



## Predicting Learning Outcomes in an Online Learning Platform

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### Abstract

This paper carried out a comprehensive analysis of a dataset collected from the Open University's online learning platform, with the aim of understanding the relationships between various factors and the outcomes for learners. Data pre-processing and analysis showed that factors such as age, gender, different course modules, educational background, IMD band and total clicks positively correlate with learners' performance. The k-means clustering algorithm was utilised to identify distinct learning behaviours among learners by grouping them into three clusters. The random forest algorithm was then used to build machine learning models based on the identified learning behaviours, achieving a higher prediction accuracy of 86.1%. The findings emphasise the importance of targeted interventions and support tailored to the specific needs of different learner groups. The contribution of this paper is that it is the first to use the k-means clustering algorithm to divide the data into groups prior to using the random forest algorithm to predict the final outcomes for learners at the Open University. Furthermore, this is the first study to apply a random forest algorithm to the Open University's online learning platform dataset, with commendable results in predicting the outcomes for learners.

Keywords: E-learning, machine learning, personalised content for online learners, k-means clustering, random forest algorithm

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