

Learning Analytics Dashboard Model to Supervise a Distance Learning

Zakaria Lahbi, Mohamed Sabbane

Abstract: *Providing performance measures of training devices becomes a necessity for teachers. Without having them, teachers will have no clue in measuring the goals achieved. However, the analysis techniques available today allow us to go further and to consider new applications to serve the quality and effectiveness of training devices. This article presents the design and the implementation of a system for the supervision of an online course and the different roles involved in a computer environment for human learning. As a result, a description of the needs in terms of dashboards during data observation phases generated during a learning situation will be provided. Our objective is to define all the stakeholders that a dashboard can contain, the different user profiles, their activities, their viewing preferences and their objectives.*

Our main goal is the design and implementation of a dashboard model that meets all the requirements of different stakeholders of consultation or adaptation rating and customization.

This model will give results in the form of different visualization style that will discuss in this article

Keywords: *Learning analytics, online course, dashboard, supervision course, Learner profile, user interactions.*

I. INTRODUCTION

Today with the evolution of distance education systems, the need for a visualization module is becoming more and more of a necessity [23]

More research has been conducted in this direction especially on the dashboards [24] [25] trace analysis and feedback from online education systems such as mooc provides relevant information about learner behavior and their interest and a clear view of the quality of educational content created by teachers [26][25] The traditional approach to follow the progress of learners [1].is based on predefined learning results such as the level of understanding and mastering through evaluation results.

The teacher is able to adapt his knowledge based on the immediate feedback from the learner [27]. For example, if one of the learners is bored or at the point to get bored, the teacher can save the situation to ensure that the resources included are all relevant

The platform of virtual education "Virtual Learning Environment (VLE) 'is used to provide online the various aspects of education such as

lectures, automated assessment tests and even focus groups. It usually keeps a log of every event that has occurred between the system and its users. Thus, it can provide ideas on how learners behave in an online learning environment.

Revised Manuscript Received on January22, 2020.

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The analysis of the user's interactions with the virtual teaching platform[2] can provide information on how the user is behaving. The behavior detection models can be used to determine reliably, but it can also be used to determine the learner's state of mind as if is he engaged in his learning experience? Is he satisfied? Based on this knowledge, we created a thumb automated response mechanisms to enable the learner to get back into a situation where learning can be conducted more efficiently.

Interpreting these interactions significantly improves learning and teaching. It can provide: all the indicators for increasing the success of learners, the detection of risk profiles, the formulation of homogeneous groups, and the customization of courses ... etc.

However, the log file structure does not provide a direct view of learners' activities and progress. Technically, data is stored in multiple tables while data events are stored in another sequential time structure [3]. By nature, recorded log files are not intended to measure specific behavioral concepts. Thus, information about learners is unclear and cannot be deduced directly from the recorded data [4].

Learning Analysis or "Learning analytics (LA)" is defined as the measurement, collection, analysis and communication of students and their context, understanding and optimization of learning and its environment in which it occurs. Based on this definition, it is emphasized that the main objective of the LA guide is decision-making on strategies to promote appropriate interventions for at-risk learners [5].

From the analysis of digital or analog traces that students and their teachers mark during the teaching and learning process, LA researchers try to extract the motives for action for decision-making. The analysis can be done by techniques of extraction and classification of data known in the literature.

The implementation of an optimization and continuous improvement approach based on the analysis of online learning data, has multiple benefits for all stakeholders:

The learner Effects : Students exposed to the dashboard get better grades than those who are not exposed [6] [7] [8][9][10]

As a result, the teacher must react with certain action such as: adapts the appropriate course for students

- update of educational content
- classification of learners
- set up target activities

Other indirect effects that is based on: The satisfaction with higher prices [10], requests for help earlier and more often [6], Improves self-assessment, reflection and self-regulation [11] [12] [13]and Improved relationships between students and teachers [14]

Dashboards are constantly used in all systems. They are useful for the purpose of presenting visually through figures and graphs the summary of a user's interactions with the system. The majority of these scorecards focus on helping teachers to gain insight into all of a learner's activities. Similarly, they allow it to locate students in difficulty. They can also be useful in distance education as it allows seeing in real time all the activities that learners exercise in their VLE environment so that teachers can intervene and adapt their course according to the need.

Recently, several dashboard tools have been developed to support the teaching and learning process. In this respect, Analytics graphs, a plugin for Moodle: allows the teacher to view and identify the profiles of his students, to send messages to groups of learners who have had access to certain content, to offer visualization of job submissions (number of users who submitted or not the requested assignments, job submissions after the deadline), and to get answers to questionnaires and exercises.

Similarly, the tool KEATS Analytics [15] based on Microsoft Excel macros, provides access statistics to Moodle, such as the total number of pages viewed, the average time per session, and the rejection rate. The tool also makes it possible to deduce the number of visits during days or hours of the week. To use the tool, the user must download the access logs to Moodle and open them in spreadsheet. Technically, the operation requires the use of proprietary software and prior knowledge of the Moodle platform (generation, backup and opening of files).

In contrast, the loop tool [16] is open source developed for Moodle and Blackboard platforms. Its goal is to provide teachers with a visualization of participant interactions based on access log processing. The views available in the tool are: the number of pages visited, the display of the progress of the course by the learners, the most consulted contents, the number of interactions in the discussion forums etc... The loop also provides measures such as page viewing, participants, sessions, average time, session duration, and average page views per session. This tool is still in test and is not available for download.

Another dashboard named Lapa [17] was recently developed by a South Korean university. Lapa processes access to Moodle folders to provide a view of participant interactions. The tool allows the student to visualize his behavior within VLE in relation to the general behavior of others. Examples of views are available in the tool: Dispersal diagram, access frequency, time spent in the VLE, regularity of visits and number of visitors.

In reality, the tools are numerous and the choice of use is made on several criteria. Here are some other indicative tools to show the interest of the scientific community and its involvement in finding the best methods to serve online education.

CourseVis is used to view online course data in the WebCT virtual environment. This tool is used as an extension of the LMS, it allows to explore the data interactively, and to activate the manipulation of different visualization mechanisms such as the representation of the learners' performance of each learning activity [18]

The EduVis solution provides an analysis of learner profiles using educational data extraction techniques

associated with specific patterns observed in program elements [19]

The gismo (interactive student monitoring tool chart for Moodle) is an open source application that functions as an extension of Moodle, and can be added to the environment to generate graphs of student interactions with resources and resources. The activities are available at LMS [20]. These solutions fulfill their role of transforming a large volume of data into some more understandable information. However, they are limited in terms of customization and do not provide sufficient resources for various situations.

The approach described in this LA study expands opportunities through an open solution that enables the development of resources to meet needs identified by specific educational contexts.

II. MATERIALS AND METHODS

The evaluation of online training devices remains a difficult subject. The traditional methods of evaluating e-learning courses are generally carried out after the course of these courses, and few relevant indicators allow the training manager to react quickly if a problem arises. The implementation of a systemic approach to knowledge management and analysis of the data generated during the development of training devices can provide training managers with the means to evaluate and monitor the quality of learning sequences within devices, as the progress of this one. In case of abnormality detected and characterized, the teacher will be able to understand the origin of the problem and provide a quick and effective response allowing learners to continue their device in the best conditions. Finally, these real-time monitoring mechanisms provide the ideal environment for experimenting and measuring the effectiveness of new pedagogical approaches.

Our job is to build an adaptive system to help a teacher group to gather the information set about these learners based on their trace generated by the system which results in a different reaction to these, to provide a clear idea about the global state of its course publishes in the platform and the operations necessary to improve them, and quantify and compare the activity of the users in an online course

This model (Figure: 1) intended primarily to provide relevant information in real time on a learning activity.

But before we go to the model, we have to answer some information a dashboard can ask them, The famous 5 questions that it asked on any system called the 5 w (Who, What, When, Where, Why)

Who: aims to collect data to help describing the characteristics of the system worker: their roles, their level of visualization, their activities and their types of decisions they want to make. In our case there are two main speakers: learners, teachers,

What: that every user must visualize to make decisions,

When: The third section is used to identify "when" it makes sense to visualize a particular piece of data and when it may be more useful in a given case scenario. In our case it is a learning activity.

Where: Defines the best way to visualize the data in a given situation for a particular stakeholder. In other words, each user must choose "how" to visualize each piece of data in order to facilitate their understanding and interpretation of another term or we can project the results of our dashboard.

Why: the first question asked is what the purpose of a dashboard is? the need for a dashboard for course supervision, students in a remote access platform.

Question	Description
Why	Supervise distance Learning
Who	Learners, teachers

What	<p>Learner: Visualize the activities of a learner on agiven course.</p> <p>Teacher:</p> <ul style="list-style-type: none"> •visualize state of consultation of the course. •Classification of students •Update of educational content. •Learnerevaluation •Add an activity
When	in an observation scenario of a learning activity
Where	Graphic format (pie3D, barplot,...), csv,excel,....

III. PROPOSED MODEL :

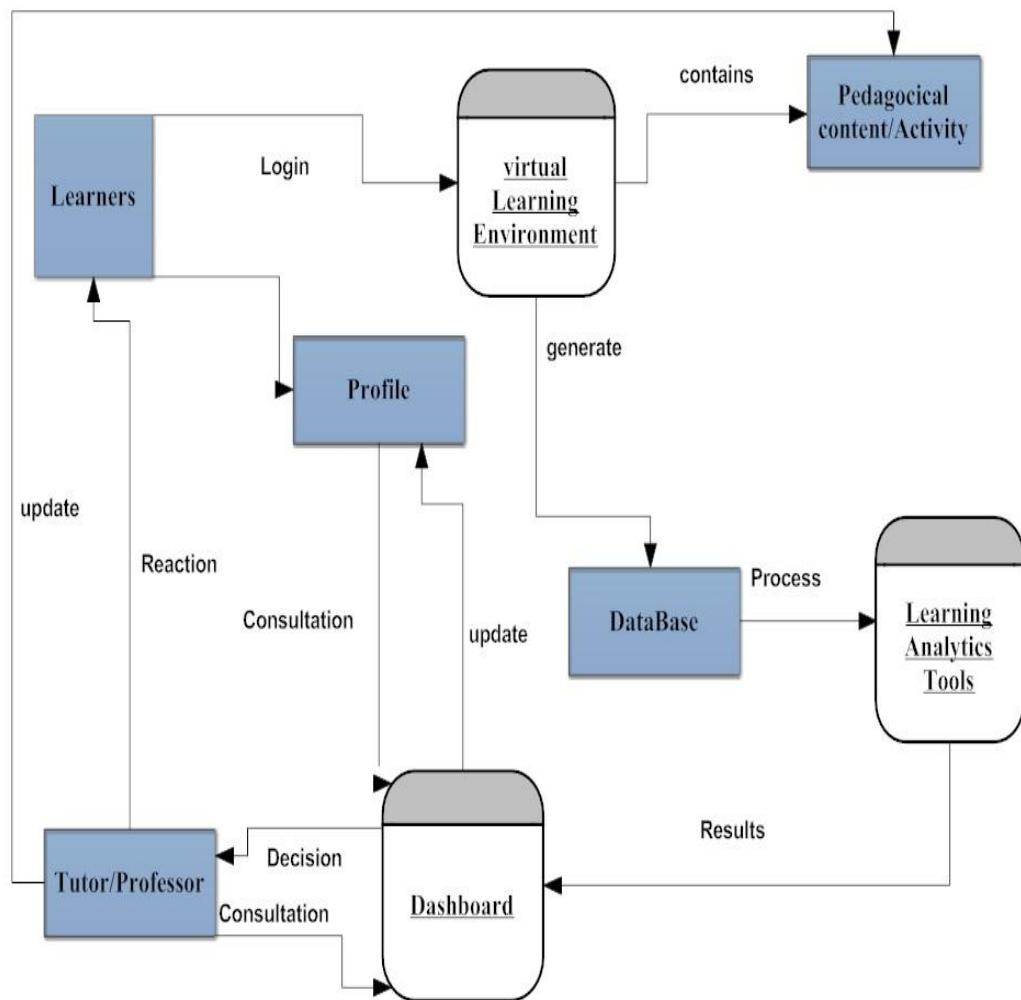


Fig 1: Learning Analytics Dashboard Model

Students must first authenticate with a login and password at the system level to perform a learning activity: course consultation, make exchanges synchronous [21]and asynchronous [22]. evaluate (quiz)

After using the platform, the student has the right to consult his progress through our dashboard in relation to the accomplished activity (the number of completed exercises,

exercise note, the exercise set performs as well as these score associate

Vle: virtual learning environment: provided a platform for which students can practice all learning activity on the one hand and on the other hand gives the opportunity for teachers to upload their teaching content in different formats and as evaluation tools.

Teacher: is the person in charge of the training. Our system makes it possible to answer some questions of a teacher such as:

- ✓ The activities carried out in the course?
- ✓ The activities performed by a learner?
- ✓ The level of the learner compared to the activity carried out?
- ✓ The course and day or not? (through the interest of the learner)
- ✓ What classification to follow?

LA Tools: In this case we used an open source tool for data analysis called R, a powerful software that handles the processing and filtering of our database generated by the VLE.

IV. RESULTS AND DISCUSSION

After having implemented a part of our model, interesting results have been generated from students and teachers, as well as from research that shows activity for an apprenticeship, activities in a given course, and learners who have followed a given activity in a precise course.

POO - : Selma Be

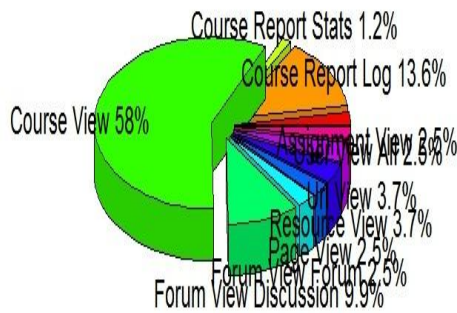


Fig 2: the activities carried out during a course of POO by a learner

Table 1 . Course activity description

Component	Access Numbers
Assignment View	2
Course Report Log	11
Course Report Stats	1
Course View	47

Forum View Discussion	8
Forum View Forum	2
Page View	2
Resource View	3
Url View	3
User View All	2

POO - : Course View

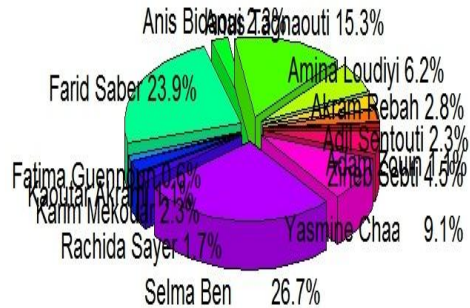


Fig 3: learners who follow an activity < course view

Table 2. Learners description

Learners	Access Numbers
Adam xxxx	2
Adil xxxxx	4
Akram xxxx	5
Amina xxxxx	11
Anas xxxxx	27
Anis xxxx	4
Farid xxxx	42
Fatima xxxxx	1
Kaoutarxxxx	2
Karim xxxxxx	4
Rachida xxxxx	3
Selma xxxxxx	47
Yasmine xxxxx	16
Zineb xxxxxx	8

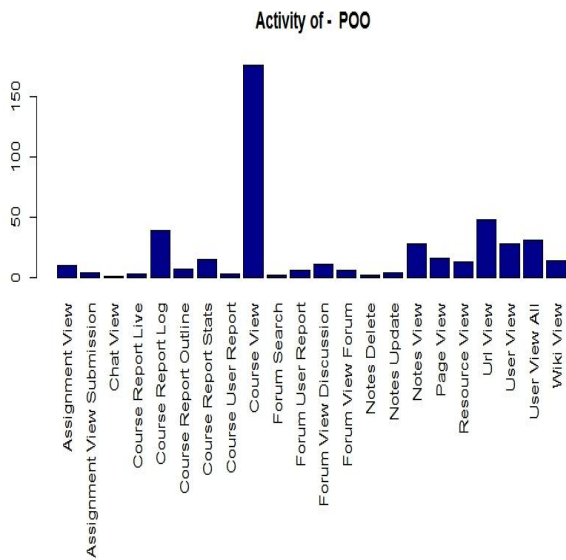


Fig 4:the activity realizes in the course: POO

Table 3. Activity description

Component	Access Numbers	component	Access Numbers
Assignment View Submission	4	Forum Search	2
Chat View	1	Forum User Report	6
Course Report Live	3	Forum View Discussion	11
Course Report Log	39	Forum View Forum	6
Course Report Outline	7	Resource View	13
Course Report Stats	15	Url View	48
Course User Report	3	User View	28
Notes Delete	2	User View All	31
Notes Update	4	Wiki View	14
Notes View	28	Assignment View	10
Page View	16	Course View	176

V. CONCLUSION

The Learner Remains A Masterpiece Of All Types Of Distance Education, For Goods Placed On The Rails, The Goods Must Be Followed And Well Supervised,. The System Has Given A Few States Of Its Interaction With The Distance Learning Platform, So It Creates A Space For The Teachers To Give A Clear View Of The State Of Their Students, Their Progress And Interest. Who Are Shown Towards A Given Course.

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