Maximizing Student Engagement by integrating social media in assignments of an online course

Sridevi Bonthu[1]*, Abhinav Dayal[2]
Vishnu Institute of Technology, Bhimavaram, Andhra Pradesh, India
sridevi.db@gmail.com[1], abhinav.dayal@vishnu.edu.in[2]

Abstract—**The Practical Courses in Engineering Education encourage higher-level thinking and creativity. Many of the practical courses' objectives are to develop end-to-end applications. Many tools exist to teach and engage practical courses online, but at the same time, it has several challenges. Making the students engaged after class hours is needed as practical courses require a lot of time to practice. To make the students genuinely participate and learn, we have involved gamification in the course and adopted a few social media platforms like GitHub, LinkedIn, YouTube, Kaggle, medium, etc., to submit the students' work as they are all public mediums. The course is offered to 124 participants of I B.Tech. Computer Science and Engineering stream students. By leveraging social media platforms and bringing in gamification in learning, the overall teaching-learning process gets highly benefited. The course-end survey results reported the students' positive attitudes and beliefs about social media use in education.**

Keywords—**Student Engagement; practical course; online course; social media; Gamified Learning; GitHub; LinkedIn, Kaggle.**

I. INTRODUCTION

SUCCESS of the student or the educational institution depends upon how the student excels after they complete their studies. A student can be successful if he gets his dream job, or gets admission into premiere organizations for higher studies, or starts their venture. Students need to be groomed from early stages to achieve success. These days teaching and learning is happening online. Online Learning and Teaching is not a new concept, as it has been followed by every educational institution, teacher, and student for the past two years. The growth of online learning is fueled by the pandemic and the associated lockdowns. This has opened up several challenges in the education sector. Many researchers worked on several tools to help the stakeholders for the smooth conduct of the online classes. Engaging the students, and making them complete their projects, motivating them remains a problem in this mode of teaching.

This paper explores the effectiveness of gamification, involving public posts for submitting the assignments in engaging students effectively in an advanced programming subject. The rest of the paper is organized as follows. Section II describes the Practical Course in which social media is used. Section III covers the related work; Section IV presents the methodology adopted to make the students engaging. Section V describes the results followed by the conclusion.

II. COURSE

The proposed gamified learning along with assignment submission through public posts is done in the first year B.Tech. practical Course titled "Advanced Python Programming Lab". The main goal of this course is to enable students to design an end-to-end Machine Learning application by the end of the semester and the prerequisite for this course is basic python programming. This academic practical course is modified into a self-paced online course with unique skill-based objectives and outcomes.

The objectives of this course are

- To gain familiarity with Machine Learning.
- To explore the basic workflow of learning from data.
- To apply various NumPy and Pandas' concepts to pre-process the data.
- To understand data visualization techniques and create reports.
- To calculate simple descriptive statistical measures on datasets.
- To use the sklearn library to get inference from data.
- To build an end-to-end application.
- To advance in self-learning capabilities.
- To improve team and communication skills.

At the end of the course, students should be able to design an end-to-end application. To design a complete application, only lectures and assessing students through quizzes are not enough. The students have to get involved in all aspects of the design by practicing and also need continuous motivation, encouragement, and finally should become self-learners. The outcomes are planned by giving importance to these goals and they are

- Able to do simple Machine Learning projects

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- Build a professional **LinkedIn** profile
- Build a professional **GitHub** profile
- Write blog posts and share on social media
- Able to participate in **Kaggle** competitions

Every outcome plays an important role in making the students industry-ready. The LinkedIn profiles are an extremely valuable asset to any job aspirant's portfolio. The resumes are confined by length, but students can describe their projects in more detail in LinkedIn profiles. GitHub is a well-known tool and resource for programmers. The students can improve their team management skills by doing collaborative work through GitHub as it is a powerful networking tool. Students with frequent commits on GitHub will also attract recruiters. Kaggle hosts several Data Science and Machine learning competitions and also offers several free online courses to learn ML. Students can become aware of the recent problems of relevance to the industry by participating in the Kaggle competitions. Blogging helps to build an online identity, improve writing skills and connect with people and serves as a motivation to learn more skills and be better prepared for their career. These social media platforms will offer immense benefits and opportunities to students if used judiciously. Social media engagement encourages knowledge sharing and creation as they are public environments, students will naturally not plagiarize the content and post. Social media increases collaboration and connections, and students can keep pace with the changing times.

III. Related work

Online Education offers a wide range of facilities, benefits, such as convenience, flexibility, etc. to the learners. To know the readiness for online learning and outcomes, scholars have conducted many studies (Alqurashi, 2019) and concluded that there is no other alternative for online learning in these pandemic times. Student Engagement is defined by most of the researchers as "activities performed either physically or mentally by students in their pursuit to gain knowledge" (Dixson, 2015; Mohd et al., 2016; Marx et al., 2016). Student engagement in online learning happens when they perform activities to gain knowledge with flexible online tools (Hu et al., 2016).

Several studies referred to gamification as a technique to increase the students' engagement (Hanus et al., 2015; Sanmugan et al., 2016; Kuo et al., 2016). Generally, the LMSs use a non-game context and that can be extended by involving gamification to raise learners' interest and engagement. The courses can be divided into levels where every level can be completed after achieving the milestone targets.

Recent Technologies are playing a crucial role in sharing knowledgeable content, increasing learner engagement, and improving the skills for self-learning. The present young generation spends a lot of time on social media platforms and they depend on them for leisure and social connections. By studying the benefits, disadvantages of social media, researchers suggested that mixing social media can make learning more collaborative (Mao et al., 2014). Therefore, in

place of the tools, the course designers can leverage social media to design a course that engages the students to a maximum extent (Kumar, 2021).

IV. Methodology

A. Participants

124 students of first year B.Tech. (Computer Science and Engineering) actively participated in this course. The reason behind picking first year undergraduate students is, that they need to be groomed as self-learners from early stages.

B. Course Design

Course design is one of the structural factors for successful online student engagement (Farrell et al., 2020). By keeping the novel objectives and outcomes planned for the course, it is designed as a gamified learning experience. The key elements of this course are the use of a forum for communication among students and between students and mentors, a customized Learning Management System (LMS), with a gamified learning path, and novelty in assignments and assignment submissions.
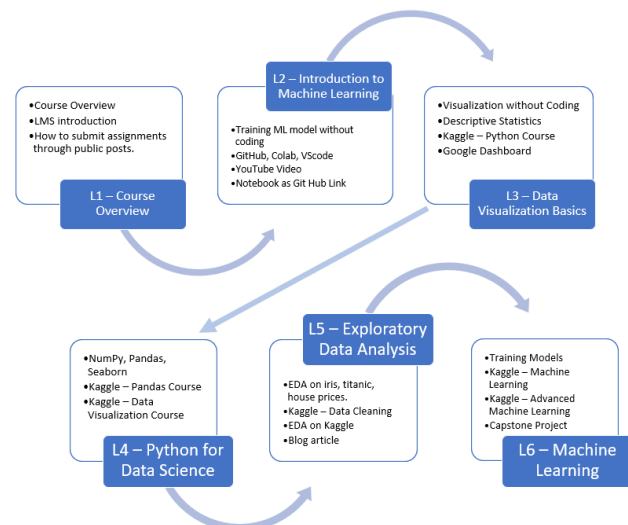

Fig. 1. Gamified Learning path with six levels, concepts covered and milestone targets need to be completed to level up.

A Telegram forum is created for all the 124 participants to share their ideas, interact with peers and instructors. Telegram has unique features to maintain student groups like adding polls, pinning the messages, and the option to view the previous messages by the newly joined participants. The LMS developed in a customized manner is the Vedic.dev platform. It is a well-crafted application suitable for hosting technical and practical courses. The unique features of this LMS that position it well for offering this course are the option to place the recorded classes, the way to combine lecture materials and assignments in an organized manner, various options to assess the student performance, incorporation of gamification in learning, a well-designed dashboard to manage students, teams, course materials, etc.

Gamification in learning provides student learners

expedience, autonomy, competence, skill development. The gamified learning path adopted is described in Figure 1. It has 6 levels and a learning objective is set for every level. Every level can have a set of milestone targets. Level 1 is designed as a basic level that introduces the environment and provides an introduction to Machine Learning without getting in depth. Levels 2 to 3 are intermediate levels that focus on understanding the concept without using programming languages. Levels 4 to 6 are higher levels with a focus on the development of the application. Various social media platforms utilized in these levels for assignment submission are summarized in Figure 2.

Fig. 2. Utilized Social Media platforms

The milestone targets in the level can be objective questions, descriptive questions, and web links that lead to their accomplishment page. As it is a practical course, more importance is given to the submission of their accomplishments as described in Figure 1. Every task is designed in such a way that they have clear learning objectives, challenging and achievable. Some of the milestone targets are completion of online courses and submitting the course completion certificate as a LinkedIn post.

V. RESULTS AND DISCUSSIONS

A course-end survey is conducted to know the satisfaction level of the students with the adopted methodology of delivering the course. 97% of the respondents are satisfied with the course delivery and the associated methods and they were shown as a pie chart in Figure 3.
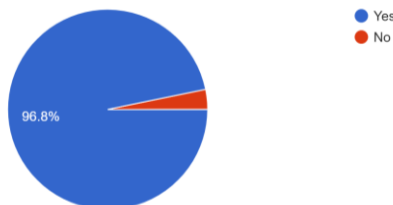

Fig. 3. Student satisfaction of students with respect to the adopted methods.

A survey on the course material, sessions organization, adopted technologies, instructor readiness is collected. The result is summarized as a bar chart in Figure 4. The majority of the respondents agreed with all the questions and nearly 7% of the respondents conveyed that they are technically not ready for the

course. The reasons behind this are they are not good with pre-requisite.

Students' opinions on the submission of the assignments through public posts are also collected. It is very evident from Figure 5 that they are enjoying this method, they are exploring new tools, finding the assignments as interesting, and improving self-learning capabilities. The survey also collected their textual responses about the satisfaction and it summarized as a word cloud and shown in Figure 6.
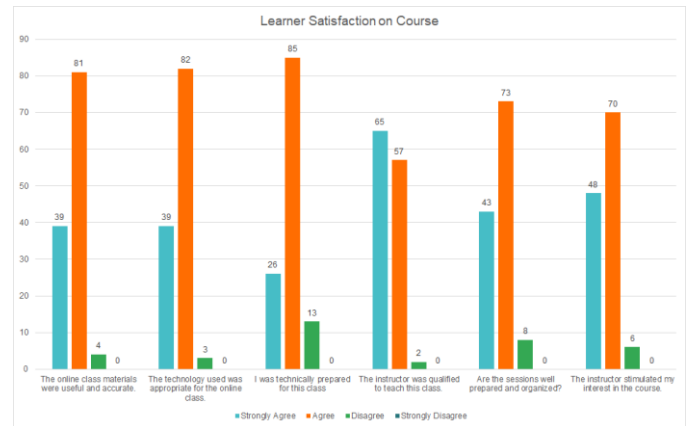

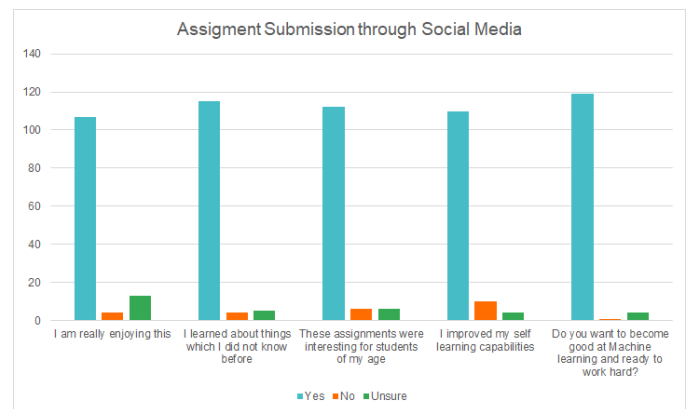Figure 4. Survey Results on Course Organization

Figure 5. Survey Results on Social Media Usage

TABLE I
SUMMARY OF ONLINE COURSES COMPLETED BY STUDENTS

Course Name	Requirement	Count of Students Completed
Python	Mandatory	124
Pandas	Mandatory	124
Data Visualization	Mandatory	124
Data Cleaning	Optional	79
Machine Learning	Mandatory	124
Advanced Machine Learning	Mandatory	124

Fig. 6. Word Cloud of Student Textual Responses

Every student started building their LinkedIn and GitHub profiles. It is observed that no two submissions are identical and they started solving the problems genuinely. All the students have got an opportunity to see others work and learn from them as every submission is public. They have completed a minimum of five online courses per head and their certificates are available in the shareable google drive link (https://drive.google.com/drive/folders/1RVDuaNXs0-Kl_6-PVaHc3WuWpTpPJHGB?usp=sharing). The statistics of online course completions are presented in table I. Many of the students have even written blog articles about their developed applications and few of them are shared with the public through a LinkedIn article at https://www.linkedin.com/pulse/articles-written-first-year-students-sridevi-bonthu/. Along with benefits to the students, there are also a lot of challenges to the instructors. Instructors have to review their submissions online, provide instant feedback so that students can improve their learning.

VI. CONCLUSION

Student engagement has always been an essential factor in the teaching-learning process right from the traditional classroom to the present online teaching model. It plays an important role in teaching practical courses online. We experimentally shifted an online academic practical course into a self-paced online course. Involving Gamification and social media usage in the course design helped the students to check their progress with their peers. The students enjoyed using these platforms. The resume alone is not sufficient to attend placement interviews for engineering students. Social media usage helped the students to build their online profiles to strengthen their resumes.

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