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Science Education

THE EFFECTIVENESS OF ONLINE TEACHING AND LEARNING COMPARED TO IN-PERSON INSTRUCTIONS ON SCIENCE FOR JUNIOR SECONDARY STUDENTS: A CASE STUDY AT A CHOSEN SCHOOL IN THE KURUNEGALA EDUCATION ZONE

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Schools and Universities in Sri Lanka have been closed intermittently during the past three years due to COVID-19 and fuel shortages. During this period, in-person teaching became impossible, and online teaching was developed. Schools have been reopened for in-person teaching and learning at present. In contrast, other countries adopted both methods, online and in-person. Declining test scores among junior secondary students in some education zones during online learning were noticed. This study aimed to assess and compare the effectiveness of online and in-person teaching and learning science among junior secondary students in a selected school within the Kurunegala education zone. The objectives of the study were to conduct both online and in-person science lessons for two groups separately and to compare grade eight students' performance in both settings; Compare teacher-student interaction, learning resources, peer group interaction, and motivation in both settings; and make suggestions for effective teaching and learning process. Two equally weighted courses were used to teach the two groups. A convenience sample of 72 Grade 8 students was used in the data collection with mixed methods approach. Pre-tests, post-tests, and questionnaires were used in the quantitative data collection. Qualitative data were collected via interviews with ten randomly selected students. The findings indicated that the in-person group achieved slightly higher performance scores in Unit 4 (Properties of Matter) than the online group. Both groups demonstrated similar performance levels in Unit 8 (Changes in Matter). However, in-person teaching exhibited significantly higher scores ($p < 0.05$) than the online group for factors such as teacher-student interaction, peer group interaction, learning resources, and motivation. Students achieved high results in both settings but needed more resources, reliable internet, and adequate technology skills for online teaching and learning. The study suggests adapting effective instructional methods, technology usage, resource availability, training, participation, peer interactions, and monitoring well-being for effective online science teaching.

Keywords: Online teaching, Science teaching, In-person teaching