SIMPL: A framework for designing and facilitating professional development to change classroom practice

● Hedi Baxter Lauffer

The challenge

Understanding the essence of effective teacher professional learning is a complex education challenge. We turn our attention to this challenge because our goal is to identify clearly those qualities shared by teacher professional learning that result in improved classroom practices. Knowing what elements are essential in *quality* professional learning is necessary to inform our efforts in science education improvement. What we do know is that, although continuing professional development (CPD) efforts are growing internationally, typical US and European science classrooms continue to place proportionally greater emphasis on memorisation and procedural knowledge than on coherent understanding of scientific concepts (Resnick & Zurawsky, 2007; Roth, K.J. *et al*, 2006). Research suggests that the problem stems from teachers' professional repertoires remaining too limited to support effectively the type of learning for understanding that is sought by reform efforts (Osborne & Dillon, 2008). Overall, reform-aligned teaching is rare (Tyack & Cuban, 1995; Rutherford, 2005), and researchers with goals for improving the situation continue to probe change-oriented CPD for clues about what constitutes effective teacher professional learning (Borko, 2004).

In response to the less-than-satisfactory effects on classroom practice reported by research on professional development (PD), we are rethinking our approach to designing professional learning opportunities for in-service teachers. During the last seven years, we have been designing, studying, and refining a model for professional learning design that we call the SIMPL approach (Lauffer & Lauffer, 2009), which we discuss at length later in this article. Like our professional development facilitator colleagues, we began our work in school districts' science education reform efforts by turning to the research for guidance about what content and which types of events we should include in the teacher professional learning we planned. The scope of these decisions took on new significance when I began to co-lead the *Science Immersion* project, part of a five-year, 35 million dollar mathematics and science partnership reform effort funded by the National Science Foundation.

Science Immersion was charged with developing and supporting one student-centred science inquiry learning experience at every grade level (K-12) in the project's four urban school districts. In one district partner in the project, supporting a single grade level with science inquiry CPD meant reaching up to 2500 teachers. The stakes were high, and we could not possibly work directly with teachers in these numbers. Instead, we worked with those individuals who provided professional development for teachers: local university educators, district lead teachers, and district administrators who were responsible for in-service teacher training. However, early *Science Immersion* experiences taught us that a 'train the trainers' approach in which a *Science Immersion* facilitator modelled a workshop and then local leaders replicated it led to widely varied CPD learning experiences that lacked coherence. How any given professional development might align (or not align) with the *Science Immersion* vision for inquiry teaching and learning was too unpredictable.

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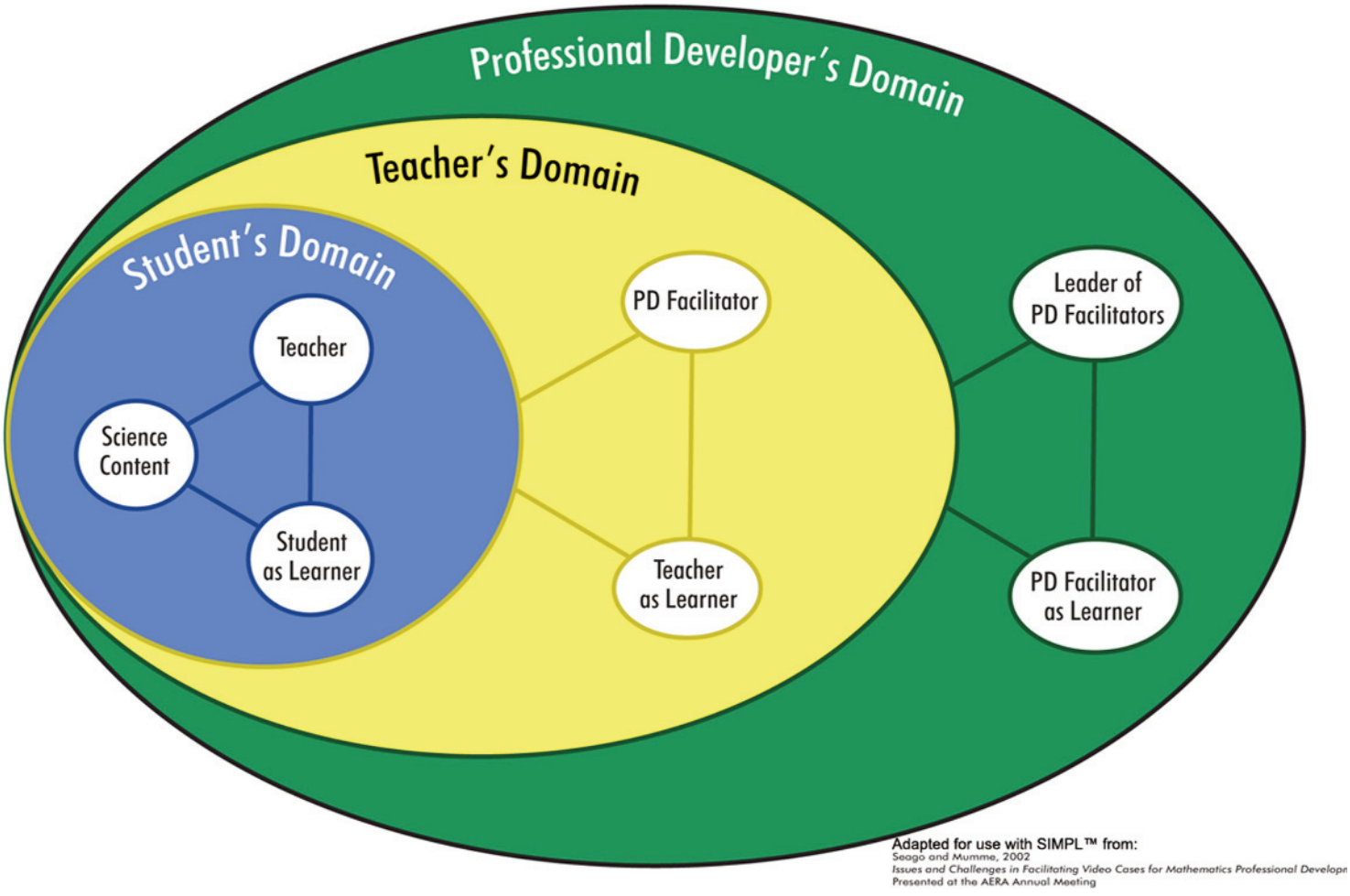
The challenge the *Science Immersion* project faced is common for any education reform effort that is intended to permeate a large-scale system. For solutions, we turned to educational research and our own experiences. We adopted an underpinning model for coherence, adapted from work in maths reform efforts (Ball & Cohen, 2000; Mumme & Seago, 2002; Loucks-Horsley *et al*, 2003) as shown in Figure 1, which places the classroom learning experience that is intended for student learners as the focus 'content' for teacher-learners. Then, the teacher professional development experience (which focuses on student learning experiences) becomes the 'content' for facilitator-learning experiences, building coherence across the system. Thus, the *Science Immersion* vision expanded to include *all* learners throughout the system. Still, we grappled with the practical question: *what can we do to improve CPD experiences to effectively influence classroom practices?*

We have learned from research into effective professional development that teachers need sustained PD (White Rose University Consortium Team, 2005; Holman, 2009). We also know that we need to provide opportunities for teacher-learners to construct understanding of the subject matter they teach (Resnick & Zorawsky, 2005), while giving support for making connections between curriculum standards

Figure 1 The *Science Immersion* underpinning model for system-wide learning coherence



and reform-oriented instructional practice (Keeley, 2005). A meta-analysis of professional development in K–12 mathematics and science conducted by the Council of Chief State School Officers in the USA (CCSSO, 2009) found that the outcomes (change from traditional practice towards practices aligned with standards) were measurable when the programmes included focus on both content knowledge and pedagogy-knowledge (Blank, Alas & Smith, 2008). Additionally, a synthesis of research into the key features shared by effective programmes reveals a list of key qualities that are important to address when planning CPD to positively affect teaching practices (see Figure 2, from Holman 2009).

Current research and resultant analyses address significant aspects of CPD: the programme, the teachers as learners, and the context in which the learning occurs (Borko, 2004). However, while some 'well-specified' CPD projects consider the facilitator's role, the associated research falls short of illuminating how to support this essential role because the teacher-learning experiences in these projects are conducted primarily by the original CPD designers (Borko, 2004). Therefore, what I present here is a theoretical framework for designing CPD that grew out of our iterative work taking *Science Immersion* to scale with a cadre of professional development facilitators. My intention and hope is that our framework, SIMPL, will continue to evolve through its use and revision by facilitators and researchers who share our goal to orchestrate professional learning that improves classroom practices.

In the following text, I begin by describing how the SIMPL framework was developed through sustained reflective practice to address the challenge of designing effective learning environments for teachers. Next, I explain how we used the SIMPL approach to build coherence between the vision for reform-oriented classrooms and teacher professional development learning environments. Then, in the *Implications* section, I offer three examples of how SIMPL can play a role in teacher learning, CPD facilitator learning and reflection on programme design. The SIMPL framework is overarching to the multiple facets of teaching and learning that involve students, teachers and PD facilitators. Addressing all facets is beyond the scope of this paper.

Figure 2 Qualities of Effective CPD (Holman, 2009)

- Relevant to teachers' needs – teaching science to their pupils in their schools
- Sustained
- Collaborative, with teachers working together on shared problems
- Embedded in the culture of the institution
- Continuous throughout the teacher's career
- Involving teachers accumulating, articulating, and communicating professional knowledge

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Rather, what follows is an introduction to the origins and rationale for the SIMPL approach, several instances of how SIMPL has been used and an invitation to reflect on strengthening the quality of CPD that we design, conduct and support.

Addressing the challenge

For teacher-learners to walk away from a CPD experience with deep understanding of the science content and pedagogy that was targeted – *and* be motivated and determined to change their professional practice – requires significant growth in several different learning domains. We design for teachers as learners to develop deep understanding of science content; we aim to support learning student-centred pedagogical approaches for teaching science content; and we seek to influence participants' knowledge and beliefs about teacher and learner roles. With experience, we came to realise that an *ad hoc* approach to addressing these different types of learning in our PD resulted in an inconsistent experience at best and significant confusion or frustration at worst.

As a result, we decided to shift from *implicitly* addressing the targeted learning domains involved in teacher professional learning to designing *explicitly* to address these domains. To accomplish our goal of intentionality, we adapted the learning model approach used by Driver and Scott (1996), Bybee *et al* (2006) and others, to design students' learning experiences, adding a new dimension to support teacher-learners in the different domains needing their attention during PD.
Our learning model explicitly allocates time for teacher-learners to learn in multiple roles – learning science concepts, learning to teach science concepts, and reflecting on practice (Lauffer & Lauffer, 2009).
This model, developed and dubbed SIMPL[1] by Dan Lauffer and me in 2005, grew as a design framework to build coherence between the vision for *students'* science-learning experiences and *teachers'* science-teaching-learning experiences. The hallmark of SIMPL, which sets it apart from instructional models designed for student-learners, is that it is used to apportion specific times for different roles that teacher-learners play during effective professional development (i.e. learning science content, learning about teaching science content, reflecting on teaching practices).

In the SIMPL approach for teacher-learners (Figure 3), participants are engaged in learning *sessions* that are designed with both an intentionally targeted pedagogical learning outcome and a science-content focus. The length of a SIMPL session is typically no less than 60 minutes and no more than one day.

A SIMPL session explicitly moves through a sequence of stages in which participants are facilitated to take on particular roles that pertain to the area of learning that is in the foreground (e.g. learning science concepts in a lesson like students would experience, or learning about teaching students science concepts). The sequential progression, outlined below, is made visible to participants by the facilitator, who displays a SIMPL poster during the PD to make this design element visible to all (Figure 3).

[1] The full title for SIMPL was originally the Science Immersion Model for Professional Learning. Because SIMPL was later used in maths CPD, we renamed SIMPL the SCALE Immersion Model of Professional Learning (SCALE being the overarching project for Science Immersion).

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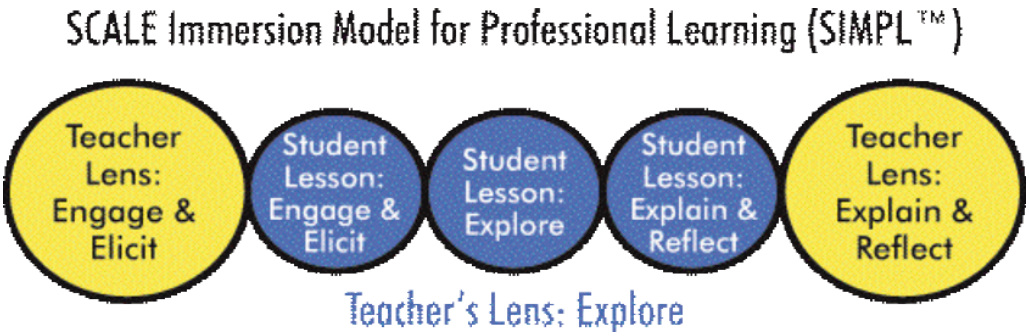
Figure 3 SIMPL approach for teachers as learners



The SIMPL sequence occurs in three stages:

1. Teacher-learners' prior conceptions about the session's primary pedagogical learning outcome are *engaged* from a teacher's perspective (e.g. quick-write or brainstorm chart about a particular aspect of supporting learners, such as supporting students to develop scientific explanations). This is the first segment, commonly referred to as 'the yellow'.

2. Teacher-learners *explore* from a learner's perspective a lesson that was selected because of its relevance to the session's intended pedagogical learning outcome (e.g. they participate in a lesson similar to what we envisage for student-learners; in this example, the content focus could be *the ability to form scientific explanations* or *the scientific explanation for a particular phenomenon*). This segment is commonly referred to as 'the blue' and includes all three *engage, explore, explain* subsegments that are central to the pedagogical approach we want teacher-learners to use in their classroom practices.

   - During this stage of the SIMPL session, participants suspend 'teacher' thinking and questions, experiencing the learning solely from the learner's perspective (frequently learning science content in ways never encountered before).

   - Also during this stage, the facilitator explicitly models the classroom teaching role that is a key aspect of the learning outcome for the SIMPL session.

3. From their common *explore* experience, teacher-learners reflect from a teaching perspective to *explain* the lesson's rationale with regard to the session's intended learning outcome. In other words, teacher-learners now return to the teacher role and examine the lesson they experienced in the learner's role. This is the second teacher-segment, and is also commonly referred to as being 'in the yellow'.

   - Teacher-learners are facilitated during this time to construct an understanding of the intended

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learning outcomes and a rationale for the pedagogical approach modelled in the lesson experienced in 'the blue'.

- Typically, additional resources (e.g. research excerpts or other outside reference materials) are used with a variety of learning strategies during this segment to connect teacher-learners' experiences with educational research.

- This time is intentionally designed for teacher-learners to reflect back on their initial conceptions (from the *engage* experience) and be metacognitive about their own learning of both science content and the pedagogy.

- Because our intention is to facilitate changes in teachers' knowledge and beliefs about teaching and learning, we explicitly employ status constructs from the Conceptual Change Model (Hewson & Lemberger, 2000). We help teachers to discuss if the ideas explored seemed intelligible and plausible; we make time for reflection on how fruitful the lesson was as a learning experience; and we explicitly ask if participants think the modelled approach might be fruitful for their own students' learning.

Coherence and consistency

Designing and facilitating teacher learning to align with those features we know are critical for high-quality CPD requires a skilled professional educator. Coherence between what we envisage for students in the classroom and teachers' experiences in CPD depends primarily on the PD facilitator. A qualified CPD facilitator must understand, plan, and implement experiences that engage a complex interplay of the teachers' knowledge and beliefs about teaching and learning, if the PD is to change classroom practice (Crawford, 2007; Anderson, 2002). It is this *quality* of the CPD facilitation and the facilitator's ability to *challenge* teacher-learners' thinking (i.e. knowledge and beliefs about teaching and learning) that are implicated as the two most influential factors in determining how fruitful a learning experience is perceived to be by teachers (Kibble, 2009). Given their pivotal importance, it is critical that we ask ourselves: *what are we doing to explain what we mean by 'quality facilitation' and to prepare those who facilitate teacher-learners for the complex role they assume?*

It is common practice to select classroom teachers who successfully teach students and grant them the role of teacher-trainer, mentor, or PD facilitator with little or no guidance. We too often provide minimal support for the design and facilitation of CPD, though it is intended to accomplish the challenging goal of effectively transforming teachers' knowledge and abilities with regard to both content and pedagogy. While it makes good sense to recruit CPD facilitators from among exemplary teachers – those who both teach children skillfully and can explain what they do and why it works – we need CPD facilitators with additional skills because *explaining what they do and why it works* is insufficient for transforming teacher – learners' practices. 'Quality facilitation' of CPD is a complicated endeavour. Teacher-learners – like student-learners – need more than demonstration and description for deep learning and change in practice to

occur (Anderson *et al*, 1994; Borko & Putnam, 1996; Carter, 1990). To be effective, facilitators must support teacher-learners to connect their beliefs, reasoning, and knowledge with the changes in practice sought by CPD (Davis, 2003; Feldman, 2000).

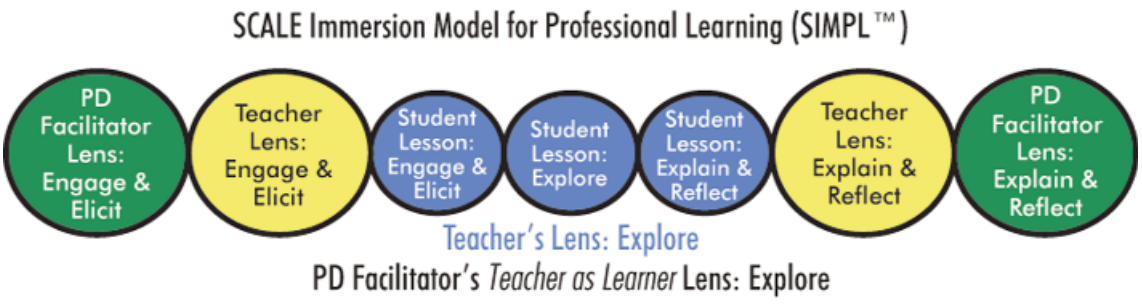
In order to address the need to communicate clear expectations regarding our vision for quality PD facilitation, we developed the SIMPL approach and graphic for facilitators as learners (Lauffer & Lauffer, 2009). Our first experience using SIMPL with facilitator-learners developed when we formed and facilitated a professional development learning community of CPD facilitators in the second-largest school district in the US, Los Angeles Unified School District (LAUSD). This professional group of up to 58 educators met monthly (approximately) for their own learning, and also facilitated the *Science Immersion* CPD for teachers. They helped shape and refine SIMPL, which framed the PD for both facilitator- and teacher-learners (Lauffer & Lauffer, 2009). From extensive experience using and analysing our work with SIMPL, we recommend the following regarding the design and facilitation of quality facilitator-learning environments:

Just as we propose that a critical element in teacher professional learning is the explicit attention to different learning roles, so do we recommend that CPD facilitators need professional learning opportunities to:

- engage prior conceptions about CPD facilitation;
- explore in collaboration with colleagues the various learning domains and key elements involved in facilitating teacher-learners;
- actively construct explanations for relevant content through experiences that model effective facilitation and teacher-learning; and
- explicitly reflect metacognitively on both CPD content and facilitation (pedagogy).

When the SIMPL approach is used to support CPD facilitator-learners, it is extended on both ends to address the facilitators' additional learning domain, the domain in which their role is the facilitation of teacher-learners (see Figure 4).

Figure 4 SIMPL approach for professional development (PD) facilitators as learners



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Coherence is fostered by using the SIMPL framework because the vision – the pedagogical goal for student-learners – is embedded in the professional learning experience for teacher-learners, which is then also embedded in the facilitator-learners' experience. In the 'green' segments of SIMPL for facilitator-learners, there are explicit opportunities for facilitators to engage and develop metacognitive awareness of their knowledge and beliefs about what constitutes *quality* CPD. Through these experiences, facilitators can develop a common understanding of the vision and expectations for CPD, which is central to a particular reform effort.

During SIMPL sessions (for teachers and for facilitators) an arrow is physically moved along the SIMPL poster to indicate which stage of the model is currently engaged. This rather rigid-sounding, linear approach is not intended to undermine the co-construction of the learning environment by all involved or restrict the unpredictable teachable moments that arise. Rather, the facilitator uses the SIMPL poster to establish a norm among participants to foreground and background their various roles. This allows the group to have shared, uninterrupted learning opportunities that are designed explicitly to address these different roles. Through this explicit use of the SIMPL framework, facilitators are supported to ask participants to engage actively as learners from a variety of angles, and the SIMPL poster clearly communicates that background roles will be moved into the foreground at designated times. Thus, teacher- and facilitator-learners can know that putting their teacher or facilitator role concerns aside does not mean they will be ignored. This allows for more freedom to participate actively in the various roles during *all three* segments of the SIMPL sequence.

We find that having clear expectations about making time for teacher-learners to become immersed in one role at a time is particularly important, because there is a strong tendency for teachers who are engaged in a lesson that involves unfamiliar content and/or pedagogy to disengage by critiquing the teaching or procedures of the lesson.

We can anecdotally document from hundreds of hours facilitating teacher-learners that lessons being modelled by facilitators are frequently interrupted by comments such as *'my students couldn't do this'*, or questions about materials and procedures for conducting the lesson. However, using SIMPL, facilitators can redirect these comments respectfully with a statement such as *'that's an interesting question/comment; we're in the blue right now, so please save that for the yellow'.* In this way, SIMPL scaffolds both the facilitator and teacher-learner to stay focused in a particular role, allowing the time needed to develop a common experience with the pedagogical learning outcome that is targeted by the session, before beginning to analyse and explain its rationale.

The explicit use of SIMPL also encourages PD facilitators to plan carefully to include meaningful content in all segments and avoid shortchanging the teacher-role *explain* segment. By calling attention to this important aspect of CPD – the time when teacher-learners are facilitated to examine their knowledge of educational research and best practices, and to reflect on their

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own beliefs about teaching and learning – we set a clear expectation that facilitators need to include this element in their CPD design.

This analysis and reflection aspect of CPD design can be challenging because it involves thoughtful selection of relevant resources to augment the featured lesson. The segment also can demand skillful facilitation of teacher-learners who may be quite resistant to the session's learning outcomes; therefore, inexperienced facilitators may avoid this domain if insufficient guidance is provided. In addition, reflection activities are regarded by some facilitators as 'touchy-feely' and without value. Because SIMPL provides more direction about what needs to be included in the 'yellow' teacher-role segments (e.g. reading and discussing relevant educational research, and reflecting using conceptual change constructs), facilitators have more guidance to plan substantive content and activities, which is better for both learners and facilitators. One final benefit we noted in using SIMPL is the effect on facilitators' redesign choices that are made on the fly during facilitation. CPD sessions are notorious for running longer than the allocated time, and that causes a common problem: cutting the time allowed for processing a CPD lesson experience. Use of the SIMPL poster makes skipping or minimising the teachers' processing time clearly noticeable and tends to encourage facilitators to modify sessions, when necessary, and use creative strategies that leave all segments represented. Overall, we find that using the SIMPL framework helps to cultivate a shared vision for quality facilitation.

Implications

The SIMPL framework for designing and communicating a model for CPD represents a synthesis of strong CPD practices and theories that Dan Lauffer and I gleaned from a wealth of experiences with talented educators. While others have most certainly underpinned teacher and facilitator professional learning with a multi-role vision for learners' experiences (Ball & Cohen, 2000; Mumme & Seago, 2002; Loucks-Horsley *et al*, 2003), SIMPL is a relatively new innovation for enacting and communicating that vision. The SIMPL framework is the result of our ongoing reflective practice designing and facilitating learning environments for teachers and CPD facilitators across the USA.

In the sections that follow, I discuss what we can know from the research on *Science Immersion* about influencing teachers' classroom practices using SIMPL in CPD. Next,

I offer an example of how SIMPL can be an effective approach for building a common vision of CPD among PD facilitators. Then, an example of SIMPL as a research lens in a South African science CPD project is given to demonstrate its use as a tool for reflection.

SIMPL Supporting Teacher Learning

The most mature *Science Immersion* work with SIMPL occurred at the middle school level in LAUSD[2]. In two consecutive years, we used the SIMPL innovation both during sessions for facilitators as learners (preparing to facilitate middle-level *Science Immersion* institutes and CPD) and for all CPD involving teacher-learners. During the 2006/2007 school year, work in grade six

became the subject of an in-depth case study, involving extensive data collection and analysis. Data collected from *Science Immersion* CPD teacher-participants included the following:

- observations in 34 classrooms (two to three observations per classroom for a total of 81 lessons)
- student work samples from 23 classrooms (including 20 of those observed)
- post-implementation survey of science classroom content with all participants
- post-implementation interview with all observed teachers

The research and evaluation team in the Year 5 Report to the National Science Foundation reported initial analyses of these data, and the following list of findings is from the Evaluator's Report (Porter *et al*, 2007). Some of the ways that Grade 6 (plate tectonics) *Science Immersion* CPD affected classroom practices included:

- Teachers reported statistically significant increases in the percent of instructional time students spent (a) discussing data, (b) working in pairs or small groups, and (c) maintaining and reflecting on a portfolio of their own work. Statistically significant decreases were reported in the percentage of instructional time devoted to (1) students listening to teachers presenting material to the class as a whole, and (2) taking tests or quizzes. This represents an increase in active learning, one indicator positively correlated with fidelity of implementation of an immersion approach.
- Classroom observations showed that immersion classrooms were much more characterised by teachers striving to teach for conceptual understanding and engaging students in analytic tasks, than is typically seen in middle school science classrooms in the USA.
- Teacher content coverage patterns shifted in ways consistent with the intent and design of the plate tectonics unit in several important ways, including: (a) increased emphasis on topics in the *nature of science* area, especially engaging students in asking scientifically-oriented questions, using evidence in scientific inquiry, and formulating scientific explanations; and (b) moving instructional emphasis away from *memorisation* as an expectation for student learning and toward *analysis* and *application of knowledge* to real world phenomena.

This preliminary research indicates that a significant increase in the use of inquiry in the classroom occurred for teacher-participants. In addition, the study of teachers who engaged in CPD to learn the Grade 6 inquiry in plate tectonics showed significant gains in content knowledge. Those teacher-learners who scored the lowest on the pre-test of content knowledge attained an equivalent level of knowledge as the more experienced science teachers as a result of institute participation (Osthoff *et al*, 2007). This indicates that the SIMPL approach, which includes time foregrounding conceptions of teaching and learning, did not dilute the science content learning (and may have enhanced it), *and* it influenced the classroom practices towards what was intended.

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SIMPL Supporting Facilitators

Science Immersion's influence on teachers' practices implies that the CPD that was used in preparing facilitators – both in designing the professional learning and facilitating teacher learning – had *qualities* that were effective in changing classroom practices. This is notable because such transformative results are what we seek when the intended outcome for our CPD is to change students' science-learning experiences to involve less memorisation and vocabulary and significantly more conceptual understanding development. While we acknowledge that changing classroom practice through any reform effort requires co-ordinated support from multiple directions, we identify quality CPD facilitation as a critical feature of the *Science Immersion* project that influenced teacher-learners' classroom practices (Lauffer & Lauffer, 2009). Further, we attribute the quality of the facilitation largely to our consistent use of the SIMPL framework (Lauffer & Lauffer, 2009).

SIMPL developed from our need to communicate effectively to both teacher-learners and facilitators what we mean by *quality CPD facilitation*. We used SIMPL with *Science Immersion* CPD facilitators to communicate and build an expectation for coherence between the learning experiences we all envisaged for students and the learning experiences we facilitated for teachers. Over the two years of *Science Immersion* when the professional development facilitators met and co-facilitated CPD, we observed a significant shift in their goals and vision for *quality facilitation* (Lauffer & Lauffer, 2009).

Discussions during our facilitator-learning sessions moved away from an emphasis on teacher-learner activities to more emphasis on teacher-learning outcomes.

Through experience we learned that using SIMPL explicitly with teacher-learners in CPD also created some accountability for facilitators to model effective pedagogy. Further, using SIMPL to guide teacher professional learning design increased facilitators' attention to planning (Lauffer & Lauffer, 2009). Designing CPD with SIMPL helped to build appreciation for and commitment to scheduling time for participants to reflect on their conceptions of teaching and learning and actively consider how CPD experiences could change their classroom practices.

In one of our final meetings for facilitator-learners, we began developing a set of SIMPL-aligned criteria for quality CPD (see Figure 5). The purpose of this document was to communicate to others (e.g. administrators, new CPD facilitators, and potential partners) the group's expectations for CPD design and facilitation.

This level of PD analysis surfaced because of the shared vision for and commitment to quality CPD that grew among facilitators who were using the SIMPL framework. We cite this draft of the group's work as early evidence that the intentional use of SIMPL to frame CPD supported professional learning among facilitators and articulated coherence. Even more important than what is represented in this written document is what we observed over the course of the *Science Immersion* project: a significant

[2] *Science Immersion* was a project within a large mathematics and science partnership grant for System wide Change for All Learners and Educators (SCALE), which was funded by the National Science Foundation

transformation in PD facilitation practices district-wide. Expectations elevated significantly for both facilitators and CPD participants, and the rigour increased as CPD designers began to address teacher-learners' multiple roles.

SIMPL Supporting Reflective Practice

In addition to framing CPD design and facilitation, SIMPL is being used retrospectively to analyse a teacher education programme in South Africa. The programme was designed to facilitate

Figure 5 Draft criteria developed to describe quality professional development

- Participant concerns appropriately aligned with learning outcomes
  - Concerns are anticipated, using the Concerns Based Adoption Model as a guide.
- Science content learning embedded
  - Opportunities to develop understanding of the lesson's content and appropriate additional content/context, to be well prepared to facilitate effective learning by students with diverse needs.
- Knowledge and beliefs about teaching and learning addressed explicitly
  - Opportunities to become familiar with the learning research and standards underpinning the pedagogy and conceptual flow embedded in the instructional materials and modeled in the professional development.
  - Sufficient time is allocated for eliciting, building upon, making connections with, and sharing learning that is grounded in participants' prior experiences and expertise.
  - Explicit opportunities are given for metacognitive awareness about both content and pedagogy learning.
- Intentionally modeling and reflecting on pedagogical approaches
  - Support for understanding and for having the ability to conduct and teach students through engaging in scientific inquiry.
  - The *Engage—>Explore—>Explain* teaching and learning paradigm shift made explicit.
  - Sufficient time given to reflect on how the intended teaching strategies in the instructional materials (and the rationale underpinning them) can work in participants' own classroom contexts.
- Participants' expertise honored; time given for problem solving and developing implementation strategies and collegial professional learning.

prospective science teachers' learning to teach argumentation as a particular form of critical thinking (Zohar, 2008), a designated learning outcome in the national curricular goals of the country (Department of Education, 2002). Using SIMPL as a framework for reflection led to fruitful discussions about how best to differentiate conversations in each of the different roles involved when facilitating teacher-learners. SIMPL is being used in this case as a lens through which the programme is being analysed to identify where the learning experiences bring clarity (or perhaps confusion) to teacher-learners' roles (Hewson *et al*, *in preparation*).

Conclusion

In our work with educators, SIMPL has become an integral strategy that is used during CPD facilitation to support educators from multiple perspectives. We use SIMPL to guide and communicate our expectations for quality learning design and facilitation, and SIMPL is being employed effectively as a PD analysis framework. In all cases – learners learning science, teachers learning to teach science, and PD facilitators learning to facilitate teacher-learning – we find that using an explicit learning framework to underpin professional learning is a valuable approach for making the inner workings of CPD visible to teachers, facilitators, and researchers. Our experiences suggest that explicitly using a learning framework to plan and facilitate CPD results in a high percentage of teacher-participants changing their roles by adopting and implementing reform-oriented classroom practices.

Both anecdotal evidence and the initial results from research on teacher- and facilitator-learning with the SIMPL approach are promising. However, these are entry points; we need greater understanding of other factors in professional learning that affect the likelihood of changing teachers' classroom practice, and there is much more to understand about the elements *within* the SIMPL framework that are particularly important for supporting change. This leads us to advocate for additional research into how CPD can better reach teacher-learners and result in their 'walking the talk' that is envisaged by education-improvement efforts.

Special thanks to Peter Hewson for his contributions to the evolution of the SIMPL framework.

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