SG+) than the previous content about the 'Code for Nurses and Midwives', which is a generalised abstract knowledge structure (SG-) referring to no person in general; what might be termed an 'every-nurse' or 'every-midwife' narrative. Therefore, this is a slight shift towards SG+ and might be termed the 'nurse-in-person' narrative.

Low scoring critical reflection paper

It was found that one very common feature of low scoring critical reflection papers was their overly-descriptive nature at the beginning comprising too much narration and little use of academic sources as evidence to generalise about these critical events. Additionally, overall at the discourse level, the learning from separate experiences was not connected. Using Maton's (2013) key terms, this produced 'segmented learning' rather than an overall more holistic, and generalised 'cumulative learning experience' (Maton, 2013).

This low scoring paper (41/60) depicts two up-escalators (see Figure 5) because it describes and discusses two events but does not connect these to provide an overall transformative learning experience. The first event is one patient's medication left unattended; the second a communication barrier with another patient. Additionally, in this example, the student-nurse switches from the narrative (SG+) to general principles of practice learned at the nursing faculty (SG-) very abruptly to produce very steep gradients (up-escalators). Therefore, there is a lack of a range between these different knowledge structures.

In this reflection, the student first describes how she found medication unattended on the bedside table of a patient suffering from dementia:

> 'After the nurse appointed us to the patients, I went to talk to the patient I am assigned to. I realized her medication was left unattended at her bedside'.

However, the student does not describe what she did. Thus, there is a lack of SG+ content as the narrative appears unfinished.

After this SG+ content, the student nurse describes the potential consequences of this mistake with a very brief mention of what her 'tutor' told her:

> 'By leaving the medication at the bedside unattended, there is a possibility of medication not belonging to the patient due to moving of cardiac table, causing medication to be mixed up'.

Once the descriptions are finished, the student nurse links this to SG- content citing the 'importance of checking the '5 Rights' medication administration: 'Right patient; Right drug; Right time; Right dose; Right route'. This change in subject matter produces a very

abrupt and steep gradient. At this SG- level, the student only uses 'every-nurse' language to discuss the problem. She concludes:

> 'The nurse can either put back the medication and come back to the patient after attending to other priorities or pass the patient the medication and make timely checks on the patient to ensure that medication has been taken'.

This content is at the weaker end of the semantic gravity continuum (SG-) as it is generalised, more theoretical knowledge, which is transferable across contexts. Thus, the narrative of the critical incident is viewed in relation to the general principles of practice. However, very little theoretical discussion citing academic evidence from the nursing faculty is provided. Thus, although weaker semantic gravity content is present, the student is not able to draw from academic sources to discuss it thoroughly. Additionally, the novice does not evaluate the strengths and weaknesses of her acts or use an 'I' at a more mid-range (SG±) to discuss potential theoretical alternatives to what she did. The narrative could be followed by a hypothetical discussion of how she may have reacted differently in this situation. This would represent weaker semantic gravity than the empirical description.

Discussion and conclusion

As noted in the introduction, this research seeks to provide an answer to the following research question: What discursive practices are deployed in reflective writing by nursing students when demonstrating their capacity to critically reflect on and learn from past experiences? It has sought to answer the question with a new social realist framework, Legitimation Code Theory (Maton, 2013). Using semantic gravity, knowledge practices that constitute effective critical reflection valued by experts in the field, have been explored. An awareness of relations within knowledge structures is viewed as essential in models of reflection in the context of higher education in diverse disciplines. Yet, this is often not treated explicitly as a practice.

In table 1, there is a translation device using semantic gravity profiling to describe the critical reflection assignments.

It can be observed from the translation device that the high scoring paper included a more complex interplay between levels of abstraction. This ability to exploit relations within knowledge according to context-dependency by shifting from the specific, empirical (SG+) to the hypothesis of the more generalised personal theoretical (still applying 'I' but in a context-independent nature) seems to be lacking in lower scoring papers. Effective writing draws learning from significant others such as the nursing faculty (SG-), the Clinical Instructor in situ (SG+) and theoretically (SG-); and the student-nurse as self-source herself (both in situ, SG+, and hypothetically, SG-). This represents general principles of practice in nursing (SG-); clinical and personal theoretical learning (SG-), and practical learning in the field based on description of the empirical experience (SG+). Moreover, although references to the more abstract or theoretical generalised perspectives (SG-) in terms of nursing principles of practice, appear present in low scoring papers, this is not linked to journal research papers from academic nursing faculty sources. Consequently, there seems to be a need for low scorers to enter more explicitly into the academic conversation and to attribute academics from the nursing faculty to help to make generalisations (SG-) in their reflections. Without this, the reflection may seem

idiosyncratic, and be assessed negatively because there is no relationship to the 'greater system' (Sharples et al., 2014). Semantic gravity profiling enables the analyst to make these shifts in knowledge structures more visible for novices to guide them.

Additionally, examining the whole text as a structure at a discourse level, the learning over the 2-day clinical placement period was provided as a general and more holistically-oriented learning experience. Being able to cite two or more critical events and to draw a general learning point from these was another characteristic of higher scoring papers. Thus, avoiding gaps in a semantic gravity profile such as the one in Figure 5 with up-escalators seems to be an essential element of valued, high scoring papers. This can be explained as an accumulation of knowledge across contexts and through time (Maton, 2013). It therefore represents cumulative learning (Maton, 2013), which could lead to deeper learning as the right questions and theories become increasingly context-independent (SG-) over time. Therefore, along with an ability to combine diverse levels of knowledge structures, a continuous semantic gravity wave might help lead to achievement. Referencing relations within knowledge by providing novices with semantic gravity profiles could enable them to better understand this essential practice of critical reflective thinking.

These findings are part of the first phase in this longitudinal three-year study. The next is to work with nursing faculty to operationalise this application of semantic gravity from Legitimation Code Theory as part of an assessment rubric. The idea is to develop a pedagogic intervention for student nurses to guide their critical reflections using semantic gravity profiles. Demonstrating to novices the practices of writing valued critical reflections through evidence should help to raise their awareness about what represents a high score for their assignments. But perhaps more importantly, it should give them the greater value of being able to reflect critically, in relation to both theory and practice, on their experiences (and not so much in relation to scoring and grades). Making visible the practices that are valued is essential in these applied disciplines. Thus, this research argues for practices of critical reflection to be based on evidence of sound and valued texts in the disciplines.

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