TRENDING TOWARDS A PERSONALIZED REAL-TIME EVALUATION SYSTEM BASED ON BYOD

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Abstract: All experienced lecturer knows that the educational environment is continuously changing. 30 years ago a good university lecture had 2 main goals! A lecture was the main source of the knowledge of the given subject, and the good lecturer added understandable examples, descriptions, relations and the real "semantics" of topics to this information. Nowadays students' main information source is not the lecture, not the library, but the always accessible internet! Therefore we need to change the classical lecture contents, methods, we have to transform the whole learning process to be active and dynamic in order to avoid empty lecture halls! We have introduced a new collaborative, team work based lecture style, based on a dynamic, bi-directional real time management system! This allows to enhance other teaching elements as well! During lectures this collaborative method collects a personalized information data set about subject, topics and critical parts. Based on this database it gives us a chance to create individual computer based exams! This environment also allows students to check their knowledge during the semester! This management system is accessible from a wide variety of computer systems, so every student can easily use his own device! (Bring Your Own Device). This paper will discuss a new evaluation method and its pedagogical necessity to use a personalized exam system at the end of semester as an enthronization of it!!

Key words: BYOD, education, lecture, real-time, evaluation

1 Introduction

In the last decades the number of students grew quickly in Hungary as well because working market needs more and more qualified people having diploma from higher education. Figure 1

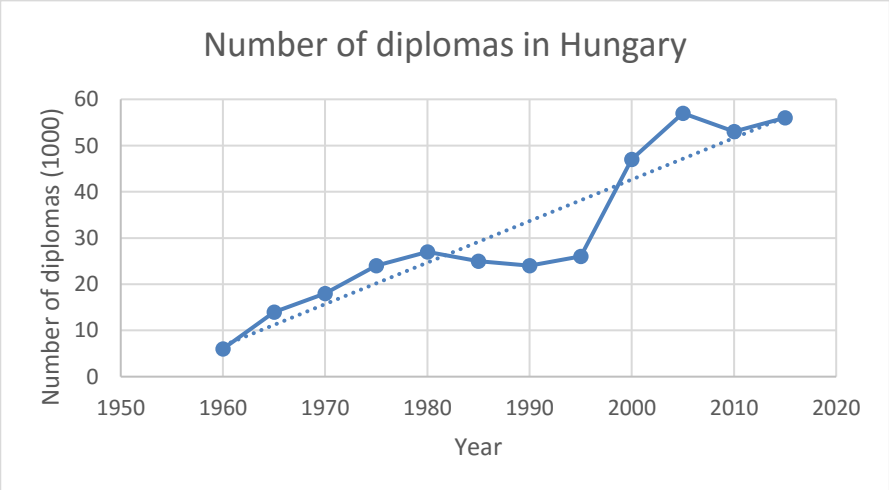

Figure 1: Number of diplomas from 1960 in Hungary [1]

As it can be seen, the number of diplomas, and parallel the number of students are growing up continuously. However this increasing process has stopped in the most recent years. This growing number is joyful from one side but this "*Multitudinous Education*" has

got some disadvantages too, like impersonalization. It is impossible to keep several hundreds of students in mind individualy, so generally lectures have lost their familiarity. Why is it important at all? The success of the learning process, among others, depends on motivation too. The motivation is strengthened by a positive teacher-student relationship, which is based on personal attention. [2] The question is given: how can we give this personal attention to our students during the whole educational process?

The other main problem is that the educational environment has also changed a lot as everything else around us due to mobile devices, developement. We use our smart devices for almost everything to read the news, to get wheather forecast or to book room for a holiday [8]. Students usually do not go to libraries to read the newest results of a specific subject, because it is enough to search on the net and within some minutes the results appear on their personal smart device. In most cases they may download lectures to see, read it on-line. These facts take a rise out of them they feel it will be enough to deal the problem sometimes later. Moreover the lectures are monotons for them contrary to the rich media environment they are used to. [6] Therefore they often miss the lectures. Experienced lecturers may notice that the results are not as good as they were some decades ago even though there are much more possibilities to get information. There are several causes of it e.g. not only the best 5%-10% of the students are attending universities, *there is no royal road* to sciences. An other cause is that if they do not deal with the topic continously the results will not be satisfying. Our next question is how can we produce such changes in our teaching process which could help us to motivate them to deal more and more with the given problems?

We produced a real-time presentation management system which helps us to activate, to motivate students during the lectures and make them more active. [3,4] The pedagogical viewpoints of its usage in strengthening the learning attitudes we talked about in another paper: *Changing the learning attitude of students by a BYOD system*. [11] Nowadays BYOD, smart devices, mobile device programming and m-learning are not roundable in education, therefore it must be part of teachers trainings as well. [9,10]

In this paper there is a new trend shown in which an application plays the main role in students'evaluation process.

2 eLection, our new presentation management system

The basic idea was to implement a tool to produce a bi-directional conversation between the lecturer and the possibly several hundreds of students. There are ready made voting systems but they can be used only for questioning students, however we wanted much more! From the other side there are situations where a student wants to ask something. Conversations started by the students are more interesting. During a lecture, students may loose the thread in many situations when the professor is not expecting it. Sometimes they do not want to interrupt the lecture thinking that everybody else understands it. My aim was to collect students' questions, problems as well in real-time during the lecture.

The question was how can I implement a presentation management system without expensive investments? In a faculty of informatics the servers and free WiFi are given for students. Therefore it was evident to produce a web-based application. As client devices students' smart phones, tablets and laptops are used. (This is BYOD system – Bring Your Own Device.) We had a survey about smart devices penetration among our students. [12] It shows that for today almost everybody has an own device which is always at the owner.

According to our plans we implemented an ASP.NET web-application which manages the whole system. [3,4] The code was written in C#, the real-time functionality is added by SignalR modul, the data is stored in MSSql, and to implement it to different kinds of user platforms we used BootStrap. The login method is managed by faculty ldap system so they are able to use their standard university login names and passwords.

The process itself looks like the following:

- The lecturer logs in to the system and creates a captcha code for the students and shows it to them.
- Students may take their own smart devices and log in by giving their university logins and the captcha created by the teacher for that special time. The system checks it and checks the IP-address of the login request as well. The check allows to log in only those who participate in the lectures and are inside the auditorium.
- After all the system is ready for the bidirectional conversation. Students may take part in the lecture in a more active way than usually. Besides answering the teacher's questions they may send questions, sign to the teacher any time they want. [3,4].

Two new features were added to the original system: now it is able to decide the exact physical location of the student as well using QR codes which helps in personalization.[11] The other new feature is to collect the actual questions, answers, problems individually logging everything into a database.

Using this new feature **we are able to follow students'personal improvement continously** during the semester. We are planning to send them a weekly report about their actual results to strengthen their motivations.

3 The evaluation

The evaluation may be classified into two main groups: criteria and normative evaluation. The aim of a criteria evaluation is to decide the outcome knowledge of the students. A normative evaluation is much more interesting for us, it compares students' knowledge with the knowledge of others and naturally measures their own development as well. [7] Therefore its purpose is to give feedbacks to students helping them in developing themselves.

A practiced lecturer knows that the same lecture will not impress different student groups the same way – somebody who is born to be an excellent teacher, feels the reaction of students at the back of his mind and slightly changes his behaviour, teaching method due to it. The continuous evaluation is an exact and very important feedback for educators: if something was not clear for students, it can be seen from the results immediately. In this case something must change:

- it might be the teaching method (to explain, using more demos, explain it again or give new examples) or
- the presentation mode (to speak slower, to stop sometimes, to tell a joke etc.).

If it is needed, the practical lessons also may help in the process to highlight the more difficult parts with tasks.

Maybe the fact that continuous evaluation is important for students as well, it is surprising – they do not like it. But it is a simple fact – if they are evaluated only at the end of the semester it may happen that they are lost for good and all. A continuous evaluation gives feedback to them about their actual knowledge, how much they developed and they may place themselves comparing to others. In this case they may see week by week what

knowledge level they should achieve and it stimulates them for a better work. It is how the Pygmalion effect works [5] – communicated expectations affect student's result.

General quiz features

There are several quiz maker systems on the market. Two main concepts are working in these cases typically. We have to mention the case when the teacher simply creates the test and the application evaulates it automatically. The results are shown with graphs or as downloadable xls files. You can give time limits or number of trials etc. and a lot more. It is more interesting when the questions are randomly choosen from a quiz bank, therefore each student may get different questions. (e.g. Moodle solution *https://docs.moodle.org/24/en/Building_Quiz*) Of course, in this case we have to pay attention to create different but equal difficult-level tests to remain fair. In the case of some intelligent systems the chosen answer (whether it was good or not) decides the next question. Describing different paths for students based on their actual answers – would be excellent especially during the time of practicing. (e.g. iSpring solution *http://www.ispringsolutions.com/ispring-quizmaker*)

New evaluation concept

Therefore, during the semester we are ready to compose the practice and exam quiz knowing students' preknowledge. We would like to reuse the previously collected information about their knowledge – what were their answers, what were their mistakes at important questions.

In the case of a practice quiz in our system questions are generated randomly from the question bank collected during the semester. It is going to give those questions more frequently which were not answered perfectly to give better feedback about topics that should be repeated again.

An exam quiz slightly differs from the standard usage. The significant difference is when the system chooses random questions for a special student we may take into considaration the average success of the questions and the individual success of it too. Therefore the exam is customized.

Due to our concept the lecturer may decide the percentage of pregiven and randomly given questions. Among randomly given questions the educator may give the rate of negative or positive questions, the rate of easy and difficult questions and the rate of questions about the topics when the student was active. As you can remember eLection is a bidirectional system so students are also able to send questions or simple signs to the teacher in case of trouble – so their active periods will also be noticed. Figure 2 shows the activity of a given student during the semester.

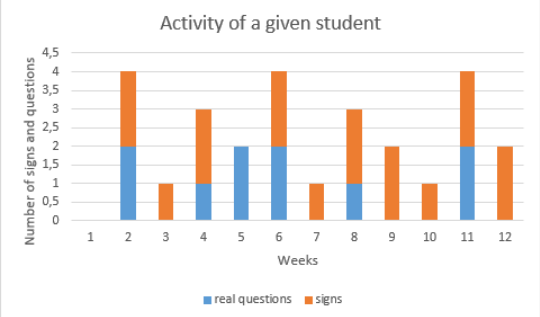

Figure 2: Activity of a given student

We classify a question positive if the examined student answered it successfully during the semester and negative if the answer was not good. A question is called easy if more than 80% of students gave a good answer for it, and it is difficult if less than 20% answered well. On the 3rd Figure you may see a graph about 15 questions. Easy questions were the 6th and the 11th, difficult questions were the 8th, 9th and 10th. The examined student failed the 1st, 6th, 8th, 12th, 13th and 14th (these are the negative questions for him).

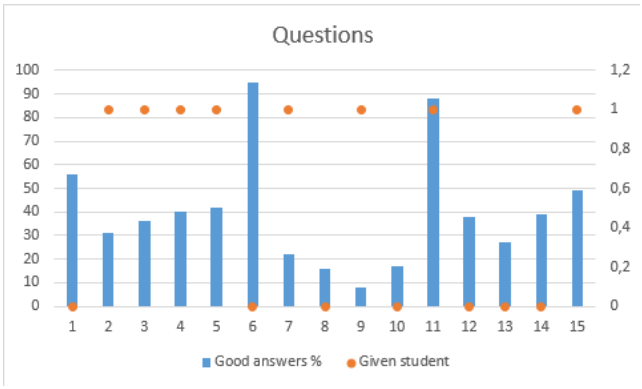

Figure 3: The percentage of good answers and the result of a given student

This feature of the application is before testing under real circumstances. We have to be very wise and do the fine-tuning of the system carefully. Tricky students may give „bad" answers during the semester hoping they may modify the question choicement advantageous for themselves. (Giving willful bad answers for very easy questions may cause that the system choose random questions among them.)

The data from the database may be downloaded in csv format and give a possibility to analyze it. In the time of writing the paper we visualize the collected data by using an external tool, but it is planned to implement a built in tool too.

4 Summary

The first decades of the 21st century according to increasing penetration of the mobile devices have caused a real revolution using new mobile technologies everywhere in daily life as well. Old fashioned university lectures are not as effective as some decades before - students often miss them.

The modernization of lectures can not wait longer because we are in the 24th hour to avoid empty auditoriums. Personal attention and continuous evaluation motivates students for better work and our aim is to achive the best results we can.

For this purpose we implemented a real-time bi-directional BYOD system which helps us to activate students during the lectures and collects some data from their actual knowledge. As a new feature we added a quiz editing tool to it to be able to make a more dynamic evaluation style. Using this continuous evaluation method, it may activate students. The first trials showed that it is a promising way.

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