Qeios

Peer Review

Review of: "Type Declarations and Typed Substitution in School Algebra"

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The paper is well-motivated and fairly easy to read. The issues and unclarities which the author mentions and is concerned about abound in educational texts on elementary arithmetic. Nevertheless, it is not easy to understand what precisely is the novelty of the proposal. The table on p 13 is clear, and so is the distinction of three levels in 7.2 and the distinction of task formats in 7.3. The latter package of “guidelines,” taken together, provides a reasonably clear-cut process/method for reliably deciding in which cases substitution of a by b in P(a) will preserve truth. These guidelines also clarify in which cases mistakes might be made. It would already be formidable progress if such guidelines were made explicit, in an informal manner, in educational texts and approaches. Perhaps the author can pay attention to the novelty of his phrasing of said guidelines. I cannot help feeling that the manifest clarity of this package of guidelines is in part obscured rather than clarified by the application of logic and type theory in the paper. As I understand the paper, according to the author, these guidelines do not sufficiently speak for themselves and are in need of a fundamental justification, which, as far as I can see, can be given along the lines proposed in the paper. What I missed, but that may be my fault (and this is why my marking is not higher), is an example that decisively illustrates why having the machinery of typing and the distinction between various judgments is an advantage and how that machinery will in practice be a tool which students and their teachers may need, or in any case may make profitable use of. There is another aspect which comes to mind and which may be commented on by the author. Introducing formal notations for environments, type inference, types, and corresponding semantic domains introduces a lot of complications, each of which requires further explanation. Is it possible to introduce the turnstile without mentioning a logic? Is it possible to mention satisfaction in an interpretation without providing a basic course in model theory? As I understand the proposal, the author expects that a sketchy introduction of type theory and semantics solves more questions than it creates. A competing approach might be to work out in detail the best phrasing of the package of guidelines discussed above.

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Declarations

Potential competing interests: I am working on similar issues, in particular I have a focus on the concept (and ambiguity) of "fraction" a theme which is quite related to the paper under review, though I am approaching the issue with other methods.

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