

PRESENTATION SESSION 7: New Approaches in STEM
(P7, 14/6/2024 10:50-12:10 HKT)

P7-4 The Effect of Digital Technologies to Improve the Math Performance of Rural Students: A Three-level Analysis

Mei Jiun WU

University of Macau

With educational films, linked computer terminals, and online education, information and communication technologies (ICTs) have continued transforming how teachers teach and students learn. While education technologies are diversifying, they also come with challenges: not only do they have to be incorporated into education, but they also must be accessible to all. Despite decades of hard work, many education systems still strive to provide educational technology to rural students disadvantaged by inadequate resources and underdeveloped infrastructure. Given resource equity takes time to achieve, rural students may have to perform with what they have for now. Considering this perspective, finding out how ICTs help students succeed academically at their current resource level may be our best bet for the time being in tackling the equity issue. Consequently, this study seeks to explore the use of ICTs among schools and students in rural areas that contribute most to student success. Using the 2022 PISA dataset on education systems that had an imputable set of ICT indices and individual scores on the focused math domain in rural areas, this study employed a hierarchical regression model to estimate, under their given resource level, the impact of school and student ICT indices on student scores. The analysis included 9,453 students from 480 rural schools across 17 education systems. Findings from the study show that, in contrast to the availability and accessibility of ICT, which were both positive but weak predictors of rural students' performance, how students used ICTs was more influential. Two indices of ICT use stood out as the most potent performance enhancers of rural students at both school and student levels: the use of ICT for school activities outside of the classroom (ICTOUT) and students' practices regarding online information (ICTINFO). Student's use of e-feedback or educational software (ICTFEED), as well as their uses of ICTs for leisure, regardless of weekday (ICTWKDY) or weekend (ICTWKEND) alike, were all found to be unhelpful to rural student's performance, ranging from at -11.75 to -2.01 and -19.27 to -3.19 on an individual and a school level, respectively. These findings suggest that if access to digital technologies is guaranteed outside the classroom to stay connected with the school and conduct some self-learning, students residing in rural communities have a good chance of outperforming themselves on an individual and school-aggregate level. Besides the two ICT uses mentioned, rural students are unlikely to grow academically if they spend too much time reviewing e-comments or engaging in leisure activities, such as gaming and social media, even if the most advanced digital technologies become available and accessible. To rural students, how they use ICTs for academic purposes might be more crucial than what or where they use them.