Chapter 9
Developing Educational Videos:
A Constructionism Approach – Active Collaborative Learning in a Science Module

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ABSTRACT

The teach less, learn more (TLLM) movement has prompted the need for teaching and learning innovations that fall under this framework. Educational videos have always been used as teaching tools. However, educational videos can also be used based on the 'constructionism' approach in which learners develop the videos. This form of teaching and learning innovation provides a variety of learnings and skills such as active and collaborative learning, including creative thinking and problem-solving skills, which are lifelong to the learners, compared to the passive learning in the teacher-centered approach. This chapter will begin with a discussion of the trends in learner-centred teaching, which falls under the TLLM framework. This is followed by a detailed exploration on the use of a constructivist approach for the development of educational videos under the assignment component in a science-based module. The chapter will then conclude with the outcome of the teaching and learning innovation for the learners, including its significance on learning.

INTRODUCTION

The use of educational videos in teaching and learning is nothing new. In fact, educational videos are commonly used as a teaching tool because they can effectively deliver concepts and demonstrate methods or mechanisms (Hoban & van Ormer, 1951). Educational videos can also be used based on the 'constructionism' approach (Papert & Harel, 1991), in which learners are given the opportunity to create their own educational videos. This approach of 'learning by doing' offers several benefits to learners. This approach engages learners in active learning, which is shown to improve student's performance in the science field (Freeman et al., 2014), and encourages collaborative learning. This approach is also consistent with Dale's intuitive model, which states that learners will learn better by doing as compared

to being exposed to passive approaches such as reading (Dale, 1969). Hence, the objective of this chapter is to introduce a teaching and learning innovation, which uses the constructionism approach to the development of educational videos. This teaching and learning innovation is a form of learner-centered learning, which is consistent with the Teach Less, Learn More (TLLM) framework. The whole process of incorporating this innovation under the assignment component of a science-based module will be described in detail. In addition, this chapter will also discuss the assessment and the outcomes of this innovation on the significance of learning to the learners.

THE SHIFT FROM TEACHER-CENTERED LEARNING TO LEARNER-CENTERED LEARNING

The traditional teaching and learning pedagogy involves the teacher-centered approach to learning. In this pedagogical model, educators or teachers deliver materials and knowledge to learners in a direct manner (Blackiea, Caseb, & Jawitzc, 2010). Hence, a major disadvantage of this approach is that it will result in passive learning because learners are required to listen to educators during classroom time, and merely retain the knowledge as much as they can. In this approach, educators have full control of the module content, and delivery of the module, including assessments for determining the knowledge gained by learners (Chua, Chia, & Yong 2018).

In many instances, educators prefer to use the teacher-centered approach. There are five possible reasons why the teacher-centered approach is preferred. Firstly, in most circumstances, a larger proportion of the module lessons have already been prepared. Therefore the lessons can be recycled every semester. Secondly, in a learner-based approach, educators need to consider the suitability of teaching and learning innovations for the module content to be delivered. Such efforts may be beyond the scope of their research interest. Thirdly, learner-centered approach requires more preparation time compared to the teacher-centered learning approach. Fourthly, educators may be conservative and unwilling to experiment with new teaching and learning innovations. Finally, educators may have the mindset that research achievements are far more superior and favorable than teaching and learning achievements.

In the past, before the invention of the Internet, the teacher-centered learning approach was probably acceptable to both educators and learners because learners were fully dependent on their educators and hardcopy versions of books in the library to gain new knowledge. However, times have changed with the availability of various ways or platforms from which learners can access new knowledge easily. With that, learners no longer need to rely solely on educators for new knowledge. In fact, learners are required to attain new knowledge independently on their own, and the educators' role is to facilitate this process. In this way, it is hypothesized that learners can learn more because they will need to acquire and apply new knowledge on their own as compared to the teacher-centered learning approach in which new knowledge is acquired passively, and assessment is mainly the regurgitation of the knowledge gained.

Hence, with the easy access to knowledge and information these days due to the advancement of technology, there is a need to shift from teacher-centered learning to learner-centered learning. Unlike the simple relationship established in teaching-centered learning in which educators are responsible in delivering the 'what', and learners are being assessed on the 'what', the relationship and processes involved in learner-centered learning are rather complex. The complexity is due to the fact that the learner-centered approach does not just focus solely on the 'what' but also the 'how' and the 'why'. In this approach, the educators no longer play the role of just delivering the 'what' since the learners can

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