Abstract

Pedagogically, it is important to know what an explanation in itself can be understood to be. It is also useful for the mathematics teacher to have explicit guiding principles that are constitutive criteria of an explanation and acts of explaining. I set out on this study to first find theoretically the constitutive criteria of an explanation, and acts of explaining and secondly to empirically apply the constitutive criteria using data from the course, Wits Maths Connect Secondary Professional Development (WMCS PD), and teachers' practices. A conceptual separation between explanation and acts of explaining was adopted from the philosophical literature, where I used Ruben's (1992) interpretation of Aristotle's four criteria of explanation. I then mobilised the PD and mathematics education literature in order to particularise and re-describe the criteria for an algebraic expressions mathematics education focus. The separation between explanation and acts of explaining served as an organisational structure through which I then read and engaged with the literature. In this methodology, the four criteria of explanation were then operationalised by translating them from four criteria into 8 codes for explanation. These were matter (M1 and M2), form (F1 and F2), process (P1 and P2) and goal (G1 and G2). I found that the course distinguished between *what* and *how* explanations with a possibility of *why* and *when* attachments for both types of explanations. Criteria transmitted by the course for acts of explaining were examples and their representations, as well as language which I coded as Rx and Rn respectively. I found from the classroom data that there were communicative techniques which I classified as acts of explaining such as re-voicing Rv, finishing teachers' sentence Rf, gestures Rt, chorusing Rc, and evaluating Re. There was regulative talk in the classroom which I coded as Rg. The dominant and most privileged criteria of explanation in teachers' practices were the reading of constitutive elements (M1) and process (P1). For acts of explaining the dominant criteria were regulation (Rg) and re-voicing (Re). I concluded that there is merit in having the analytic separation between criteria for explanation, and acts of explaining. The implication the findings had for PD was that more attention ought to be focused on criteria for explanation and acts of explaining as well as effective ways of communicating and transmitting these to teachers. The interpretation I made about the findings was that poor learner performances are linked to the most dominant criteria of explanation transmitted by teachers.

Key words: Explanation, Acts of explaining, Criteria, Algebraic expressions