An evaluation of the drawings in a new South African textbook for science and technology: a large scale comparison of the assessment responses of different cultural groups

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The purposes of this study were:

1. to investigate learners’ and teachers’ perceptions and evaluations of 40 illustrations in a new South African school textbook for Natural Science and Technology, and
2. to compare assessments of the illustrations made by different groups of users, e.g. by classes in advantaged and disadvantaged schools; learners speaking different home languages; learners of different grade levels; biology teachers compared with biology learners; and so on.

Firstly, repeated null hypotheses were used to test each dependent variable against each independent variable. These were:

1. That, when rating the quality of a given testbook illustration, no significant differences would occur between the expressed levels of satisfaction of two given samples of respondents (e.g. the disadvantaged and advantaged learners; the grade 8 and grade 9 learners; the high school and primary school teachers; and the science learners and the science teachers).
2. that there would be no significant differences between samples of respondents in their frequencies of choices of most favoured and least favoured illustrations.
3. That there would be no significant differences between samples of respondents in their frequencies of yes/no choices of a particular illustration.
4. That there would be no significant differences between samples of respondents in the frequencies of their right and wrong answers for each of two selected illustrations (perlemoen and fly).
5. That there would be no significant differences between samples of respondents in the frequencies of their “well drawn/poorly drawn” assessments for each of the two selected illustrations of the fly and perlemoen.

To test the hypotheses, the study used samples of 1100 disadvantaged learners (in four low socio-economic status schools), 960 advantaged learners (in eight medium socio-economic status schools), 29 high school teachers (in eight schools) and 35 primary and secondary school teachers-in-training. They responded to two kinds of questionnaires, namely a textbook-based questionnaire and an auxiliary pictorial questionnaire.

The respondents were asked to use six standard, professionally selected criteria to assess and grade 40 illustrations in the school textbook New Nations Science Grade 7 (1999). The learners used basic criteria provided by expert colleagues in graphic art and design at Groote School Hospital and Michaelis School of Fine Art at the University of Cape Town, but expressed in simple language. The respondents were also required to indicate whether, in their view, certain illustrations were an accurate scientific representation of what the textbook artist claimed they were. Each respondent had his or her own new, free copy of the textbook to evaluate the illustrations, considered ten at a time, rated on a five point scale as either “poor”, “fair”, “very good” or “excellent” for each of the six criteria. The complete analysis involved the use of both qualitative and quantitative research methods.

The inter-group correlation ratings obtained between the assessments of four pairs of groups (advantaged and disadvantaged learners; high school and primary school teachers) for ten illustrations rated inclusively yielded values between 0.70 and 0.93. These high learner-to-learner and teacher-to-teacher correlations suggested that the rating exercise had been taken seriously and consistently by most, if not all, of the participants.
An important finding of the study was that, although there were significant differences in individual preferences and ratings among the groups, the learners were found to be more positive in their ratings, whilst the teachers tended to rate more conservatively than the learners on the whole.

Of the 40 illustrations evaluated, each one assessed according to six separate criteria, only three illustrations, namely the chicken (textbook page 100), days of big rain (textbook page 145) and the hippo (textbook page 157) received mean ratings of less than 2.00 (“fair”) on at least one of the six assessment criteria; so these particular illustrations will be referred back to the artist. The learners expressed problems with the size of 60% of the illustrations; a dissatisfaction with the lack of labels; as well as their interpretation and understanding of certain illustrations such as the perlemoen.

**Overall, the sample of disadvantaged learners expressed less satisfaction with quality of the illustrations in the textbook than the other samples of evaluators**, and their supplied written reasons have made available useful qualitative feedback to science textbook illustrators.