

Gamifying Content and Language Integrated Learning: A Study Exploring the Use of Game-Based Resources to Teach Primary Mathematics in a Second Language

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Abstract : Research findings presented within this paper form part of a larger scale collaboration between academics at Manchester Metropolitan University and a technology company. The overarching aims of this project focus on developing a series of game-based resources to promote the teaching of aspects of mathematics through a second language (L2) in primary schools. This study explores the potential of game-based learning (GBL) as a dynamic way to engage and motivate learners, making learning fun and purposeful. The research examines the capacity of GBL resources to provide a meaningful and purposeful context for CLIL. GBL is a powerful learning environment and acts as an effective vehicle to promote the learning of mathematics through an L2. The fun element of GBL can minimise stress and anxiety associated with mathematics and L2 learning that can create barriers. GBL provides one of the few safe domains where it is acceptable for learners to fail. Games can provide a life-enhancing experience for learners, revolutionizing the routinized ways of learning through fusing learning and play. This study argues that playing games requires learners to think creatively to solve mathematical problems, using the L2 in order to progress, which can be associated with the development of higher-order thinking skills and independent learning. GBL requires learners to engage appropriate cognitive processes with increased speed of processing, sensitivity to environmental inputs, or flexibility in allocating cognitive and perceptual resources. At surface level, GBL resources provide opportunities for learners to learn to do things. Games that fuse subject content and appropriate learning objectives have the potential to make learning academic subjects more learner-centered, promote learner autonomy, easier, more enjoyable, more stimulating and engaging and therefore, more effective. Data includes observations of the children playing the games and follow up group interviews. Given that learning as a cognitive event cannot be directly observed or measured. A Cognitive Discourse Functions (CDF) construct was used to frame the research, to map the development of learners' conceptual understanding in an L2 context and as a framework to observe the discursive interactions that occur learner to learner and between learner and teacher. Cognitively, the children were required to engage with mathematical content, concepts and language to make decisions quickly, to engage with the gameplay to reason, solve and overcome problems and learn through experimentation. The visual elements of the games supported the learning of new concepts. Children recognised the value of the games to consolidate their mathematical thinking and develop their understanding of new ideas. The games afforded them time to think and reflect. The teachers affirmed that the games provided meaningful opportunities for the learners to practise the language. The findings of this research support the view that using the game-based resources supported children's grasp of mathematical ideas and their confidence and ability to use the L2. Engaging with the content and language through the games led to deeper learning.

Keywords : CLIL, gaming, language, mathematics

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