

## Online Learning and Peer Support: Using WhatsApp to Enhance Students' Understanding of Engineering Mathematics Concepts

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### Abstract

This paper explores the use of a social media platform, WhatsApp, to improve peer learning and student support to understand engineering mathematics concepts in a cohort of 180 entry level university students. The institutional shift to online learning, considering the COVID-19 pandemic, has enhanced the necessity and significance of online peer support. Consequently, there is a need to research all aspects of this phenomenon especially for students largely unprepared and disadvantaged during national lockdown. This case study is in the interpretive research paradigm and based on grounded theory. It used a qualitative approach to explore WhatsApp postings involving mathematical interaction, the frequency, type, and the extent of engagement. Data have been thematically analysed according to mutual peer and tutor-tutee interaction. The preliminary results point towards specific areas of interest and challenges, and conceptual change. It highlights the social impact of bringing together students in one group, on a social platform, whose comfort zone for teaching and learning has been a face-to-face environment. The benefits of face-to-face proximity have been largely taken for granted but is now thrown into sharp relief. Furthermore, the increased difficulty in reducing anxiety about mathematics, because of the under-preparedness of entering university students is exacerbated by the pandemic. Anxiety is closely linked to the notion of self-concept, an important factor in predicting academic success. Our study also found examples of these issues in the WhatsApp postings, and shows how peer support in the form of empathetic and direct guidance alleviates the worse effects of remote learning and identifies the worse symptoms of anxiety as expressed on the social platform.

Peer support has also taken the form of providing information on WhatsApp by sharing solutions of past tests, links to lectures, and recordings of tutorials. Often such information is inaccessible to students who cannot afford communication technology (ICT) devices like laptop computers, internet modems and smart phones plus easy access to the internet. The low-cost and low-technology nature of the WhatsApp platform provided the students with freedom and gave them ownership of the group, because they contributed spontaneously to interactions not directed or introduced by the lecturers of the mathematics courses. This has led to a greater acceptance and adoption of the platform as a teaching and learning forum and home for the cohort. Although most of the activities on the WhatsApp group concerned peer engagement to enhance their understanding of challenging mathematical concepts, lecturers also made use of the platform to share information about important notices, study material and examination deadlines.

This study lays the ground for future quantitative research that could investigate student participation in the WhatsApp platform and their performance in terms of race, gender, and socio-economic background.

**Key words:** Online learning, peer support, engineering mathematics, WhatsApp, COVID-19 pandemic