Learning Evidence Analytics Framework (LEAF) in Practice: A2I2 based Teacher Adoption Approach

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Abstract: Learning Analytics (LA) platforms can gather data from the teaching-learning interactions during a course. While there have been previous discussions regarding the individual tools, limited scholarship describes the utility of a LA framework for supporting evidence-based teaching-learning practices. We have proposed LEAF, a framework to bridge that gap. We implement the framework in a platform by integrating LMS, learning behaviour sensors such as an ebook reader, learning analytics dashboard and an evidence portal through Learning Tools Interoperability (LTI). The platform was then made available to teachers from different colleges in India to orchestrate their course offering for one semester. This paper describes the design of the teacher training module for the adoption of the platform based on the A2I2 model as its theoretical basis. The A2I2 model explicitly focuses on encouraging scholarship of learning and teaching among participating teachers and thus is an ideal candidate for utilizing an evidence-based framework.

Keywords: LEAF, A2I2, Evidence-based Education and Learning, TEEL

1.   Introduction and Background

There are 10,426 of engineering and technology colleges in India affiliated to the All India Council for Technical Education (AICTE). However, not all of them set up their own learning management system (LMS) and use e-learning tools to potentially enrich the teaching and learning experiences. In class, teachers follow traditional didactic teaching lecturing with the aid of presentation tools such as powerpoint. In the context of India, earlier attempts were in the form of faculty development programs (FDPs) to nudge higher education teachers from didactic classroom-based teaching to adopt more learner-centric active learning strategies using educational technology. These training programs were offered in face-to-face (Warriem, Murthy & Iyer, 2013), asynchronous online (Warriem, Murthy & Iyer, 2015) and even large-class MOOCs (Warriem, Murthy & Iyer, 2016). This cross-country collaborative work investigates the utility of providing a learning platform integrated with learning analytics framework to the college teachers to set up and conduct their semester-long courses. Our Learning Evidence Analytics Framework (LEAF) includes existing e-learning and learning analytics tools connected through Learning Tools Interoperability (LTI) to gather and analyse learning logs captured in standard xAPI format (Flanagan & Ogata, 2017; Ogata et.al. 2018, Majumdar et.al. 2019). Over a period of one semester, interested teachers and their students from colleges across India accessed Moodle as LMS, BookRoll, an ebook based learning system and LAViEW, a learning analytics tool which had the dashboard and initial design of the evidence portal. This article describes our approach to design a training module for teachers who are adopting any learning analytics framework for the first time in their teaching practice. Based on it we study how the teachers participated across the phases of adopting the framework and how the platform was used by their students while they conduct courses in their college over a semester.

2.   Implementing LEAF for instructors in India

The developed framework was implemented as service through the LET lab Moodle and we provided access to the interested Indian instructors. Further, we designed the TEEL workshop, followed by a TEEL coordinating course on the Moodle. The various activities involved to introduce the framework followed A2I2 model over four phases. Table 1 provides the details of the phases and the mapping with the A2I2.

Table 1 *Design of Adoption phases based on A2I2 model*

Adoption phase	Description	A2I2 phase	Outcomes
Faculty Development Program	A MOOC on "Mentoring Educators in Educational Technology" was offered to college teachers as FDP.	Attain	The teachers were introduced to the basics of offering a Small Private Online Course and designing active learning strategies while using online learning management systems like MOODLE
Workshop for exposure to the LA platform	A workshop with hands on activities to get introduced to the TEEL framework	Align	The teachers link the knowledge gained in the MOOC to the practice system introduced during the workshop
Preparations for course offerings	The teachers create the course material and prepare the Moodle to offer the course	Integrate	The teacher integrates the LMS and the tools offered in their own semester course
Orchestration and Reflection	The course is run with students and teachers conduct a reflection on the activities offered.	Investigate	The teacher offers the course and links reflects on the course with the help of the dashboards and the surveys given to the students.

As seen in Table 1, the starting point of the workshop was a MOOC specifically aimed at helping teachers understand the several aspects involved in the creation, offering and analysis of online courses. As part of the MOOC, the participating teachers collaboratively (in groups of 4) developed a module of a Small Private Online Course (SPOC) using MOODLE. They also participated as learners in the SPOCs created by their peers and thereby generated the learner data for each of the course. To complete the MOOC, the participants had to submit a summarized report regarding perceived and actual engagement and learning in the course and their direction of refinement based on that.

It is followed by a workshop on the TEEL infrastructure with the LA platform. The exposure in the workshop regarding accessing analytics intended to highlight the relevant features available in the LA platform. Once the teachers are familiar with the analytics infrastructure they will start uploading their course-related resources and start the teaching & learning activities. During the orchestration of course activities, the LAView system will help the teacher in reflecting on the students' actions and refine their own instructional activities.

3.   Participant engagement across phases of adoption

We wanted to investigate *What is the extent of teachers' engagement across different phases of the framework adoption?* The LA framework was introduced to the teachers by following the A2I2 model and sent an invitation to adopt LEAF platform to 533 different college teachers in India. These teachers registered in a MOOC course titled Mentoring Educators Educational Technology. Participation in all the four phases was voluntary. Those teachers who participated in each phase were the sample of this study. The MOOC had the largest amount of participation and there was consistent attrition across the multiple phases. This was expected as the effort was based on a voluntary participation model. 144 of the teachers involved in the TEEL workshop and 75 of them prepared for their course. However, if we take a look at the geographic spread of the

participants (Fig 2a), we see that even with this attrition there was a significant amount of diversity in the regions that people are participating from. This diversity is also seen in the variety of courses intended to offer (Fig 2b) from varying areas of STEM as well as Management, Pharmacy and Humanities found representation. Later 28 of them created their course and 22 of them orchestrated on the platform. Total 628 of their students were active on the platform out of the 1,463 registered in the TEEL Moodle.
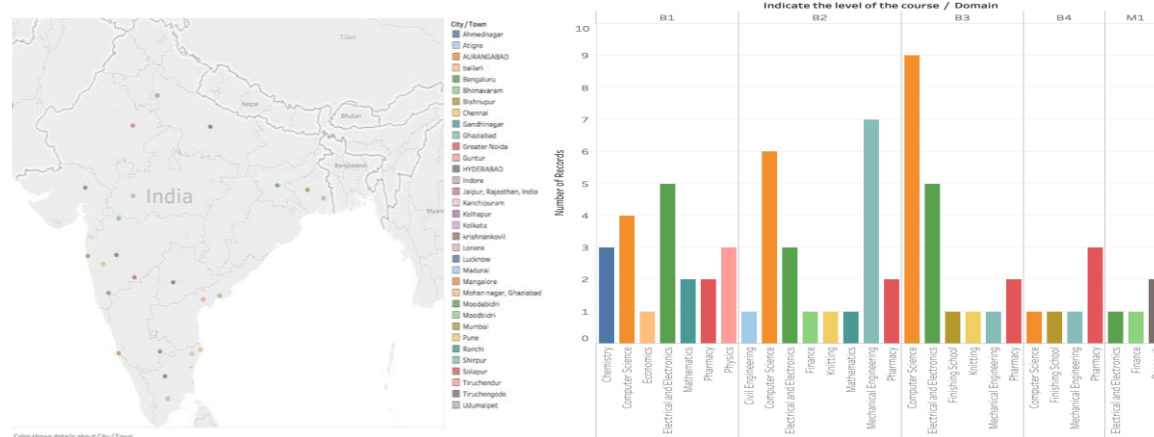

Figure 2. Location of colleges and courses planned by the participants in the preparation phase

We have presented the initial descriptive analysis of the courses offered. We further plan to conduct a detailed analysis of the teaching-learning experience with the data logs collected in the LEAF platform. We envision the evidence portal to emerge as a central platform for dialogues between teachers and researchers. Teachers would provide the actual context data and issues from the field (their courses) where the researchers can then collaboratively ideate about possible solutions and further systematically evaluate the result of its implementation and save them as a case for evidence.

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