Project Proposal

CS6460

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Abstract—In the past few weeks I researched on how educational technology may impact classroom learning by facilitating active learning. Based on those research based practices and known online educational frameworks (for example, Bosch's online educational model-appendix A), I want to propose a content based solution to existing instructional problems in my school. My target subject (content to be created) would be biology for class 12 targeting a particular chapter about the Human Muscular System.

PROBLEM STATEMENT

This project is about my workplace (inefficient classroom practices in k12 school), being a remote area we still use normal white boards, teachers standing in the front; writing on board or explaining the chapter content orally. Students must make a note of what the teacher says so overall one way communication from the instructor side and very little opportunity for students to reflect on their learning. Objective is to repurposing content through the addition of interactive elements (multimedia) integrated into learning management systems (LMS) to facilitate two way communication and hence derive some value in terms of learning effectiveness, creativity, and critical thinking among students. Doing so efficiently in terms of time and resources, however, presents a considerable challenge. This content track project demonstrates a possible solution.

BACKGROUND

School is functional since 1999 having state board affiliation. Objective was to empower the villagers by offering them quality education. It has achieved the enrollment target up-to a large extent (catering to 1000s of students) in the past 20 years but the quality of classroom instruction is still missing (as per written and oral test data from exams) when we compare to city schools.

Nowadays, with the advancement in technology and electronic equipment, most of the schools in cities are equipped with smart boards, laptops, learning

management systems, hybrid classes etc. that help students in developing 21st century skills (by facilitating collaboration, communication, critical thinking, and problem solving) critical to the current workplace.

In the context of this School, I personally joined as academic director in 2015 after having worked as an assistant professor, it took me about 2 years to understand the school functioning and possible problems at every level. I realized that lack of expert teachers (in the absence of professional training) and lack of infrastructure (internet connectivity and content delivery platform) are the biggest hindrance to bring some transformational changes in the classroom practices. Having said that, even without using technology we can improve teaching practice if we relate our classroom practices to educational theories and facilitate various activities, where students get opportunities to collaborate and create.

Most of the teachers are not using any sorts of educational theory in practice because of their unawareness, so inquiry driven or project based learnings at the very basic levels are largely missing. Standing in front of white boards and asking students to make note of oral lectures is what they do. So no scope of two way communication exists. In the absence of any group project students can't work on their presentation skills or learn teamwork.

We do require continuous professional development opportunities for teachers to learn new things about classroom strategies ***(technology is a potential solution that is scalable***) and self-reflect on their practices, also the multimedia resources for students to explore contents outside books and be a life-long learner, at least take control of their learning process.

Since my joining, in the past 3-4 years, there has been a rapid advancement in technical infrastructure (internet connectivity and computer hardwares) and it is now connecting to the remotest places in India. Having seen this development, I thought that to integrate technology with multimedia content in the classroom, we do have evidence (based on past few weeks of research) that such multimedia based technology has a great impact in transforming the learning process, critical thinking and problem solving among students.

Through this project, I will create contents for biology classroom for 12th grade. Focus topic will be the human muscular system, since it is too vast, so the hip and knee joint will be kept in primary focus. Students will understand its working, causes of pain in old age or in general, remedial steps to alleviate such

pain and lead a healthy life. I am expecting it to be a learning by doing approach using some virtual lab (exploration is in progress). Such a topic will be useful to both the students and their parents as 70% of the middle and old age population suffer with these conditions.

PROPOSED SOLUTION

All the contents will be authored using the features available on EdLesson platform (an interactive multimedia supported learning management system). So teachers and students require familiarity with a graphical user interface inbuilt into the LMS platform. With a little bit of initial practice and training, users should be able to navigate the platform. This platform would be able to host video contents into a sequential form, followed by reflection spots and quizzes based on the shown videos.

Since we are targeting hybrid classes, face to face discussion and questions from instructors may take place during reflection spots (in between the videos). LMS should also support a hyperlink to jump into discussion on a particular topic/video with peers and teachers outside the class hours.

External resources using hyperlink will be provided into LMS for additional material. LMS will also facilitate an electronic repository to upload additional shareable content by the user. Discussion forums will have similar features too. LMS should also support individual profile data that will be used by analytics softwares later on. Overall objective of using LMS is to facilitate two-way communication between teachers and students, those students who are introverted or shy, can also participate in the open ended discussion.

In the final step, LMS would support a virtual lab (using a hyperlink to the website) where students can perform virtual practices similar to medical practitioners and present their overall understanding in the class.

RELATED WORK TO SUPPORT PROPOSED SOLUTION

There is numerous research that suggests educational technology facilitates a learner centered , constructive and active learnings in the classroom(McCombs et al.,2000; Lee et al., 2018). Going further in educational research, we also found that recent advancement in technologies are able to support all the major educational theories (for example; constructivism, cognitivism, and socratic etc) that further leads to critical thinking and problem solving in learners (Brad, 2017;

Yun Li et al., 2022). We found one such example, Bosch's model of online education framework (Picciano 2017). It connects most of the major theories and offers a great detail on using an integrated learning management system.

CONTENT AND SCOPE

Through this content track project the objective is to deliver biology courses in a k12 classroom using a hybrid approach. The course content I describe above is well suited to edX platforms into multiple sections.Due to time boundation, I propose to create just one unit (divided into 3 sections) from the chapter on 'human muscular system' on Edx titled " joint (hip) problems: causes and solution". Whole content will be divided into 45 minute worth of smaller parts consisting of 3-5 minutes videos, reflection spot and some formative assessment exercises consisting of multiple choice questions.

WORKFLOW AND TOOLS

The first step would be to ingest all the videos (few self recorded, few voice over into local language, and few online materials) into a video editor (in progress) and isolate the demonstration segment into individual clips. These clips are then trimmed to eliminate unneeded portions containing dead space, inadvertent errors, and extraneous content.

Next, we will host these videos onto LMS (edX platform) along with reflection spots (multiple choices that reinforce the content learning). Quizzes, exercise and a virtual lab (hyperlink to external website) will follow. Selection of a virtual lab website is still under process, it could be Labster or similar tools, which will offer animated graphics for hands-on training.

Last stage of learning would be in the form of individual or group presentation of the learned topic.

OUTLINE (SUBJECT TO MINOR CHANGES)

The course is organized hierarchically into sections, subsections, reflection, link to discussion, external resources link, and link to virtual lab . Outline color code for edX structure :

RED – Section, Green – Subsection, Blue – Virtual Lab Link, Violet – Interactive elements, YELLOW - External Resources

Section1 - Hip/Knee Muscle Anatomy

a. Introduction
b. Reflection Spot [multiple choice and discussion]
c. Link to discussion [feedback from teachers or peers]
d. Link to external resources [dependency to other muscles etc]
e. Link to Virtual Labs

Section2 - Main causes of Pain in Knee Joint

a. Introduction
b. Reflection Spot [multiple choice related to chemicals associated in pain]
c. Stages of Pain
d. Reflection Spot
e. Link to Discussion [feedback from teachers or peers]
f. Link to external resources [details of associated chemicals]
g. Link to Virtual Labs

Section3 - Solution associated with different Stages

a. Stage 1 : solution
b. Reflection Spot
c. Stage 2: solution
d. Reflection Spot
e. Stage 3: solution
f. Reflection Spot
g. Link to Discussion [feedback from peers or teachers]
h. Link to Virtual Labs

DELIVERABLES

TASK LIST

[AS SHOWN IN APPENDIX B]

WEEKLY STATUS CHECK

I will provide 5 weekly status checks via Chat Channel in Ed Discussion and designated submission links on Canvas beginning on 15-10-23 and continuing through 12-11-23. These brief reports will cover (a) progress made in the past week, (b) challenges encountered in the past week, and (c) any new expectations that your final project will differ from what was described in this proposal.

INTERMEDIATE MILESTONES TABLE

	Due Date		Goal
Intermediate Milestone 1	10/30/2023	Prototype 1	Section 1
Intermediate Milestone 2	11/20/2023	Prototype 2	Section 2

PROJECT PAPER

At this stage I have not decided on any journal or conference to present this project paper.It is more suitable for any academic journal related to Instructional approach using online educational technology and targeted to k12 schools. The project paper will be editorially complete and in a format ready for submission in full compliance with the style requirements. It will describe the motivation behind my solution to the stated problem of efficiently repurposing existing content for interactive delivery by an LMS. It will summarize the results in terms of time required and feedback received from participants along with any "lessons learned" and recommendations for future work.

PROJECT PRESENTATION

My project presentation will likely be a short (estimated length: 10-15 minutes) video presentation which contains brief excerpts from the traditional classroom instruction for comparison purposes followed by a narrated screen capture of a learner interacting with the finished product on edX. I also anticipate including narrated graphics which convey the project's motivation, illustrate the workflow involved and display examples of information obtainable from the LMS.

FINAL PROJECT

The completed course will be released and published on edX. The respective links will be provided in the catalog.pdf file contained in the .zip file submitted to T-Square. The .zip file will also contain copies of relevant resources used during creation of the revised course including (but not limited to) narration scripts, logs of "time worked" on various tasks, original PPTx files, and results of the feedback surveys.

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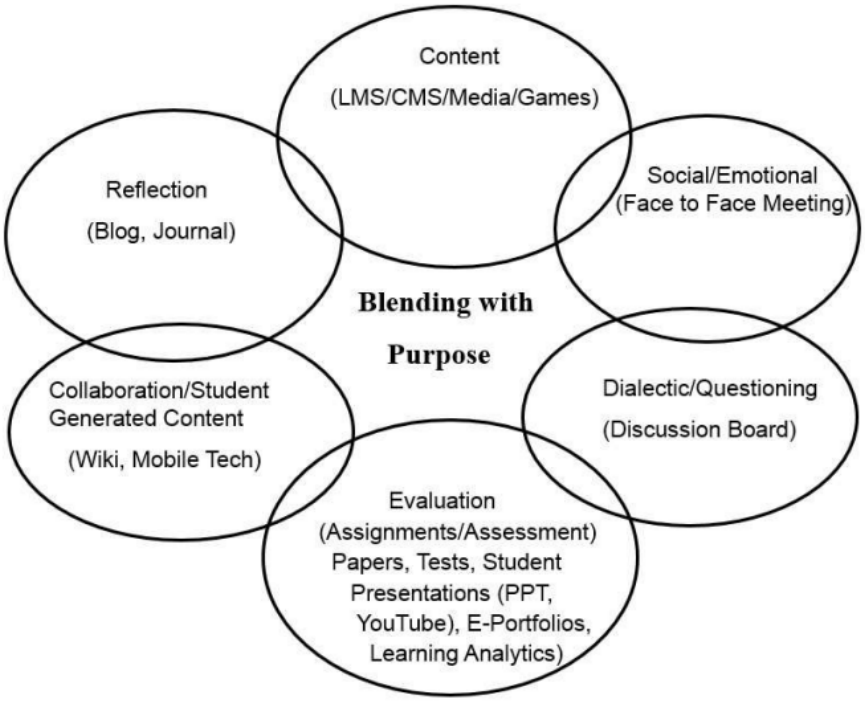
Appendix A



igure 7. Blending with Pedagogical Purpose Model

Appendix B

Week	Task	Task Description	Estimated Time	

#	#		(Hours)	
8	1	selection of LMS	2 to 3	
8	2	selection of Video Editor	2	
8	3	creation of video contents for section 1	5	
8				
8				
9	4	creation of video contents for section 1	5	
9				
9				
9	5	outline section1 into LMS	1	
9				
10	6	inject video clips at defined places -section 1	5	
10				
10	7	inject reflection spot multiple choice worksheet	5	
10				
10	8	finalize section-1 with all the activities	10	
INTERMEDIATE MILESTONE 1 DUE				
11	9	creation of video contents for section-2	15	
11				
11				
11				
11	10	outline for section-2 into LMS	1	
12				
12				
12	11	inject video clips at defined places -section 2	5	
12				
12	12	inject reflection spot activities	5	

13				
13				
13				
13				
13	13	finalize all the activities for section-2	10	
INTERMEDIATE MILESTONE 2 DUE				
14	14	creation of video contents for section-3	15	
14				
14				
14				
14				
15	15	outline for section-3 into LMS	1	
15				
15	16	inject video clips at defined places - section 3	3	
15				
15				
16	17	inject reflection activities	2	
16	18	finalize section-3 contents	1	
16	19	prepare paper project	4	
16	20	prepare presentation	3	
16				
FINAL PROJECT DUE				