

## Cluster Analysis of Students' Learning Satisfaction

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**Abstract :** One of the indicators of the quality of university services is student satisfaction. Aim: We aimed to study the level of satisfaction of students in the first year of premedical courses in the course of Medical Physics using the cluster method. Materials and Methods: In the framework of this goal, a questionnaire was collected from a total of 324 students who studied the medical physics course of the 1st course of the premedical course at the Mongolian National University of Medical Sciences. When determining the level of satisfaction, the answers were obtained on five levels of satisfaction: "excellent", "good", "medium", "bad" and "very bad". A total of 39 questionnaires were collected from students: 8 for course evaluation, 19 for teacher evaluation, and 12 for student evaluation. From the research, a database with 39 fields and 324 records was created. Results: In this database, cluster analysis was performed in MATLAB and R programs using the k-means method of data mining. Calculated the Hopkins statistic in the created database, the values are 0.88, 0.87, and 0.97. This shows that cluster analysis methods can be used. The course evaluation sub-fund is divided into three clusters. Among them, cluster I has 150 objects with a "good" rating of 46.2%, cluster II has 119 objects with a "medium" rating of 36.7%, and Cluster III has 54 objects with a "good" rating of 16.6%. The teacher evaluation sub-base into three clusters, there are 179 objects with a "good" rating of 55.2% in cluster II, 108 objects with an "average" rating of 33.3% in cluster III, and 36 objects with an "excellent" rating in cluster I of 11.1%. The sub-base of student evaluations is divided into two clusters: cluster II has 215 objects with an "excellent" rating of 66.3%, and cluster I has 108 objects with an "excellent" rating of 33.3%. Evaluating the resulting clusters with the Silhouette coefficient, 0.32 for the course evaluation cluster, 0.31 for the teacher evaluation cluster, and 0.30 for student evaluation show statistical significance. Conclusion: Finally, to conclude, cluster analysis in the model of the medical physics lesson "good" - 46.2%, "middle" - 36.7%, "bad" - 16.6%; 55.2% - "good", 33.3% - "middle", 11.1% - "bad" in the teacher evaluation model; 66.3% - "good" and 33.3% of "bad" in the student evaluation model.

**Keywords :** questionnaire, data mining, k-means method, silhouette coefficient

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