

# Highlighting E-learning Adoption Challenges using data Analysis Techniques: University of Kufa as a Case Study

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**Abstract:** Electronic learning (e-learning) plays a significant role in improving the efficiency of the education process. However, in many cases in developing countries, technology transfer without consideration of technology acceptance factors has limited the impact of e-learning and the expected outcome of the education process. Therefore, this shift in learning method has been met with low enthusiasm from academic staff and students owing to its low perceived usefulness and perceived ease-of-use. The University of Kufa (UoK) in Iraq is considered a good case study because it has implemented the e-learning platform since 2013. The UoK platform is based on open-source Moodle owing to the latter's advantages, such as low implementation cost, open community for support and continuous update and development. To identify and evaluate the challenges, this study uses a questionnaire survey that targets the level of adoption, implementation, familiarity and technology acceptance of staff and students. A total of 242 educators participate in the survey, and the data are subsequently analysed. Important information is extracted using data mining techniques, namely clustering and decision trees. One of the main crucial factors extracted from the analysis results is the perception that social media is easier to use compared with a dedicated e-learning platform such as Moodle. This factor may also discourage educators/learners from adopting an offered e-learning platform, regardless of actual usefulness, motivation and training programs. Therefore, this paper offers practical information regarding the main issues and a guideline to fully utilise e-learning for policy makers and e-learning developers, particularly in newly established institutions or developing countries.

**Keywords:** e-learning, technology acceptance model, Educational data mining, Moodle, social media, Facebook, clustering, decision trees

## 1. Introduction

Some educators have considered electronic learning (e-learning) as the most remarkable leap in the education process since the invention of writing (Tan, Chew and Mellor, 2016). This set of education means is believed to be the newest method of passing knowledge and expertise as a supplement and/or replacement to traditional classrooms owing to their flexibility and efficiency. Moreover, the need and importance of e-learning have grown because the education process and outcome expectancies have changed. For instance, modern institutions have realised that education is no longer the memorisation of knowledge but rather the ability to solve problems with novelty, developing independent and long-life learning and communication skills (Atanda and Ahlan, 2014). Traditional classes, which are limited by space and time, can also no longer satisfy the growing demands for knowledge. This entire set of new requirements has driven the development of e-learning tools.

E-learning has been a standard technique of education in developed countries for many years (Koponen, Tedre and Vesisenaho, 2011; Tan, Chew and Mellor, 2016). However, developing countries continue to struggle in reaping the benefit of such techniques (Atanda and Ahlan, 2014; Ansong, Boateng and Boateng, 2017; Canedo, Santos and Leite, 2018). This situation may be due to numerous reasons, such as lack of technical infrastructure, service availability, staff readiness and experts to build and manage such infrastructure, which has been the case for e-learning in many institutions including those in Iraq (Mahmod et al., 2017). However, the infrastructure or technology may not be sufficient for learners and educators to fully adopt e-learning and accept e-learning technology, thus remaining a major concern in many developing and developed countries (Kanwal and Rehman, 2017; Ansong, Boateng and Boateng, 2017; Haron and Sahar, 2010; Almazroi et al., 2016; Cidral et al., 2017). Therefore, determining the factors that play a crucial role in e-learning adoption and technology acceptance is an active research area. Student motivation, perceived usefulness, perceived ease of use, policy making and the method to break traditional outdated concepts of the education process or its expected outcomes are factors that may need to be tackled on different levels. Thus, experts are in dire need