Transforming E-Learning through Cloud-Based Interactive Multimedia Authoring Solutions

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ABSTRACT

With the advent of multimedia in education sector, there is a big paradigm shift in teaching and learning scenario. The revolutionary approach of technology-based and technology-enhanced learning mechanisms has taken the teaching and learning practices to a new horizon. Most of the higher education organizations have already adapted this shift keeping the rapid growth in the field education technology and they have even setup dedicated departments to support e-learning by means of various support systems, then whether its related to the hardware or software related support or it is related to the support provided for academic practices by means of various orientation and regular training sessions for the staff members. Various tools and techniques are available to assist teachers for varied level of studies, for the course as well their respective assessments. But deploying these tools and techniques are not always very comfortable with some level of customization and thus there are certain authoring tools which provide very easy to implement solutions to the teachers. Along with the Virtual Learning Environment (VLE), implementation of various online tools has equipped every community of learners with plenty of options to learn and implement to enhance the learning experience. These days, most of these VLEs are implemented on the cloud due to the constraint of storage at the organization level. And hence, various cloud-based authoring tools are developed to support the community of learners, which includes both educators as well as students. This paper highlights few of such implementations and their impact on the overall teaching and learning process. The paper finally recommends a framework, which can be implemented along with various cloud-based authoring solutions.

Keywords: Multimedia authoring, eLearning, Cloud-based tools for eLearning, Education technology

1. INTRODUCTION

Education organizations these days have witnessed the technological change in several aspects of teaching and learning. Hence with the change in technologies, every moment the education sector is moving one step ahead in adapting them to cater the need of stakeholders. The students of present days are learning faster with various innovative techniques implemented in the classrooms, by the teachers. And hence the educators need to start thinking of various solutions, which are innovative and effective to implement at the same time in order to increase the performance of the students, with better teaching and learning environment. Many of these tools and techniques could not be implemented as such in the classroom since the implementation totally depends upon the learning

outcomes of the session. Moreover, not every subject will have similar kind of assessments, and hence in order to provide a better learning environment, various tools need to be authored. But authoring of new educational tool needs lots of experience and skillsets. If the faculty is having some IT related background, it's easier for him/her, but on the other hand, if the faculty does not possess any knowledge in the field of software application development, then there must be some easy application which can be customized with least efforts and with a very basic knowledge of computers. Some cloud-based authoring tools provide the best solutions in these cases [1].

Moodle is one of the examples of virtual learning tools which can also be termed as learning management system. This can be easily customized by the IT specialist with a background on Linux programming. But still having things customized on Moodle requires a lot of expertise and end-users can just have basic options for the changes such as assignment configurations, feedback, grading etc. When it comes to the addition of a completely new feature, it requires a considerable amount of coding, time and man-hours. Most of the institutions have their dedicated department of education technology to do this task, but sometimes, due to a large number of parallel requests from different faculty members for different purposes, and different nature of module, it becomes difficult for the education technology unit to handle the request. In such case, orientation could be provided to the staff members for developing some ad-on toolsets on cloud and use them in their class. Later assessments could be routed through the VLE (Moodle) in order to assess the learning of the students.

2. RELATED WORK

In order to do a literature review, many research papers related to this research area were reviewed and analysed. The key papers which provided the major breakthrough at this initial stage of research were taken from Elsevier. The first paper titled "Results of Enhanced Learning with the Edutainment Format" and the second paper titled "The Model for Introduction of Gamification into E-learning in Higher Education. As per the first paper, the author is showing the importance of one of the application areas of multimedia, which is edutainment (education + entertainment). It is evident that the author has done a good background analysis on the practical implementations of this research area. The author has provided a clear idea about various findings in this research area. The scope of this research is well defined on a global level. The Development of Edutainment will study from both printed document and electronic document to analyse the principles relate to education form, which provides the knowledge with entertainment. [2]

The boundaries were:

* Study idea of Edutainment both local and foreign countries.
* Analysis and synthesis the Edutainment Concepts and inquire opinions from specialists of entertainment. It will be a frame to specify the scope, direction and guidance to confirm the development.

As we can see from the above scope, which is defined in this research paper, the author is able to make the scope wider on a global level but is unable to specify very clearly the actual area of its future development and its impact.

On the other hand, the 2nd research paper presents the model for the introduction of gamification into the field of e-learning in higher education. Concepts and differences between techniques and methods of game mechanics and game dynamics are explained. With proper integration of gamification in the field of e-learning into higher education, a positive impact on the learning process can be achieved, such as higher satisfaction, motivation and greater engagement of students. [3]

The importance of clearly defined objectives, rules, techniques and mechanisms of gamification that affect the dynamics of the students is shown. The paper presents a comprehensive view of the

gamification concept in higher education. The advantages and disadvantages of introducing gamification in e-learning are described. The paper combines the characteristics of gamification with e-learning and shows the possibilities of use in practise. The scope of this research work is defined well but it is not subject specific. The different subject area might have different requirements. But the authors have tried their best to keep the problem area very specific, but it again speaks in general and thus as per this paper, the scope of this research can be defined as open one and can be enlarged to any extent as per the demand of teaching and learning environment and the available platforms.

3. AUTHORING SOLUTIONS

There are various eLearning authoring solutions available, from which some are freeware, some are free-mium (Free to use with limited features, pay to use with full features) and there are many tools which are completely free and open source, and hence provides flexibility to the developer to customize as per their preferences. Many free and open-source authoring tools work on the principle of What You See is What You Get (WYSIWYG), which means the user can customize and author the application without any complexity of learning to code. One such example is H5P, which is basically an HTML5 based cloud-based authoring solution [4]. And hence, the user doesn't need to install any heavy program to develop any tool. They can follow certain wizards and author a tool online itself. This kind of flexibility provides the educators with a big push towards developing various eLearning content by themselves for their students as per the learning outcomes and the requirements of the class. Users can download this as a plugin for their existing learning management system, such as Moodle, and work in order to develop some new and innovative learning materials for the students.

Similar tools include LAMS, which is meant for designing online based collaborative learning activities which can be completely designed on cloud and need not be installed on the laptop. The student activities also could be conducted online. These collaborative activities are really helpful for the group-based tasks. Especially when the group members are unable to collaborate by being in the same place physically, they can work together virtually from their places, online [5].

Apart from these various other tools are available which could be utilized after a certain level of customization and authoring in order to cater the needs of students of these days, who loves to use the technology as an aid for their assistance. Although technology is being used in the classrooms for an increased level of understanding, the faculty must not forget about the learning outcomes of the course. And hence, before deciding on the authoring tool to be implemented, course learning outcomes must be clearly analysed. Keeping these authored solutions on the cloud gives flexibility of implementation and use. Although these solutions depend on internet connectivity, their implementation could be done Globally. And hence this could, possibly provides the Colleges and Universities with a chance to launch their own MOOCs on the cloud, which is nothing but the Massive Online Open Courses. Students from various parts of the world can register in the same and hence, this provides an opportunity for an organization to expand its operations on a global level.

4. PROPOSED FRAMEWORK

Cloud-based authoring solutions involve multiple stages which are illustrated in the Fig.1.

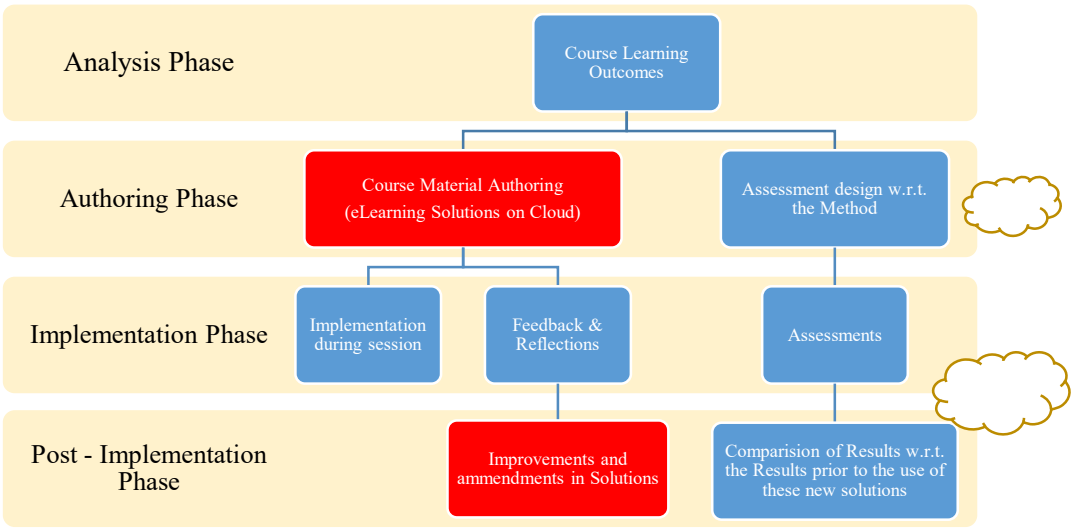

Fig 1. Proposed framework

a. Analysis Phase

The analysis phase is the first most phase in which the learning outcomes of the course are analysed and it has to be found about whether the entire course needs to be taught using e-learning based solution, or a certain part of it needs such implementation. For example, in certain courses that involve mathematical explanation, faculty's intervention would be required and hence in such case, this method will be avoided. Once the learning outcomes are identified and analysed, the type of e-learning solution is also decided at this stage. Whether its e-book-based implementation or design of an interactive quiz etc. Meanwhile, the assessment strategies are also studied and finalized to assess the learning

outcomes by the end of the course.

b. Authoring Phase

This phase involves two tasks, authoring of necessary solutions in the form of toolsets to be implemented in the classroom and design of the respective assessment with respect to the nature of the subject/course. The eLearning solutions could be designed using any of the available online based authoring tools. H5P is one of the best solutions with various options for the developers and it just needs basic knowledge of the computers [9] [10].

At the same time, respective assessment is designed to assess student learning by the end of the session or the course. This assessment should be designed in such a way that it synchronizes with the teaching and learning methodology adapted in the classroom. For example, if the faculty has used activity-based learning during the sessions, then assessments should also be designed in such a way that it doesn't involve lots of writing. It could involve some online activity-based assessment methods.

c. Implementation Phase

At this phase, the solutions designed in the previous phase is implemented in the classroom. These solutions are then monitored for their effective implementation. Prior to the implementation

faculty could perform a test of these newly developed solutions for their functionalities. During and after the class, it is really important to ensure the amount of participation of students. And hence, its important to collect their feedback and recommendations for further modifications and improvements.

On the other hand, respective assessment needs to be conducted during this phase to ensure that learning outcomes are met and the students and all the students have taken part in this new approach of the activity.

Cloud based implementation of such practices must be governed by various policies of IT infrastructure of the campus that includes usage as well as privacy related policies. It also involves specific infrastructure to be procured for the implementation such as cloud storage and a high-speed line for uninterrupted services [11].

Faculty can also share the link of these online activities and eLearning content through LMS, such as Moodle so that it will be useful for the students at a later stage for a revision of the topics and prepare for the exams or assessment. Moreover, it will also benefit the students who have missed the classes due to certain reasons.

d. Post – Implementation Phase

This final phase is really important since it defines the next version of authoring. Based on the feedback and reflections received, further improvements in the tools could be done. Not only this but also based on the comparison of results from previous time with this time, the improvements could be incorporated in the future of this solution. Later the system could be further improved based on recommendations and problems identified in the previous implementation of these solutions.

5. CONCLUSION

Interactive multimedia-based authoring framework is just an attempt to suggest a cloud-based implementation of those solutions, which can be accessed globally. This opens new ways of learning which can also be termed as distance learning or virtual learning environment (VLE). The level of authoring solely depends on the subject and nature of module. The faculty must wisely decide on the part of learning outcomes which needs to be covered with this method. This is because, still for certain subject areas, the traditional way of teaching is essential. Many students move one step ahead of the teachers, but with such authoring tools, teachers can model their own and exclusive content which can be also an intellectual property of that institution. Cloud-based repositories could be further implemented in order to take all these interactive content for risk-free backup. WYSIWYG based interface gives freedom to design different types of content by the faculty of any specialization to take interest and work to develop his own exclusive learning materials. Although the implementation of this framework needs some considerable level of capital investment it will surely bring the returns in terms of increased students' performance. Moreover, the teaching and learning environment of the campus can be surely enriched by the implementation of this framework.

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