A Case of Innovative and Successful Use of Digital Resources for Online Learning:
Quality Evaluation Tools for Learning Objects

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EXECUTIVE SUMMARY

The purpose of this chapter is to provide readers with an overview of a case of the innovative and successful use of digital resources for open distance online learning, or e-learning. To further summarize the content of the chapter, background is offered in a literature study, including related definitions, on the extent to which the application of quality evaluation tools for learning objects were adequate and appropriate for engineering tuition. The main focus of the chapter is on presenting the authors' perspectives on the issues, challenges, problems, etc., as these relate to the themes and arguments supporting their position. The next section of the chapter discusses how this research will lead to the development of solutions and recommendations that will deal with the issues or problems presented. Emerging trends and future research directions are discussed before a discussion of the overall coverage of the chapter and concluding remarks are provided.

INTRODUCTION

In this research, multimedia products used in engineering tuition in an ODeL setting are given a juried review, based on a summative *methodology*, with assessments performed using the Learning Object Review Instrument (LORI) criteria. In the study, a *comparative analysis* of products is also carried out, based on the pedagogical quality and usability effectiveness of each individual product, and the results are presented in the LORI appraisal.

A practical assessment approach is employed in the research and a technology scorecard will be established, together with the presentation of an evaluation of various LO technologies applied in teaching and learning; specifically, those that are used for the training of engineering students. The research adopted criteria and guidelines for the selection and implementation of (Goosen, 2004) learning objects in the scorecard as stipulated in the LORI. The general dimensions of the scorecard were set up according to the functionalities of the technologies, which were captured using the evaluation themes and indicators score. When focusing on a particular technology, for example, the indicator will reflect a value that describes the importance of a particular attribute of the technology as described by the theme.

The scorecard is founded on broadly interpreted dimensions intended to support and highlight the Strengths, Weaknesses, Opportunities and Threats (SWOT) related to the technologies, when applied or as evaluated. Since methods used are rarely chosen independently of the context (Georghiou & Roessner, 2000), the *LORI criteria* represent a world class approach and unbiased assessment. The article by Georghiou and Roessner (2000, p. 657) reviewed "the analytical tools, methods, and designs being used to evaluate public programs intended to stimulate" modern technological advancement. The review by the latter authors was "organized around broad policy categories rather than particular types of policy intervention, because methods" used for evaluating technology programs should fall within the parameters of the research policy. The benchmark for quality required in engineering tuition is based on the stipulations of the governing body, which is the highest engineering statue of governance in South Africa. The Engineering Council of South Africa (ECSA) stipulates, among other things, the quality standards for the training of engineering students. These stipulations are documented in various forms and this research will engage with one such document, known as the Guide to the Competency Standards for Registration with ECSA (2018). The results of the assessment study are *analyzed and compared* to the module outcomes standards of ECSA. The appraisal is conducted to ascertain whether the assessment applied to the *LORI criteria* is *adequate* and *appropriate* to measure acceptable levels of LO pedagogical *quality and usability* effectiveness for the training of engineering students. If not, a *gap* will be identified and stipulated. Recommendations for closing the *gap* will be tabled and a new LO quality assessment will be established.

The strength of this chapter lies in the timeliness of this kind of research towards the post-COVID-19 era. Quarantines and various COVID restrictions forced more education online without the assessment of tools and technologies. Studies like those by Ngugi and Goosen (2021) on innovation, entrepreneurship, and sustainability for Information and Communication Technology (ICT) students, Van Heerden and Goosen (2021) on students' perceptions of e-assessment in the context of COVID-19 in the case of the University of South Africa (UNISA) and an empirical study by Bolton, Goosen and Kritzinger (2021) into the impact of digital transformation at an automotive enterprise on innovation and productivity towards the post-COVID-19 era have already been reported on. According to Goosen (2019), more research on technology-supported teaching and learning and studies like this one, that propose and demonstrate evaluation methods, are, however, sorely needed.