# MoLekol: An Enhanced Learning Support System for Class-Based Scenarios

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## ABSTRACT

Many of the existing learning support systems do not lived up to their promises when used in a real classroom environment. They lack flexibility and cannot be adapted to the needs of the tutors and that of the students. MoLekol is a smart and innovative learning platform which provides a plethora of facilities. These include regular ones like the ability to have different types of users, creation of courses, upload of course materials, week planners, creation of online tests and enrolments. However, MoLekol brings some innovative features as well. Now, tutors are able to monitor the attendance of their students, monitor their progress in assignments, mark their assignments online, collapse or extend course sessions easily and they have more control over the management of their course materials. Students also have facilities to form teams online, to allocate tasks to team members, to monitor the progress of their assignments and to submit it online. They can also view their attendance and their tests and assignments marks anytime after the information have been updated by the tutor. Although the system includes a superadministrator, his roles and responsibilities have remained basically the same as in current e-learning systems. MoLekol is expected to become a reference amongst learning support systems.

## Indexing terms/Keywords

Education, E-learning, Learning Support System, Information Technology.

## Academic Discipline And Sub-Disciplines

Education; Information Technology

## SUBJECT CLASSIFICATION

Learning Support System

## TYPE (METHOD/APPROACH)

System Development

# Council for Innovative Research

## INTRODUCTION

Since the advent of the internet, the necessity of an online Learning platform has grown up significantly. Systems such as CMS – Content Management System, LMS – Learning Management System, LSS – Learning Support System and VLE – Virtual Learning Environment have been developed and available to provide systems and supporting tools do feed this necessity. The LMS and VLE have no clear distinction. Some may consider them as similar other may consider VLE as LMS but emphasizing the learning environment over management that LMS do [1].

The CMS is a widely used technology as it to deliver course content easily but does not manage the course. While LSS is rarely used as their criteria to cater for the necessity depends on vast variables such as type of study, level of study,

environments needed. Thus to implement a LSS, boundaries have to be settled up and consider specific requirements based on the course curriculum [2, 3]. Valencia institutions consider LSS to be the learning-centered (the system) of interactions among students so that to promote the interest (support) of gaining knowledge by study (the learning). It emphasizes on the learning aids needed by students rather than managing the course. For Valencia College, The system provides electronic portfolios, online libraries, and web-based learning tools. It goes beyond that. In short, Valencia LSS interacts in multiple ways, so as to support student learning and achieve student career and educational goals.

There is a need of LSS in distance education programs. There are challenging factors that interfere with such programs. These factors are the time that have elapsed since these students have completed their undergraduate degree and lack of familiarity with modern learning technologies. Thus there is a need to normalize the background academy of students. Also, we have to consider the transition of persons with jobs back to faculty life [4, 5]. Furthermore, it has been long recognized that active, participatory and systematic learning is more effective than passive learning and that learners need feedback early and often [6, 7].

This paper proceeds as follows. In the next section, some popular elearning platforms are reviewed. Section III describes the architecture of the system. A description of each component is also provided. Section IV proceeds by giving details of the implementation aspects and finally Section V concluded the paper with a note on future works.

## RELATED WORKS

These are existing systems that provide a learning platform similar to our proposed system. The most used platforms are: Moodle, ATutor, Claroline and BlackBoard Learn.

### Moodle

Moodle is an open-source Course Management System with the goal of creating effective online learning sites and is very useful to course providers and learners. The hierarchy of Moodle is Administrator, Tutor, Student and Guest. The Administrator or course creator manages courses and the list of students and assigns them to a tutor. The Tutor manages the resources and activity of courses. The Student interacts with the course once he has register in the system; he can enrol himself to other courses by using Enrolment key. Guest is access a course using an enrolment Key.

Moodle Resources are course materials used for a particular course and are Book, File, Folder, IMS content package, Label, Page and URL [8]. Moodle Activities are tools that interact with students and are Assignment, Chat, Choice Question, Database, External Tool, Forum, Glossary, Lesson, Quiz, SCORM [9] package, Survey, Wiki and Workshop. Moodle also offers extra features such as backup facilities, Imports and exports of courses, course reports, Grades, Blackboard Migrations, Surveys, Assignments, Chats and Workshops. Moodle can be enhanced by adding plugins.

### ATutor

ATutor is an open course Learning Content Management System is used for online course management. It has a key feature which is accessibility to visually impaired and disabled learners.

Anyone willing to create a course can do so by first registering and create as many courses as needed. Compared to Claroline, ATutor lists all courses created in its Home Page under the tab *Browse Courses* .There is also a Search Engine to search for a specific course. Each course marked as *public* – anyone can access it, *private* – only the owner can access it or *protected* – anyone with an enrolment key can access it.

ATutor also provides the following features: chats, group blogs, social networking. Inbox/Messaging, adaptive navigation, workgroup, file storage, feedback, preference settings and content pakage viewer

## Claroline

Dokeos is a continual development of Claroline since 2004. Both are still available to use and download Claroline is an open course e-learning and e-working platform allowing tutors to build effective online courses and to manage learning and collaborative activities on the web.

The key features [10] of Claroline are: publishes documents and files, provide PDF and DOC Format Conversion, provides forums for public or private use, builds a learning path, organises working of groups, creates exercises, gives notices through the agenda on home page and publish announcements which can be sent to e-mail, enables tutors to manage assignments and check students' attendance, checks statistics on completed exercises and collaborates with the wiki.
Claroline includes other features such as chat, Users and Groups Management and Session Course. A course can be set accessible by anybody (without login), only registered Users or By Users in the course User list. It also enhanced security by using an enrolment key for which registered Users can access the course by using an enrolment key. The creator of Claroline has ceased its development but continues it under another name called Dokeos since 2004.

## BlackBoard Learn

Blackboard Learn is an online proprietary learning management system that consists of 4 modules: a learning system for online course delivery and management, a community and portal system, a CMS and a system to record and examine student assessment result [11].

The key features of Blackboard Learn are: Backboard Drive, Inline Assignment Grading, Test Enhancements, retention center, Calendar, Content editor, my Blackboard, Course evaluations, user-centric interface, quick enrolls, student activity reporting, internal & external collaboration and course relationship management.

## Comparison of Existing Learning Platforms

**Table 1. Comparison of Existing Learning Systems**

| Platforms | Ratings | Date of last Update | Type | Supported Languages |
|---|---|---|---|---|
| Moodle [13] | 4.379 | 14 May 2013 | OpenSource | 70 |
| ATutor [13] | 4.333 | 14 Mar 2013 | OpenSource | 15 |
| Claroline [13] | 4.574 | 28 May 2013 | OpenSource | 35 |
| Blackboard Learn [14][16] | N/A | 8 May 2013 | Proprietary | 15 |

## SYSTEM DESIGN

The proposed system consists of the following components: CSM (Course Support Manager), CTS (Class Test System), MPM (Mini-Project Manager), LFS (Learning Forum System), FM (Faculty Manager), Profiler and UM (User Manager).
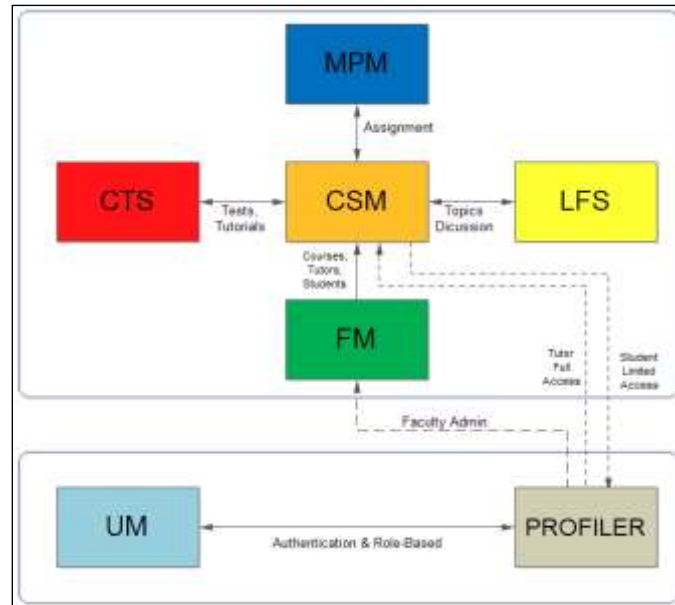
**Fig 1: Architecture of the LSS**

Figure 1 shows how the different components of the system interact with each other. The roles, functions and responsibilities of each component are explained in more detail below.
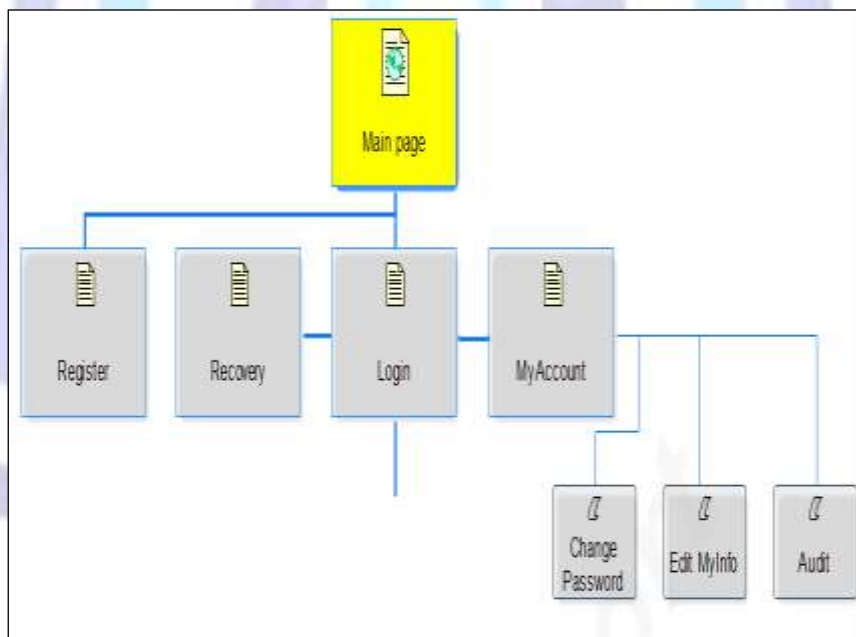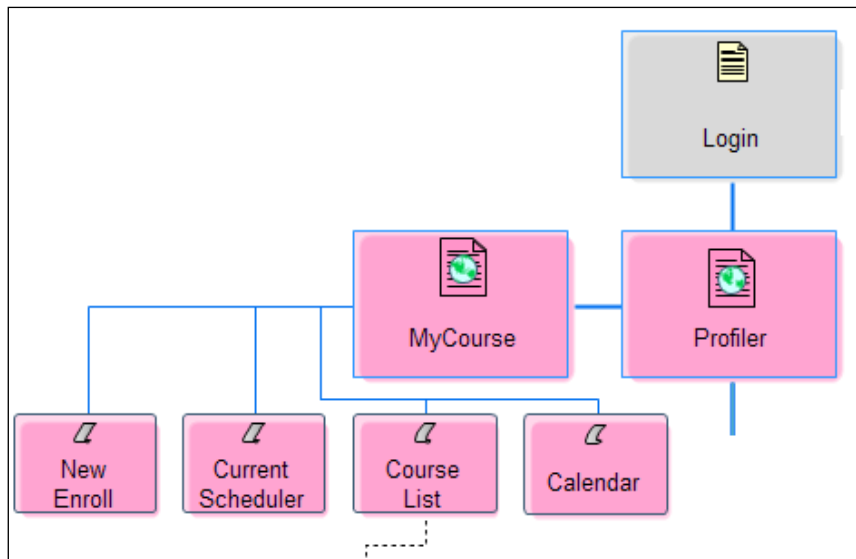
## User Manager



**Fig 2 : User Manager**

The User Manager (UM) and the Profiler are together responsible for the authentication of users by defining their roles and creating a profile for each user. The Profiler is explained in more detail below.

## Profiler

**Fig 3 : Profiler**

The Profiler allows users to have different roles or profiles. The roles are Student, Tutor and Faculty Admin. It allows a student to enrol on an existing course, to view the list of courses on which he is currently enrolled, the activities of the current week via the Current Scheduler, the Week Planner of a particular course and the Calendar of all events for all courses. The Tutor role is handled by the CSM and the Faculty Admin role by the FM.

## Course Support System (CSM)
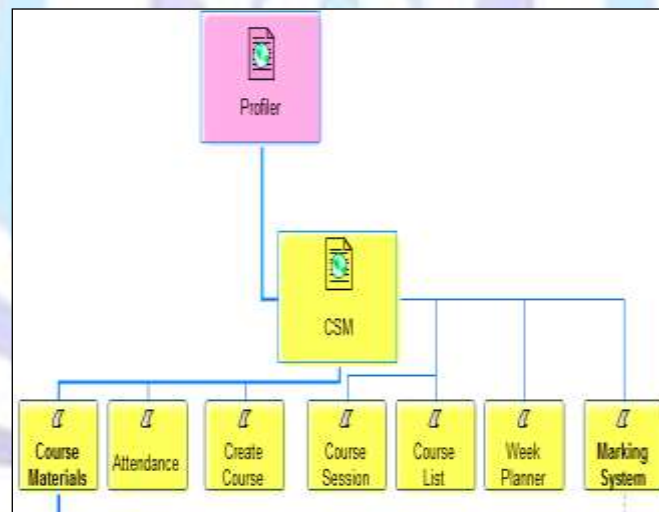


**Fig 4 : Course Support Manager**

The Course Support Manager (CSM) manages courses owned by tutors. A course will usually have more than one course session. This is a way to avoid redeploying the same course for another year and to another batch of students. Each course has its own Materials and the tutor can easily copy and share Course Materials from other courses. A Course Materials can be a file, a document, an assignment, a class test, tutorials and/or revision notes. Each course session has its own Attendance, Week Planner and Marking System. The Attendance is optional. The Week Planner classifies the course into weekly sessions and each week will then show its Course Materials. The Marking System keeps the grades obtained by students in Assignments and Class Tests.

## Class Test System (CTS)
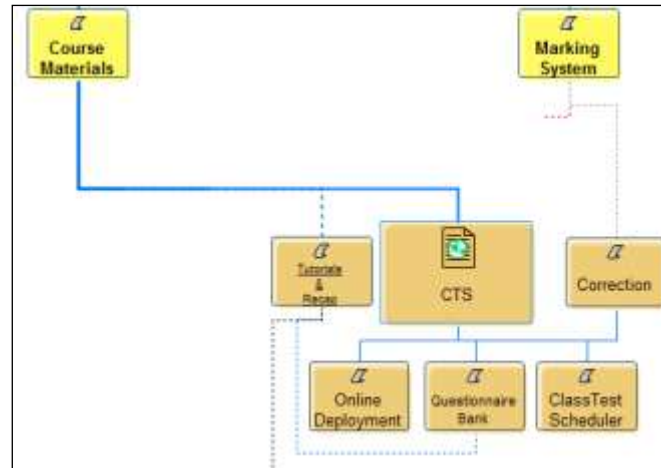
**Fig 5 : Class Test System**

Tutorials, Recaps and Class Tests are Course Materials that are managed by the Class Test System (CTS). All questionnaires are stored in the Questionnaire Bank. When a questionnaire is created, it can copy questions from other questionnaires in the bank. The types of questions available are Multiple-Choice Question (MCQs), one-word answer questions, challenger questions (this is similar to MCQs but the questions carry different marks depending on the number of choices) and structured questions. Class Test has the options to have a Grade scheme and to be scheduled such that all students take the test simultaneously. Once a Class Test is over, the Tutor has the tools to correct it. All Questions are corrected automatically by the system except Structured Questions. The marks are automatically stored in the Marking System of the CSM.

The challenger question originates from a French TV game named "Tout le monde veut prendre sa place" [17] which is broadcast on France 2 Channel. There are 3 ways to answer a challenger question: Duo, Quad and Mono. The duo package shows 2 choices and the score is 1 point. The quad package shows 4 choices and the score is 3 points. The mono package does not show any choices, the user has to enter a one-word answer to score 5 points. The attribution of points can be set by the tutor.

## Mini Project Manager (MPM)
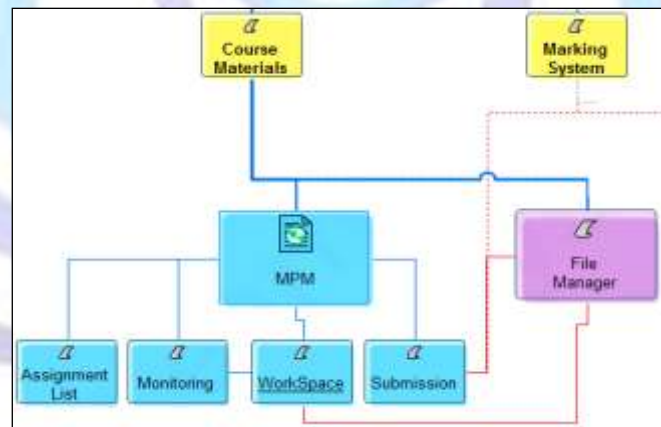


**Fig 6 : Mini Project Management (MPM)**

The Mini Project Manager (MPM) manages assignments. It    provides the tutor with tools to monitor, comment and view files while an assignment is in progress. Each group of students has their own Workspace to manage the tasks assigned to them. The File Manager enables a tutor to upload files into the Week Planner. A student can also upload files when he is working on an assignment.

## Learning Forum System (LFS)

The LFS is similar to a forum except that it has limited topic or discussions based on course keywords that the tutor needs to provide when the course is created. The tutors can also participate in the discussions. When a student has an issue, first, he first searches for the topic closest to his problems. If no one has posted a similar problem, only then he should create a new issue. Students can collaborate on one problem in order to elucidate different view points or different answers. The best solution will be marked by the person who posted the problem.
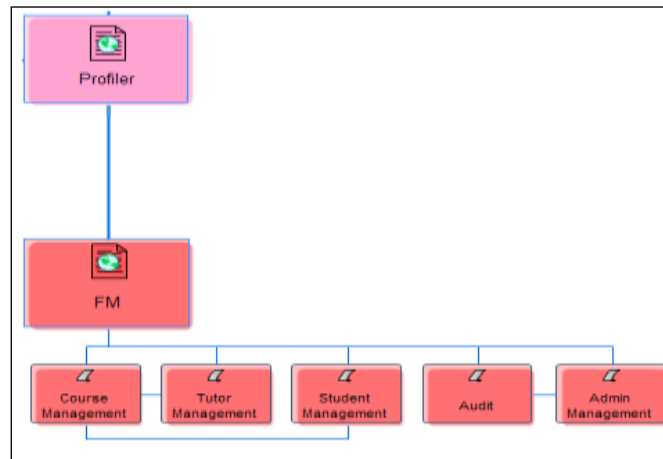
## Faculty Manager (FM)



**Fig 7 : Faculty Management**

The Faculty Manager (FM) is managed by a faculty admin. To act as a Faculty Manager, a user has to send a request together with the information about the faculty to the Web Admin. The admin will decide whether to allow or to decline this request. The faculty admin can see the grades and attendance of students. The faculty admin can also allow other users such as a clerk of the faculty to access these information.

## IMPLEMENTATION

The main entities involved in the Learning Support System are Tutors, Students, Faculty Admins, Courses, Course Sessions, Course Materials, Tutorials, Recaps, Assignments, Class Tests and Grades. The tutor manages the list of students enrolled in a course. A course consists of course sessions, students, course materials and grades. A student can view his grades at any time. The faculty admin can overtake the management of courses and students from the tutor. The key components that this system proposed are the Profiler, Week Planner, Marking System, Attendance, Assignment Management, Assignment Workspace and Assignment correction. Due to space constraint, only the main and innovative parts of the implementation will be described.

## Profiler



**Fig 8 : Profiler**

It is possible for one member to have multiple profiles to accommodate different roles. A tutor can create as many courses as needed. The student can enroll to a particular course by providing the course's enrolment key and his student identification number.

## Week Planner

**Fig 9 : Week Planner**

The Week Planner is the main interface of each course. It classifies course materials into weekly sessions. In case, there is a public holiday or classes are cancelled, the tutor can easily inform the students about the change when postponing the lecture by one week. The week planner automatically handles the date issues. In a situation where the tutor is not able to complete his lesson in one lecture, the tutor can expand the content of that week with the next week. Any course material can be dragged or moved from the right panel to any week panel. A student can see the Week Planner but cannot modify it. Tutors can upload all the files at the beginning of the semester but these will be hidden to the students until its due date. This facility of hiding documents until the due date is not available in most systems.

## Marking System



| | Student ID | Class Test 1 (25 Marks) | Class Test 2 (25 Marks) | Assignment (50 Marks) | Assignment 2 (25 Marks) | Class Test 3 (50 Marks) | Overall % |
|---|---|---|---|---|---|---|---|
| 1 | 113400 | 18 | 16 | 44 | 14 | 33 | 71.43 % |
| 2 | 113401 | 12 | 24 | 13 | 24 | 22 | 54.29 % |
| 3 | 113402 | 25 | 18 | 27 | 23 | 33 | 72.00 % |
| 4 | 113403 | 12 | 24 | 13 | 18 | 22 | 50.86 % |
| 5 | 113404 | 25 | 18 | 47 | 18 | 39 | 84.00 % |
| 6 | 113405 | 12 | 24 | 13 | 14 | 22 | 48.57 % |
| 7 | 113406 | 25 | 18 | 0 | 13 | 45 | 57.71 % |

**Fig 10 :  Marking System**

The Marking system keeps data from class tests and assignments. It shows the overall marks obtained by each student. A student can view his grades at any time. The tutor can view all grades at once.

## Attendance



**Fig 11 : Attendance Sheet**

The attendance sheet enables a tutor to record the presence of students in a course session. A student can view his attendance for all courses that he is currently following. In this way, he can make sure that he is sticking to the 80% attendance threshold policy of the university. This facility is also missing from most systems.

## Assignment Manager



**Fig 12 : Assignment List**

The Assignment List shows the list of all assignments for all courses. The tutor can create a new assignment, edit existing ones, monitor assignments, perform corrections and/or mark them. Most systems provide limited support to manage student-submitted materials.

**Fig 13 : Add an Assignment**

When adding an Assignment, a tutor can insert details such as to which course it is for, its duration, the assignment type, list of topics and the marking criteria. The Assignment Type determines whether the assignment is done in groups or individually. Students are allowed to choose their own assignment from a list of proposed topics. The system allocates the assignment on a first come first serve basis.



**Fig 14 : Assignment Grading Criteria**

The Grading Criteria enables the tutor to add different criteria to assess the assignment. Each criterion usually carries different number of marks. Usually, the criteria which are more difficult to satisfy or which involves more work will carry more marks. The total points is also provided. New criteria and its appropriate points can also be added. The total points will be updated automatically.

## Assignment Workspace

**Fig 15 : Student Workspace**

Figure 15 shows a student workspace where each student of the group has been assigned different tasks. The team leader of the group has the power to manage tasks and assign them to his team members. Students can comment on the work of their team members. The system also allows the tutor to post comments on each deliverable and to monitor the progress of the assignment. The time left to submit the assignment is always indicated at the top of this form. When less than 24 hours remain before final submission, the system automatically sends a notification through email to all the team members. When the individual members have completed their tasks, the team leader selects the necessary files and submits them to the tutor through the Final Works panel. Only these files will be used by the tutor for marking.

## Assignment Correction

**Fig 16 : Assignment Correction**

The system enables the tutor to correct all assignments that are submitted. He can view or download submitted files as well as grade the assignments using the Grading Criteria previously defined. The total marks scored is automatically saved in the Marking System in the CSM.

## Course Manager



**Fig 17 : Course Manager**

The Faculty Admin has the power to manage Courses. He can view the details of each course session such as its attendance, course materials, students' lists and grades. He can also create course, accepts request from tutors, manage the records of students, performs auditing, etc. In fact, the faculty admin is also the superadmin and thus he has all the rights to do any kind of change that he wants.

## CONCLUSION

Despite the fact there are many learning management systems, many of them have serious limitations when it comes to the nitty-gritty of the classroom. It was thus important to implement a system that not only caters for general functionalities

which are appropriate for many institutions but which also gives a lot of importance to the multitude of types of interaction which goes on between a tutor and a student inside a classroom. MoLekol manages all the time-consuming tasks of tutors and thus gives them more time to prepare quality materials for their students so that they can benefit fully from the course. Students are freed from the tension of having to print and submit their assignments within working hours. They can submit assignments at anytime within the deadline. They can also monitor their attendance percentage so that at anytime they can know whether they are inside the attendance threshold set by their institutions. They can check their marks online. They no longer need to disturb their tutors via email or by dropping in their offices at anytime. Having said all this, MoLekol is still in its infancy and at a developmental stage. There are many facilities which can still be added like an automatic tool for marking unstructured answers, a tool to detect plagiarism and a tool to maintain a learning profile for each student. However, for the time being, these are left as future works..

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