School Policy and Information Management

Design principles for effective teacher professional learning

Teacher professional learning, by definition, consists of learning undertaken by a teacher to gain insight into and knowledge of their craft. The potential for teacher professional learning lies in the fostering of new ways of thinking about content and new approaches to teaching that will substantially impact on student achievement over a sustained period of time. Changes in teaching practice and improved student achievement need to be observed, measured and correlated.

In implementing changed practice, teachers need to acquire new knowledge, modify their existing beliefs and attitudes in relation to their teaching, modify pedagogical practice and sustain that change over time. This change in teaching practice needs to correlate strongly with the improvement of specified student outcomes.

If teacher professional learning is to be judged as effective, there needs to be a set of common criteria against which such a judgement can be made. Research over the past 15 years has reached a consensus for five key areas that are important in the design and delivery of effective teacher professional learning that can lead to improved student outcomes. The research also identifies important contextual factors and facilitators that provide the necessary conditions in schools to promote improved student outcomes through changes in teacher practice.

This paper summarises the key ideas and provides suggestions for optimising the design of professional learning. Additional suggestions are made for designers of e-learning. It is interesting to note that studies comparing online learning to face-to-face learning find no significant difference between the effectiveness of the two. There are good and bad examples of professional learning practice regardless of the medium. It is the quality of the teaching that matters most. It is also important to choose the learning medium most appropriate to the audience and the circumstances.

1. ***Content focus***

   Research suggests content focus may be ***the most influential of the key areas.*** A compilation of research evidence identifies the link between professional learning that focuses on subject matter content and how students learn that content with increases in teacher knowledge and skills, improvements in practice, and, to a more limited extent, increases in student achievement.

   Content is broadly defined as:
   - subject matter content and ways to teach that content
   - knowledge about students and how they learn
   - pedagogical content knowledge (including how to correct misconceptions)

When designing teacher professional learning the following questions should be addressed:

- Is the content well-researched?
- What is the current research for how students learn this content?
- Does the course focus on pedagogy as well as content?
- Is the teaching methodology used proven to be effective?
- Is the content suitable for the target audience?
- What are common misconceptions held by teachers/students in this area? (e.g. when teaching multiplication how do you overcome the misconception that multiplication always results in a bigger number)

What are the implications when delivery is by e-learning?

The extensive use of multimedia works best for novices. More experienced learners (experts) are able to create their own mental maps/models/images so they don't require as much structure from words and graphics. It may well be that specific instructional supports that assist low- knowledge learners may not help (or may even hinder) high-knowledge learners.

The key message is know your audience prior to engaging in the design process and tailor the e-learning accordingly. Try to match the sophistication levels of the lesson and the learner. Teachers can be classified as novices with unfamiliar content. If you are working in their areas of expertise then you should assume they are experienced learners and tailor the e-learning accordingly.

It is most important to keep the lesson uncluttered. You should avoid adding material that does not support the instructional goal. You may be tempted to embellish lessons in an effort to motivate learners. For example, in order to counter high e-learning dropout rates, some designers attempt to spice up their materials by adding entertaining or motivational elements such as dramatic stories, pictures, or background music. This should be avoided. Dewey (1913: 11–12) warned that "when things have to be made interesting, it is because interest itself is wanting".

Following are specific design elements for content presentation.

- The learning needs to be focussed on outcomes and not overload the learner with virtual worlds, games and social media.
- Avoid irrelevant videos, animations, music, stories and extended narration.
- Information is encoded and remembered better when it is delivered in multiple nodes than when delivered in a single node. i.e. animation + narration is better than narration only. Text + illustration is better than text alone.
- Learning is facilitated when the graphics and the text work together to communicate the instructional message. The text needs to be integrated with the graphic and not separated on the screen or kept in a separate screen or popup.
- Excessive reliance on text defeats the purpose of multimedia presentations. Avoid large slabs of text and integrate appropriate multimedia elements that assist the learning.
- In general, static illustrations plus integrated text is more effective because it allows for active processing, e.g. learning a sequence of events in separate frames or web pages as opposed to an animation of the whole process: learners have to mentally animate each frame and form linkages. When this is done for them in an animation they tend to become passive learners and do not form new concepts themselves.

2. *Active learning*

Active teacher professional learning includes:

- observing expert teachers or being observed, followed by interactive feedback and discussion
- collaboratively reviewing student work
- leading discussions and participating in online forums incorporated into the professional learning activities
- working with other teachers to design lessons and assessment tasks as well as participating in peer teaching

When designing teacher professional learning the following questions should be addressed:

- What opportunities are provided for active learning in the course design?
- Are there IT solutions available that can be employed to encourage active learning (e.g. blogs, wikis, moodle)?

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- Is there technology available that can be employed to encourage collaboration and sharing of ideas? Examples include establishing wikis, blogs, forums, discussion groups and file sharing ability
- Use videoconferencing and interactive whiteboards as well as desktop sharing software like *Bridgit* to connect the learning of geographically separated groups

3. *Coherence*

For teacher professional learning to be successful, its content focus needs to be:

- consistent with teachers' knowledge and beliefs
- supported systemically i.e. policy and/or funding support at commonwealth, state, regional and/or school level
- supported by school leaders

Changes in teaching practice to improve specific student learning outcomes require:

- professional learning integrated into classroom practice and reflected in the school plan with the impact on student learning outcomes monitored by school improvement targets
- time and support for teachers in the classroom
- effective mentoring
- allocation of resources to support teacher practice

When designing teacher professional learning the following questions should be addressed:

- What are the needs of participants?
- Are the strategies and structures in place to support the implementation in the classroom? (e.g. mentoring, action learning, reflective conversation)

- Are the content and pedagogy proposed consistent with the participants' ideas and beliefs about good classroom practice? How would this be determined?
- Is the course or program well supported by school leaders
- Is the professional learning strategy linked to school improvement targets in the school plan?
- How is the impact of professional learning measured and monitored?
- Can the professional learning be readily implemented into current practice?

What are the implications when delivery is by e-learning?

Participants can be expected to be working in a variety of locations where the collective work practices may be different. It may be difficult to determine if the course material will be consistent with their ideas and beliefs. It is very important to engage the learner. Some suggestions include:

- an initial survey tool to determine the background of the learner
- designing the course material so that there are tailored modules that can be contextualised for the learner
- different levels of practice exercises for different levels of expertise
- asking questions about the relevance of the course material to their specific school environment
- using narration in preference to textual explanation. The narration should be personal and engaging
- the use of agents (avatars) and/or narration where the approach is less formal and more conversational has been shown to improve outcomes
- using second person active voice engages the learner in a "conversation" even though the computer is incapable of this
- recognition that people learn better from a human voice than a machine voice (female voice is favoured)
- on-screen agents that are polite, e.g. Not "Click the enter key" but "Do you want to click the enter key?"
- avatars need human-like gestures so they engage learners as conversational partners (realistic human-like behaviours). They must also sound real
- making the author visible. Can we hear the "voice" of the author? If we can then this increases the human to human interaction and increases motivation

Consider your audience and the cognitive consequences. Write with sufficient informality so that the learners feel they are interacting with a conversational partner but not so informally that the learner is distracted or the material is undermined.

4. *Duration*

Research supports professional learning activities that are spread over at least a semester and include 20 hours or more of contact time with the course facilitator(s). It takes time to apply new knowledge to practice, reflect on responses from students and colleagues and revise the approach to suit the local context. Short professional learning activities may be useful in providing teachers with new information but further follow-up is necessary for significant

change to teachers' practices and beliefs for improvement in student achievement to occur.

When designing teacher professional learning the following questions should be addressed:

- Is there sufficient contact time built into the course for professional learning to impact on teaching practice?
- Is the content and method of presentation of sufficient interest to keep teachers engaged in a process for an extended period of time?
- Does the course design include the requirement for teachers to apply new knowledge and skills in the classroom?
- Does the course incorporate classroom experience as a component of the professional learning?

What are the implications when delivery is by e-learning?

The advantage that e-learning provides is the ability for the learner to engage in practice exercises that can be made available when required and tailored to their ability level. A well designed practice session will also include constructive feedback. In summary:

- add sufficient practice interactions to achieve the learning goal(s)
- ensure that the practice elements are placed and spaced logically within the learning
- practice exercises should be distributed and mixed among the learning events, not a separate section at the end
- mirror the practice within the context of the workplace
- provide effective feedback. Explanatory feedback is better than corrective feedback

Tips for feedback

- feedback should focus learner attention to the task and minimise responses that learners will perceive as feedback on themselves
- after the learner responds to a question, provide feedback that tells the learner whether the answer is correct or incorrect and provide a succinct explanation
- focus the explanation in the feedback on either the task itself or on the process involved in completing the task
- avoid feedback such as "Well done!" that draws attention to the ego and away from the learning
- likewise, avoid normative feedback such as grades that encourage learners to compare themselves with others
- emphasise progress feedback in which attention is focused on improvement over time
- position the feedback so that the learner can see the question, his or her response to the question and the feedback in close physical approximation to minimise split attention
- provide step-by-step feedback for multi-step problems for which steps are interdependent
- for a question with multiple answers, show the correct answers next to the learner's answers and include an explanation for the correct answers

5. Collective participation

Collective participation:

- reflects a number of cognitive theories for teaching and learning: situated cognition, cognitive apprenticeship and social constructivism
- involves the gathering of teachers with a common purpose e.g. same school, grade level, subject specialty
- includes the formation of professional learning communities

Professional learning that occurs in a school with a group of staff reinforces the school's culture, values, beliefs and policies.

When designing teacher professional learning the following questions should be addressed:

- What does current research tell us about the implementation of a professional learning community?
- Does the course design involve the formation of a professional learning community – either a group of teachers from the same school or a cluster of teachers?
- Does the course design provide the opportunity for experts to interact with the professional learning community to ensure support for changes in teachers' practice in their classrooms?

What are the implications when delivery is by e-learning?

Computer Supported Collaborative Learning - CSCL

Learning together in a virtual environment has been widely studied over an extended time period. However, effective collaborative learning principles are not easy to generalise to all situations. While there is still much to discover about CSCL, there are some enablers that can be used in planning e-learning that have been demonstrated to produce positive outcomes:

- ensure social interdependence through assignments that are of sufficient complexity to engage each group member
- provide incentives that reward people not just for their own learning but for the learning of all team members
- assign ill-structured case problems. Problems that have a single solution will not generate the discussion and controversy required to engage each member
- groups should be heterogeneous in nature and composed of three to five members
- use guided collaborative assignments such as structured controversy
- provide clear guidelines, roles, and objectives for team processes
- ensure there is sufficient time to support team discussions and production of an authentic outcome
- there needs to be some element of asynchronous work (offline) to allow time for application, reflection and individual research

- ensure that evaluation of student work reflects the accomplishments of each member of the team
- quality of collaborative dialogue (There needs to be substantive contributions from all parties with no participant ignored. The formation/organisation of participants into small groups to “work together” is not sufficient. There needs to be monitoring of the dialogue to ensure that the contributions for each team member are thoughtful and engaged with the task and other participants. This process can fail if it resorts to each team member telling the others what they know.)

CSCL works best with ill-structured problems (those that have multiple possible solutions or pathways). This can be explored through the use of structured controversy where teams are required to prepare opposing arguments and the use of social media such as a wiki can be employed to collate the arguments. Synchronous discussions can be used to allow team members time to discuss in real time.

6. Contextual factors

For professional learning initiatives to be successful in translating into improved teacher practice resulting in improved student outcomes, they need to be responsive to local factors that impact on teaching and learning.

The three key factors that need to be considered when designing and delivering professional learning are strongly tied to the key area of coherence and are:

1. Teacher characteristics: Prior experiences of teachers can change the way that they approach new learning. For example, new teachers may be more open to learning new teaching techniques than more experienced teachers. Teachers with greater depth of content knowledge will benefit more from certain types of professional learning than those with less expertise. It is important for all teachers to see that proposed changes to their teaching practice will make a difference to improving student outcomes and that they can directly observe these improvements in the classroom.

2. Student characteristics: How effective changed teacher practice is on improving student outcomes depends on the receptiveness of students to the changes. To maximise student receptiveness, teachers must be responsive to students' cultural knowledge and academic and social strengths. It is important that teachers have opportunities to practise new techniques in their school and classroom. The new content and/or instructional practice needs to closely match the learning environment and the characteristics of the students being taught.

3. Local curriculum: Schools and teachers adapt the curriculum to meet local needs of students and the community. Teachers will more likely change their practice if they can see how it directly relates to the content they teach in their local context.

7. Contextual facilitators

Hochberg and Desimone (2010) have identified three local facilitators within schools that can positively influence the effect of professional learning in changing teaching practice and beliefs leading to improved student outcomes. They are:

1. Trust: Changing teaching practices in a school rely on teachers recognising that the changes will be more effective than their current practice. In doing this, teachers may experience heightened vulnerability about their performance e.g. national testing results and the importance that those results can assume in relation to their everyday practice. Mutual trust is a key enabler for collaborative and supportive practices and for necessary innovation by the teacher to implement change within the school and classroom. The absence of trust can lead to teachers feeling isolated and/or not supported.

2. Effective leadership: Effective instructional leaders promote a clarity and commitment to school goals and motivate teachers to participate in professional learning that will lead to improved teaching practice. They encourage the formation of learning communities within the school, create a positive learning environment, provide necessary support for teachers to implement changed practice in their classroom and give constructive feedback.

3. Staff collegiality: The effectiveness and longevity of professional learning communities within or across schools depend on the professional culture within which teachers work. Collaborative professional cultures enable teachers to address challenges particular to their school contexts and the students they teach. Teachers need to be willing to collaborate, be actively engaged and embrace new thinking about content and instructional practices.

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