



An Augmented Reality System for Biology Science Education in Malaysia

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Abstract— This paper presents an educational application for Form 4 Biology Science in Malaysian secondary schools using Augmented Reality (AR) technology, includes topics of mitosis, meiosis, respiration and their systematic relations. Worth mention is knowledge is a whole in which no part is really isolated but more or less systematically related to others. Knowing regularities is essential for having a concept at students' disposal as well as for object perception. An implicit understanding of regularities is a precondition of object perception. Having a concept means being able to assert that something, such as a specific attribute, a rule or a function, applies to all the objects of the same kind. These lessons are presented in dedicated stereoscopic and photo-realistic views, thus facilitating students in noticing, memorizing and understanding Biology concepts. Also, it allows students individualized interaction while enabling social communication, given thinking is but epistemic in its nature and that its organization has both individual and social dimensions. AR technology introduces a new type of automated applications and to enhance the effectiveness and attractiveness of learning environment for the students in a real world scenario. This AR study emphasizes on merging computer vision, image processing and computer graphics to form a new Human-Computer Interaction (HCI) paradigm.

Keywords — Augmented Reality, virtual reality, education and training.

I. INTRODUCTION

The purpose of this study is to design and construct an Augmented Technology system (aka ATTech System) for educational purpose in learning Form 4 Biology in Malaysian secondary schools using markers as pointing devices. The Form 4 Biology units covered in this system include mitosis, meiosis, and respiration. This is an ongoing long-term study which has a goal to enhance students' perception and understanding about the complex process and phenomenon in Biology. Unlike VR system that aims to replace the perception of the world with an artificial one, this ATTech system provides a better means to make students learn in an interactive learning environment and acquire the cognitive and metacognitive skills for better "transfer" of learning. "Transfer" can be improved by helping students become aware and actively monitor their performance in understanding or comprehension. Creating suitable representation of the learning process in a rich context using AR interfaces allows the students to promote reflection of the metacognitive processes, where the students could see the real world as well as the virtual imagery, augmenting the real world with additional information. Worth mention is that human mental representation is an activation of knowledge and background knowledge provoked by a percept or sign in context of action.