ABSTRACT

This study investigated 257 OECS grades 10 and 11 students' conceptual frames of reference for interpreting electrical phenomena using a researcher-designed concept instrument. A researcher-designed intervention strategy involving cycles of confrontation methodology was administered to two sub-samples of grade 10 physics students to determine its effect on their performance and conceptual frames of reference. The concept instrument was used to determine the configurations of the subjects' conceptual frames of reference; the intervention was used to determine the effect of the cycles of confrontation methodology on the intervention subjects' performance and their initial configurations' conceptual frames of reference. The results showed that the subjects' conceptual frames of reference tended to be phenomenological, qualitative and pseudoscientific with pronounced pre-paradigmatic, peripatetic orientations. The OECs sample's levels of performance and scientific thinking were below expectations; the relationships between their performance and demographic factors such as their age, gender, school location, socioeconomic background (SEB) and previous instruction, were also explored. The results indicated that there were statistically significant differences in their performance linked to their (a) gender, in favour of the boys, (b) exposure to physics instruction, in favour of students who had previous exposure to physics teaching, (c) age in favour of the 16-year and 17-year old subjects who performed significantly better than 15 and 18-year-olds and (d) grade level, in favour of grade 11 students, while there were no statistically significant differences in the subjects' performance based on their school location and SEB. Positive, significant but low correlations were found between the students' language and mathematical abilities and their physics performance . The intervention results showed that, in the posttest, the experimental subjects taught using the cycles of confrontation methodology did significantly better in the test on electrical phenomena than their control group peers who were taught using lecture, demonstrations and chalk-and-talk methods.