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Artificial intelligence to predict pre-clinical dental student academic perfor…

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Artificial intelligence to predict pre-clinical dental student academic performance based on pre-university results: A preliminary study

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Source   **JOURNAL OF DENTAL EDUCATION**

DOI: 10.1002/jdd.13673

Early Access   JUL 2024

Indexed   2024-08-05

Document Type   Article; Early Access

Abstract   Purpose/ObjectivesAdmission into dental school involves selecting applicants for successful completion of the course. This study aimed to predict the academic performance of Kulliyyah of

Dentistry, International Islamic University Malaysia pre-clinical dental students based on admission results using artificial intelligence machine learning (ML) models, and Pearson correlation coefficient (PCC).MethodsML algorithms logistic regression (LR), decision tree (DT), random forest (RF), and support vector machine (SVM) models were applied. Academic performance prediction in pre-clinical years was made using three input parameters: age during admission, pre-university Cumulative Grade Point Average (CGPA), and total matriculation semester. PCC was deployed to identify the correlation between pre-university CGPA and dental school grades. The proposed models' classification accuracy ranged from 29% to 57%, ranked from highest to lowest as follows: RF, SVM, DT, and LR. Pre-university CGPA was shown to be predictive of dental students' academic performance; however, alone they did not yield optimal outcomes. RF was the most precise algorithm for predicting grades A, B, and C, followed by LR, DT, and SVM. In forecasting failure, LR predicted three grades with the highest recall, SVM predicted two grades, and DT predicted one. RF performance was insignificant.ConclusionThe findings demonstrated the application of ML algorithms and PCC to predict dental students' academic performance. However, it was limited by several factors. Each algorithm has unique performance qualities, and trade-offs between different performance metrics may be necessary. No definitive model stood out as the best algorithm for predicting student academic success in this study.

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Categories/ Classification	Research Areas: Dentistry, Oral Surgery & Medicine			
	Citation Topics:	1 Clinical & Life Sciences	› 1.14 Nursing	› 1.14.363 Nursing Education
	Sustainable Development Goals: 04 Quality Education			

Web of Science Categories	Dentistry, Oral Surgery & Medicine

Language	English

Accession Number	WOS:001280070200001

PubMed ID	39080875

ISSN	0022-0337

eISSN	1930-7837

IDS Number	A1F8F

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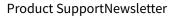- Science Citation Index Expanded (SCI-EXPANDED)

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