Towards development of a blended learning model to enhance on-campus and academic and clinical medical physics education and training

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The beginning of the 21st century has seen an important shift in the ways society embraces Information Communication Technologies (ICTs) in everyday living. This resonates within the educational environment, with higher education institutions undergoing far-reaching transformations of their governance, policies, and teaching and learning modes to provide meaningful and effective technology-enhanced learning (TEL) experiences. Amongst them, blended learning is expected to become the "new traditional model" (Ross & Gage, 2006) or "the new normal" of course delivery mode (Norberg, Dziuban, & Moskal, 2011). With the proliferation of blended learning models within higher education institutions more research on characteristics of particular, context-specific, tailored blended learning models is needed. This paper responds to this need by investigating the effectiveness of a blended learning model designed and implemented for the Radiation Therapy Physics unit, part of the Master of Applied Science (Medical Radiation) course at a large metropolitan university. The model encompassed three distinctive educational modules: online, face-to-face and clinical work experience. The online module included multimedia-based resources such as educational videos demonstrating important clinical procedures and practice accompanied by a series of questionnaires and quizzes that test students' understanding of the videos content and provide connection with the face-to-face module. The face-to-face module encompassed the technology-enhanced in-class activities such as lectorials delivered in collaborative learning spaces complemented by activities conducted in a virtual radiotherapy simulation environment with the aim of preparing students for their clinical experience. The third module, practical clinical experience, provided students with opportunities to visit clinical departments to view and engage in real world procedures and practice.
The current study investigated the effectiveness of the framework from three student perspectives:

1. engagement with individual features of the framework,
2. development of learning strategies, and
3. achievement.

Data were collected and analysed using mixed methods. Qualitative data were analysed within the interpretative content analysis framework and descriptive statistical method was used to analyse the quantitative data. A preliminary analysis of the data suggests that overall the model was effective in enhancing students' engagement. As for the responses to the two remaining research questions, the conclusions are more complex and will be discussed alongside with the implications for the research and indications of further research directions.

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Ross, B., & Gage, K. (2006). Global perspectives on blended learning: Insight from WebCT and our customers in higher education. In C.J. Bonk, & C.R. Graham (Eds.), *Handbook of blended learning: Global perspectives, local designs* (pp. 155–168). San Francisco, CA: Pfeiffer.