Digital Learning Principles and Capabilities: Its Impact to the Learning Outcomes of Grade 9 Students

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Abstract

The study aims to describe and analyze the correlation between digital learning principles and the students' capabilities concerning their learning outcomes in Mathematics. The research design employed by the researcher is a descriptive approach for this study, specifically, a correlational research design. The study's respondents were 150 Grade 9 students selected using the purposive sampling technique. The findings indicated below are based on the data gathered by the researcher: The level of digital learning principles of the respondents in terms of quality and standards, tools and equipment, building digital learning capabilities, and evaluation strategy is observed. The level of digital learning capabilities of the respondents in terms of ICT proficiency and productivity, digital learning and development, digital creation, problem-solving and innovation, collaboration, communication, and participation, digital identity and well-being, and information, media, and data literacy is perceived to be much capable. The respondents' level of learning outcomes in Mathematics regarding collaborative learning, interactive behavior; motivation; self-esteem; cognitive development; and mathematical skills are perceived to be high. There is no significant relationship between digital learning principles and learning outcomes in Mathematics. There is no significant relationship between digital learning capabilities and learning outcomes in Mathematics.

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Introduction

Students in Southeast Asian countries have benefited from the fact that their schools had previously implemented some type of online learning, like the Canvas learning management system and Google classroom, even before the pandemic crisis (Nurul et al., 2021). With regards to the use of digital technology on education, research papers focusing on the use of spreadsheets, graphing calculators, and other forms of digital technology in teaching Mathematics have been plentiful over the past decade (Sinclair, 2016). Despite of that, the role of several 21st century skills and literacies on the students' learning of Mathematics has not been fully clarified and taken into account by educators, particularly by curriculum designers (Martinovic & Freiman, 2017).

Recently, online course enrolment is quickly increasing, and public universities are the leading educators of distance education students. One motive for expanding online course offerings is to accommodate more students without incurring large infrastructure costs (Allen & Seaman, 2017). Distant learning is currently extremely concentrated, with nearly half of all distance education students attending only 5% of all institutions. Increased online course alternatives, in particular, offer the potential to reach students who have limited access to higher education due to social, regional, financial, educational, and personal constraints (Choe et al., 2019). Studies on the relationship between digital learning and learning outcomes of students have emerged since the dawn of the pandemic. A study of Baber (2020), for example, focuses on the determinants that are resulting on the students' perceived learning outcomes and their influence on student satisfaction in online classes during the pandemic. However, studies focusing on digital learning and its relationship towards the learning outcomes in Mathematics are minimal especially on the secondary level. As such, the researchers' curiosity on determining the digital capabilities of students led to the development of this study. In response, this study specifically aims to explore the digital capabilities of grade 9 students of Calumpang National High School and how this correlate with their learning outcomes in Mathematics.

Methodology

The study employed descriptive and correlational for this study, specifically, a correlational research design to describe and analyse the relationships of digital learning principles and capabilities of the students, and their individual learning outcomes in Mathematics. Through purposive sampling technique, the researchers decided to choose all

Grade 9 students of Calumpang National High School, A.Y. 2021 – 2022, as the respondents of the study with a total number of one hundred and fifty (150). A 4-point Likert scale was used with the survey-questionnaire as it is one of the most common quantitative scales for a descriptive type of research. Mean, standard deviation, and Pearson product moment correlation are the statistical tools used by the researchers in treating the data obtained from the respondents.

Findings

The study found out that the level of digital learning principles of the respondents in terms of quality and standards (M = 4.14), tools and equipment (M = 3.75), building digital learning capabilities (M = 3.51), and evaluation strategy (M = 3.97) are perceived to be "Observed", with an overall mean of 3.84. The level of digital learning capabilities of the respondents in terms of ICT proficiency and productivity (M = 3.77), digital learning and development (M = 3.65), digital creation, problem-solving, and innovation (M = 3.80), collaboration, communication, and participation (M = 3.80), digital identity and well-being (M = 3.94), and information, media, and data literacy (M = 3.83) are perceived to be "Much Capable", with an overall mean of 3.80. The level of learning outcomes in Mathematics of the respondents with regards to: collaborative learning (M = 3.94), interactive behavior (M = 4.15); motivation (M = 3.41); self-esteem (M = 3.33); cognitive development (M = 3.37); and mathematical skills (M = 3.32) are perceived to be "High", with an overall mean of 3.59. The computed r-values between digital learning principles and learning outcomes show positive correlations existing between the two variables. The null hypothesis is rejected. The computed r-values between digital learning capabilities and learning outcomes show positive correlations existing between the two variables. The null hypothesis is also rejected.

Conclusion

The study aimed to analyse the correlations of digital learning principles and capabilities of the students with respect to their individual learning outcomes in Mathematics. The study has concluded that there is a significant relationship between digital learning principles and learning outcomes in Mathematics. Furthermore, there is also a significant relationship between digital learning capabilities and learning outcomes in Mathematics. Future researchers are recommended to test the digital learning capabilities of private school students and test if it is significantly different to the digital learning capabilities of those in public high schools.

Computer subjects are more elaborately and comprehensively taught in private high schools in Laguna, particularly in Catholic private schools. These institutions are well-equipped with computer, speech, and science laboratories. Researchers may also test the digital capabilities of teachers and whether these affect the academic performance of their students.

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