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Abstract: Philadelphia AMP Research Symposium and Mentoring Conference

Mentor: Boris Delibašić

## Project Title: The Development of An Educational Data Mining Environment for The Analyses of Moodle Data

Our research was a continuing application of a case study called “Using data mining on student behavior and cognitive style data for improving e-learning systems: a case study” by Milos Jovanovic, Milan Vukicevic, Milos Milovanovic, and Miroslav Minovic. Our research was solely a duplication of some methods used in this case study on different student data. I collaborated with a fellow under graduate student, Milos Jovanovic, Milan Vukicevic, and our mentor Boris Delibašić.

This research involved the design and application of a data mining environment for the extraction, analysis, and interpretation of student data from an e-learning environment. This was achieved by using and processing student data in a data mining software called Rapid Miner, in order to create clustering models for grouping students based on their behavior in the e-learning environment of Moodle. Moodle is “an open source Learning Management System (LMS) that is mostly regarded as Course Management System by the open community” (1). Teachers use learning management systems as a supplement for the education of their students by using LMS tools, which can involve attributes such as the administration of assignments, quizzes, discussion forums, and other leaning materials. We used student data from these attributes, which include courses, assignment activity, quiz activity, forum activity, grades, ect (4). We then created classification models by inputting data from these attributes into a Rapid Miner process (1 - 4). The model building process included data preprocessing, the application of the Decision Tree Algorithm, algorithm performance evaluation, and parameter optimization. When these models are interpreted they could be used to categorize students and predict their success (1). Cluster models described in this paper should assist educational institutions with “engaging students who are likely to become excellent on a selected topic,” and profiling students into groups that may “enable better adaption of the learning materials, improve teaching methods, as well as assist collaborative learning” (1).

In our Rapid Miner process we created models by clustering students in each course based on their overall performance. Our results are the interpretations we made from these courses or models. We had difficulty during our research because teachers did not utilize Moodle tools enough. Therefore much data was missing, making it difficult for us to make an adequate amount of interpretations and find consistent contingencies in our interpretations. Due to this difficulty there were only five out of twenty courses that had enough data to produce models with compressive interpretations. Our research results of these five course models are that students’ utilization of an LMS can improve student success in distance learning courses. These course models indicated that there are certain Moodle attributes that differ in each course that hold the most weight in student success. Three out of the five courses indicated that increased participation in these attributes will determine weather the student passes or fails the course. Therefore we concluded that LMS are effective tools to supplement student education in a distance learning environment.

My participation in this international research experience was opportunity has improved many of my skills. One of my improved skills was my interpersonal aptitude in a group environment. Another improved skill was my ability to communicate in an environment where my associates and I aren’t fluent in each other’s language. My most significant improved skill was executing tasks in the absence of mentors. I know these skills will greatly facilitate my success in a future career and I plan on presenting my international research experience Philadelphia AMP Research Symposium and Mentoring Conference.

Works Cited

Jovanovic, Milos, Milan Vukicevic, Milos Milovanovic, and Miroslav Minovic. "Using

Data Mining on Student Behavior and Cognitive Style Data for Improving E-learning Systems: A Case Study." International Journal of Computational Intelligence Systems 5.3 (2012): n. pag. Web.