

Ascertaining what Grade 8 Natural Sciences learners already know: a starting point for meaningful learning

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Abstract

Science classrooms are places where learners are taught to understand the world we live in. Having lived in and experienced the world, grade 8 learners enter the science classroom with some knowledge of this world. From a sociocultural perspective, if learners are to make sense of new concepts, using the tools of language, learners must link what they already know, to new concepts. However, this is not easily achieved, as learners come to class with a myriad of ways of understanding science concepts. My study explored how four teachers, working in a suburban high school in Gauteng, interacted with learner prior knowledge (LPK) over two years when teachers taught the topics effects of electric current and light, to 13 and 14 year old learners in grade 8.

Working within an interpretivist research paradigm, my qualitative study used an action research design, to investigate, how do interactions concerned with exploring LPK change, as teachers participate in a professional learning community (PLC) focused on encouraging learners to make their knowledge explicit? Data collection methods included using semi-structured interviews, video recordings of lessons, and audio recordings of lessons and PLC meetings. Recordings from lessons were analysed using Mortimer and Scott's framework: analysing meaning making interactions in science classrooms, particularly the pattern of interaction that happened and the communicative approach teachers used. Pimental and Mc Neill's coding schemes were used to code learner responses and teacher moves.

Initially teachers interacted with LPK, mostly from formal instruction. None of the teachers planned activities to challenge alternative conceptions learners have. When interacting with LPK in their baseline lessons, teachers tended to use the triadic IRE pattern of interaction. Questions (I) were of low order, learners would respond (R) in single words or phrases, and the teacher evaluated (E) the learner response. The interactive authoritative communicative approach was preferred by teachers when interacting with LPK.

It was during PLC meetings that teachers reflected on their shared experiences. Teachers became aware of the prevalence of IRE interactions, the low order questions they asked, and developed activities to challenge possible alternative conceptions learners may have. Teachers started asking higher order questions. Interactions with learners included more IRPRE interactions, where the teacher would initiate an interaction asking a question (I), a learner world respond (R), the teacher would then either 'probe' the same learner or ask a classmate in a 'toss -back' move to explain their meaning. However, when learners went off task, teachers opted to either shut down the interaction or revert to an IRE pattern of interaction. More instances of teachers including an interactive dialogic communicative approach occurred.

The study confirms the value of sustained school-based support for teacher uptake of interventions. Effective professional learning occurs when the intervention considers the context of the teachers and learners, what the teacher knows and that teachers are provided a safe space where they can discuss challenges and solve problems. Participation in PLC meetings was a factor that influenced the way teachers interacted with LPK. The role of the leader in the PLC became evident, as they created a safe space for teachers to participate in discussions. Results showed as teachers attended more meetings, so their participation and the level of their reflection increased. The importance of identifying teachers to lead PLCs that could use an action research design to solve context-specific problems is highlighted.

Key Words:

Learner prior knowledge, patterns of interaction, professional learning community, reflection