

E-learning Systems as a Behavioural Analyst

Valentin Videkov¹, Rossen Radonov²

Abstract – The report discusses the application of e-learning systems as a tool for indirect survey. Some possibilities for summarizing data from the application of electronic learning as a tool for assessing the behaviour of students are presented. Some practical results of such studies are also shown.

Keywords – E-learning, statistics, behavioural analysis

I. INTRODUCTION

Over the past two decades, e-learning systems have gone through various stages - from implementing electronic tests [1] Internet-based learning [2] to remote [3] and mobile [4]. There are many platforms for creating e-learning courses [5] [6] which widely use multimedia tools. The application of state-of-the-art information technology allows the learning process to be statistically traceable. Virtually any system monitors and processes certain information. Most often it is directly linked to the learning process and presents the results of the evaluation [7]. A more detailed analysis of this information can show other sides of the implied process characterizing the behaviour of its participants. These include efficiency in the completion of tasks, teamwork and others.

II. DATA IN E-LEARNING

A. The training objective

We can consider the question of the purpose of learning from different positions. These could be educational, economic, moral, and others. Achieving these goals is related to the assigning of tasks to be performed by trainers and trainees through appropriate means. On the other hand the achievement of the goals, i.e. tasks is associated with the collection and evaluation of various data. The evaluation of these data is the criterion for achieving the objective.

B. Data

Data that are associated with e-learning can be divided into the following types: data representing a database object (such as text documents, multimedia) data to evaluate the outcome of training (two types - tests and assessments), data from the process (attendance, number trained, schedules), data on

participants (personal information for teachers, students).

Another division can be introduced to a state of data in time domain. Part of the data is slightly changing or constant (data of the participants in the process, quantity), others are dynamic (evaluations, test results, statistics of visits).

The typical for e-learning systems is that data are directly applicable for processing by various electronic means.

C. The statistics

Virtually all modern e-learning platforms contain a set of procedures for statistical processing. These are classic processing for average scores, distribution depending on the score, number of solved problems, distribution of wrong decisions and similar. Processing which brings interactive learning, i.e. the platform allows evaluation of the achieved level and manages training procedures is relatively rare [8].

III. STATISTICS OF BEHAVIOUR

A. The task

Solving the problem of determining the behaviour of participants in the educational process assessed using electronic systems is of interest. In this case, different demands can be placed on this assessment and the assessment of the behaviour itself. It can be viewed from the perspective of psychologists, educators, managers, users and other staff. In this paper an attempt is made to show some results from the use of e-learning systems for such behavioural assessment.

B. Database

For the purposes of this study various electronic modules and databases for them were used. They had been developed at the Technical University of Sofia. These are the university student information system (USIS), E-management, electronic survey, electronic report of student's assessment, electronic report of teacher's workload.

USIS contains data for students, faculty, courses, assessments of students and number of times, good luck. The E-management platform is used for electronic control of the learning process and is linked to USIS. It contains data on discipline (teaching materials), academic schedule, results from the conduct of classes and tests, time parameters for data entry and more. The electronic surveys collect data for evaluating the discipline by students and time related parameters of the vote. Other modules contain similar data.

¹Valentin Videkov is with the Faculty of Electronic Technologies at the Technical University of Sofia, 8 Kl. Ohridski Blvd, Sofia 1000, Bulgaria, E-mail: videkov@ecad.tu-sofia.bg

²Rossen Radonov is with the Faculty of Electronic Technologies at the Technical University of Sofia, 8 Kl. Ohridski Blvd, Sofia 1000, Bulgaria, E-mail: radonov@ecad.tu-sofia.bg

C. A hypothesis

A number of training data for assessment of the learning process is collected in the electronic systems. However, these may be associated with additional time indicators allowing indirect evaluation of the behavior of learners, and learners well as.

For example, tracing of time spent for test training or number of trainings with different tests, the average rating of training and final assessment may be an indicator for memorizing the material. Even more interesting relationship may be the beginning of the task assignment and its completion. This can be an assessment of statistical predictions of the time for completing the work in a company. In this spirit a link between the performance of duties in curriculum and a future technological discipline could be sought.

D. Experimental results

Fig. 1 shows the relative distribution of answers (Q) in time at answers to the questionnaire and submission of reports (R).

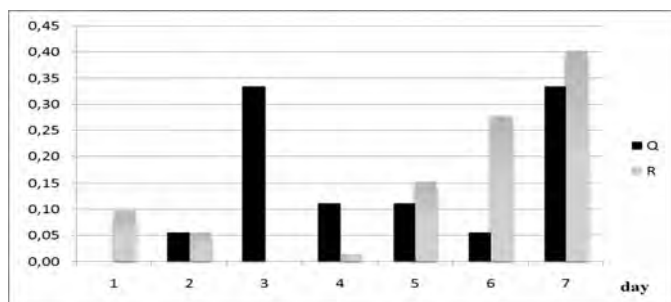


Fig. 1.

It can be seen that the statistical distributions are similar, indicating a behavioural influence.

Fig. 2 shows the distribution of assessments in two subgroups divided on the basis of their own choice.

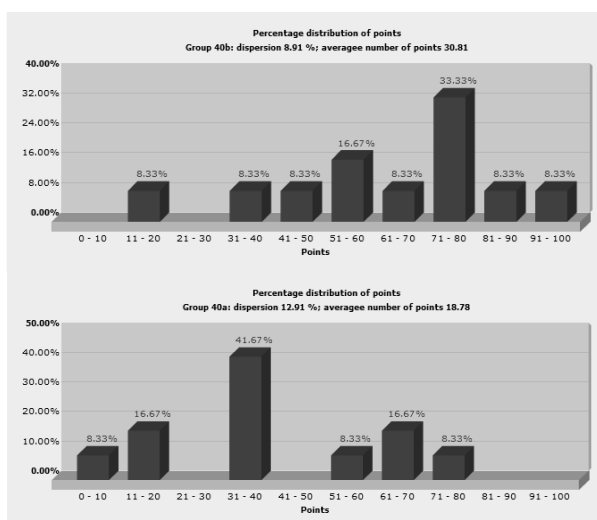


Fig. 2.

The difference in scores that could be interpreted as self-grouping of strong students in a separate subgroup can be seen.

The results from tracing the tendency for self-study or use of external results are interesting. Fig. 3 shows the data for review of other reports before the preparation of their own.

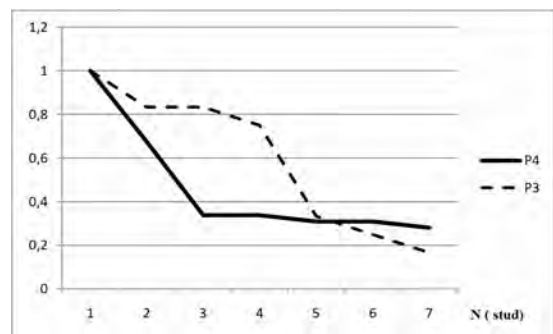


Fig. 3. Relative distribution of foreign protocols reviewed 4th year - P4 and 3rd - P3.

The sharp decline in the rate chart related to 4th year, we can interpret as a preference for independent work. 43% of the female students have reviewed other protocols and 73% of the male students.

IV. CONCLUSION

Preliminary results in this work show that using a suitable algorithm, the data accruing from e-learning systems can be used for behavioural analysis. They may show the tendency of the student group to prepare team solutions, to deliver results within a specified time, a tendency to individualism and other.

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