

1.4.4 Teachers' Ownership: What Is it and How Is it Developed?

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Introduction

In recent years, science curriculum developers realized that one of the key factors regarding the effective implementation of science curricula is the involvement of the teachers in the process of designing and active development of the various learning materials (Bennet et al., 2006; Rannikmae, 2005; Ogborn, 2002). Ogborn in the UK for example in his essay regarding involvement of teachers in an innovation, concluded that:

“One of the strongest conclusions to come out of decades of studies of the success and failure of a wide variety of curriculum innovations is that innovations succeeded when teachers feel a sense of ownership of the innovation: that it belongs to them and is not simply imposed on them. This lesson is hardest to learn in countries with a centralized curriculum” (pp. 144).

This curricular approach is fondly called the Bottom-up approach as opposed to the traditional Top-down approach (Blonder, Mamlok-Naaman & Hofstein, 2008) that prevailed for many years in the western countries, e.g. the 1960s' and early 1970s' in the USA (The Golden age of curriculum development) and the UK (Nuffield projects).

Based on a long-term study conducted in Estonia, Rannikmae (2005) investigated the development of ownership among chemistry teachers. She wrote:

“The potential for developing social issue based-students participatory, supplementary teaching materials by teachers and seeking

teachers' feedback that involves both conceptual and values education has been considered as an essential component of teacher ownership. Teacher ownership of STL teaching was defined as the phenomenon of adaptation of everyday teaching by the teacher, accordingly to the STL philosophy.

Irrespective of the type of ownership most teachers, during the intervention, developed a more advanced perception regarding their role as facilitators of learning. The teachers increased their confidence to teach science (chemistry) in a student centered manner. They appreciated the students' motivational feedback, collected through the essay type answers after lessons where the materials developed by the teacher, were used.”

Similar findings were found regarding development of ownership in the process of adaptation of several PARSEL modules in Israel. Blonder et al., (2008) wrote that:

“The “bottom-up” approach helped the teachers to align their teaching with the philosophy and the teaching style of the PARSEL project. At the same time, the teachers adopted the modules to their own needs, their schools, and their students, and maintained their own professional identity. Each phase in the adaptation process increased the teacher's ownership towards the PARSEL project and its unique value aided in forming the modules before the teachers met the Israeli students.”

To sum-up this section, it is fair to claim that the involvement of teachers in the curricular process is a promising way to ensure effective implementation of new teaching and learning innovations (Mamlok-Naaman, Hofstein & Penick, 2007).



Developing teachers' ownership in a CPD program

It is suggested that in order to develop a sense of ownership among teachers, it is vital to develop the teachers as learners and as practitioners in their classroom. In other words, the goal should be to equip the teachers with the relevant content knowledge (in PROFILES context the scientific content and its related social applications) and the aligned PCK (pedagogical content knowledge).

These two developments, namely the teacher as learner and the teacher as teacher, are the two initial and basic components in the Four Stage CPD Model (See Figure 1) that is used in the PROFILES project.

It is suggested that the 3rd stage, namely the teacher as a reflective practitioner, is the initial stage in which sense of ownership starts to be developed in the teacher's mind.

In addition, this stage is the foundation stage for further development leadership oriented characteristics and behaviors (Hofstein, Carmi, & Ben-Zvi, 2003).

The development of ownership among science teachers during the PROFILES workshops

In the PROFILES project teachers are involved in a CPD oriented workshop. This includes face to face meetings on line discussions. The various PROFILES partners adopt varied-types of professional development models that differ in the degree of teachers' active involvement.

However, the CPD approach provides the teachers with ample opportunities for reflection on their experiences regarding the adaptation, development, and implementation of the PARSEL oriented (now PROFILES) modules.

Ideally the workshop provides (or should provide) a platform for reflection (and feedback) for the teachers.

The feedback is provided by the other teachers as well as by the professional development providers (leading teachers).

In addition to the ability to reflect on their practice, we have observed (and identified) other variables that indicate development of a sense of ownership namely (these are only examples):

- The willingness to involve other teachers in school in the project
- The willingness to identify socio-scientific issues (to be developed) that has a local characteristics (e.g. an environmental-type issue) looking for a relevant issue.
- Identifying themselves with the project (development and implementation).
- Identifying one self with the newsletter (published on the web)
- Involving the principle in the project (stakeholders).
- Telling your students that you were involved in the development or adaptation of the module.
- The dissemination of modules among peers.
- Teachers make an attempt to bring items (artifacts) that eventually will provide evidence for their classroom behavior and practice.
- When teachers perceive that the topic or

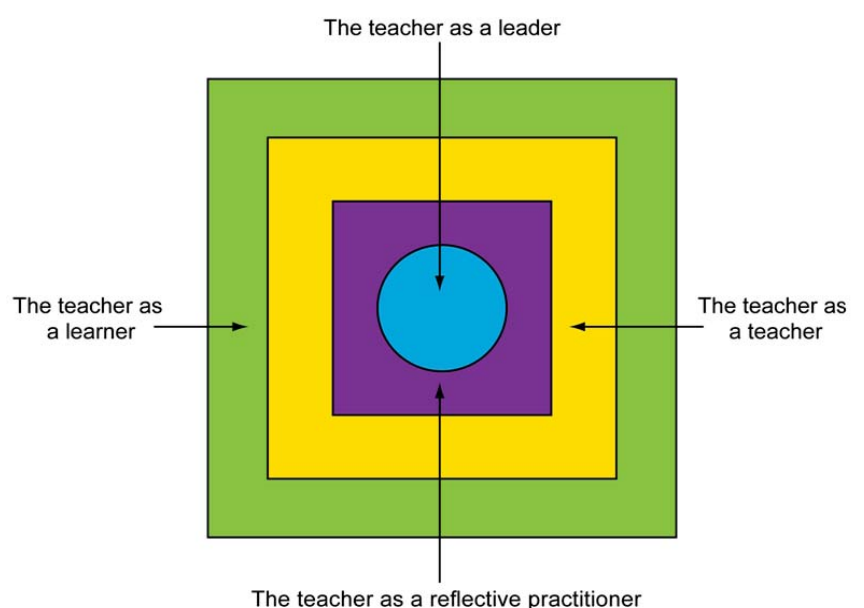


Figure 1. The Four Stage CPD Model

issue taught is relevant to his/her classroom (the nature of the students).

- When teachers decide to make changes, alternations, and amendment to the original module (based on their reflection).
- Willingness to serve as leaders in the 2nd year CPD program (2012 - 2013 academic year).

In the beginning of this working paper we wrote that there are professional development models that are more effective in regarding the development of ownership and those that are less effective. Based on several years of experience with CPD we came to conclude that the most effective models are:

1. *The teacher as a curriculum developer*: In which the teacher is intensively involved in the various curriculum development stages.
2. *Action research*: In which the teacher in collaboration with science educators researches his/her own class.
3. *Focus groups*: In which the teacher collaborates with other teachers as a community of practice.

These are teacher-centered approaches in which he/she is in control regarding content, pedagogy and implementation.

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