

COMMUNICATIVE ACCOUNT OF SEEMING CONFLICTS WITHIN STUDENTS' DISCOURSES: THE CASE OF “ $\sqrt{\quad}$ ”

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Research has been interested in the learning and teaching of roots. In Kontorovich (2019), I explored the unconventional ways in which mature students in a bridging course extracted square roots from squared numbers and parametric expressions. My analysis concentrated on the unconventionality and internal conflicts between students' responses in a questionnaire. In this communication, I revisit this analysis aiming to provide a theoretical account for what may appear as conflicts within students' mathematical discourses.

The commognitive framework argues that communication is a patterned and rule-driven endeavor, which allows people to be efficient in situations that they consider as similar. Lavie et al. (2019) explain one's capability to act in a new situation by harking back to *precedents* that this person views as sufficiently similar to the present one. Identifying relevant precedents occurs within one's *precedent-search-space*. This notion can be further deconstructed into internally consistent *precedent pockets*.

In the questionnaire, when the radicands were presented as perfect squares, Anna copy-pasted the prompt preceding it with the ‘ \pm ’-symbol and responded with two opposite roots encapsulated under the ‘ \pm ’ (e.g., “ $\pm\sqrt{169} = \pm 13$ ”). When the radicands appeared in a squared form, she started with converting the radical to the power of half, followed by reducing the powers to 1, and concluded with the initially squared input (e.g., “ $\sqrt{11^2} = (11^2)^{\frac{1}{2}} = 11^1 = 11$ ”). To an algebraically-versed observer, Anna's procedures and results may appear conflicting. However, I suggest that she resorted to (at least) two *incommensurable* pockets of precedents: one involving perfect squares and one with squared radicands. It is possible, then, that each prompt was compared to the relevant pocket and entailed different actions. Within this account, claiming the existence of conflicts between actions that Anna employed in situations that she saw as different, would be like arguing that having different breakfasts on the weekdays and the weekends creates a contradiction.

References

- Kontorovich, I. (2019). What can be more challenging than square-rooting from squared things? In *Proceedings of the 42th Annual Conference of the Mathematics Education Research Group of Australasia* (pp. 412–419). Perth, Australia: MERGA.
- Lavie, I., Steiner, A., & Sfard, A. (2019). Routines we live by: From ritual to exploration. *Educational Studies in Mathematics*, 101, 153–176.