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## Interactive Learn: A Dynamic Virtual Classroom for Seamless Online Education

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### Abstract

The phenomenal growth of online education continues to undergo rapid transformation, platforms that provide dynamic and interactive solutions will be extremely popular among students and educators alike. The approach guide teacher to create a well-interactive online learning environment and improve the conceptual learning of students. It has two portals, the student learning portal, enables various learning experiences by each student, recorded videos, students can download their classes and rewatch recordings, they can also have access to course materials and interactive quizzes, moreover, submit assignments and track their progress in assigned classes. The instructor portal, capable of arranging classes, creating a variety of tasks and effectively grading student assignment. It allows instructors to upload lecture materials and recorded videos. The integration of virtual leaning can improve individualized learning, increase understanding capacity and enhance the learning experience for students and insights for educators to provide targeted support and guidance. E-Learning offers students a safe learning environment, engaging platforms, and most importantly a quality education.

### Keywords :

Online Education, Virtual Classroom, Course Management, Assignment Submission, Interactive Learning.

### 1. Introduction

The way we interact with each other and receive training materials is totally different because of the introduction of digital technology. With students free to pursue their studies from home, online learning platforms are becoming more and more common. Both teachers and students have been empowered by this website. An efficient and interesting learning environment, which goes beyond the constraints of traditional online learning platforms, is the main objective. Interactive Learning is a dynamic virtual classroom platform designed to enhance the online learning experience through interactivity, engagement and collaboration, which provides a wide range of features and functions that are specifically designed to meet the specific needs of teachers, students and educational institutions using the latest technologies. In contrast to traditional videoconferencing tools, Learn Interactive uses cutting edge technology to create a seamless and immersive virtual classroom environment where teachers can deliver lectures, conduct interactive discussions, and facilitate collaborative activities in real time. The widespread COVID-19 outbreak has increased the use of online learning, and encouraged instructors to look for innovative ways in which they could teach from a distance. The main objective of the Platform is to create a dynamic virtual classroom environment which encourages collaboration, interaction and tailored learning experiences. Increased student participation and engagement through the use of interactive course materials, multimedia resources as well as cooperation learning activities. In order to achieve a successful monitoring of students' performance and the delivery of quality learning materials, it enables teachers to use any tools necessary for creating, managing or analysing courses. The website provides students with a wide range of programmes, subjects, and materials suited to their specific learning needs, as well as to their academic objectives. By bridging the gap between traditional classroom learning and online learning,

Interactive Learning is able to fundamentally change how we teach and learn in a digital age. Through its creative methodology and user centric design, it enables students of all ages and backgrounds to access high quality education for learning.

## 2. Literature Survey

A study by Prince defines active learning as “any instructional method that engages students in the learning process,” referring in particular to the activities that are carried out in the classroom. Active learning is often contrasted with traditional lectures, where there is a transfer of information from the teacher to the students and the latter play a passive role in the learning process. Conversely, active learning approaches are based on student engagement, through carrying out activities. In this perspective, the studies by Prince and Bishop and Verleger agreed to include in active learning some instructional methods, such as: collaborative learning, cooperative learning, problem-based learning (PBL), peer-assisted learning, and peer tutoring.

According to Bishop and Verleger, active learning approaches laid the foundations for the birth of the flipped classroom, which reverses the places of the learning process: the information transfer phase is carried out independently at home by the student, whereas the sense-making phase is carried out in the classroom and is transformed into a social learning process, taking place under the teacher’s guidance. Peer instruction also moves the sense-making phase to the classroom and is based on the engagement of all students. For these reasons, it is considered to be an active learning method.

Eric Mazur developed peer instruction in the 1990s, after teaching physics for a few years using the traditional lecture method. He knew that students were generally dissatisfied with university introductory physics courses, and through some tests he found that his students were able to apply the laws of physics to solve exercises, but did not perform as well in understanding the underlying key concepts. Looking for a different approach, Mazur came to define the peer instruction method, which operates as follows. First, he assigns his students a task of reading lecture notes a few days before the classroom lecture. Once in class, he makes a brief introduction to the topic and asks the students to answer a short conceptual question individually (ConceptTest). Afterward, he asks students to convince their neighbors of the correctness of the given answer. The peer discussion process encourages students to verify their understanding of the topic, because they have to explain their position to their classmates. The process lasts a few minutes, after which he poses the same question to the class again. With the second poll, the number of correct answers tends to increase, because of the peer discussion.

After applying this method and its subsequent improvements for ten years, Mazur reported an increased student mastery of both concept understanding and quantitative problem solving. A recent review of the literature by Schell and Butler showed a consistent spread of peer instruction across five continents and through a variety of disciplines, not only in STEM subjects, but also in the humanities.

Several authors faced the challenge of applying active learning approaches in the context of distance learning university courses, both before and during the COVID-19 pandemic. Andersson et al. applied active learning elements to an online database management course, to improve the engagement of students in a noncore topic. The course consisted of evening Web conferences that were recorded for students who could not attend in real time, two face-to-face workshops (this is a pre-COVID study), and some mandatory assignments before the written exam. Students were provided with a list of active learning techniques from which to choose the two they preferred, then the teaching staff used a Web conference tool to carry out the lectures and also manage the active learning activities. Each Web conference started with a discussion session (a discussion consisting only of questions, entered in a text chat), whereas, in the last 10 min, the teachers applied the snowball technique. This technique consists of making a statement to which a few students add something, and progressively increasing the number of participating students in subsequent rounds until the whole class is involved in the activity. A qualitative discussion with students revealed that such an approach made them feel more involved in the learning process.

Peramunugamage et al. developed a Moodle mobile plugin for PBL in engineering education. In the plugin, the teacher can form groups of any size. The teacher opens the task by adding a problem in the plugin, then the group members can chat, add photos and videos and work together to solve the problem. The teacher can view and comment on the participants’ chat sessions and submissions. The assessment also takes place through the Moodle mobile PBL plugin, which provides self, peer, group, and teacher assessment schemes. The survey and the semi-structured interview carried out by the authors at the end of the trial, regarding the use of a mobile plugin for PBL, showed positive feedback from students.

A group of researchers from the University of Florida investigated the impact of the flipped classroom on learning outcomes. They assigned students videos to watch before the classroom activities took place. The results of the experiment led the research team to a different approach, which consists of making videos that are active learning materials themselves. This can be done by embedding in the videos: various kinds of quizzes; hotspots toward other resources (files, links, etc.); branching, i.e., the possibility for the interactive video to move its playback to another point, for example, redirecting it on the basis of the answer chosen by the student in a quiz. These authors compared 53 video platforms that offer these kinds of features and selected the top three, based on cost, interactivity, LMS integration, and data analytic capabilities.

The lecture-free classroom approach, adopted by Shoufan, appears as one of the most innovative and radical within the active learning scope. Assuming that the current learning technologies are able to support the students’ activities in the classroom to such an

extent that lectures are unnecessary, he replaced lectures with in-class learning activities implemented on the Moodle platform. During the COVID-19 pandemic, he used this method for a distance learning course of embedded systems, which combined both conceptual learning and hands-on experience. The activities (called learning quiz) consisted of several pages, with a brief introduction followed by one or more questions for each page. The questions were ungraded and provided immediate feedback to the student. The question types were diversified and included conceptual questions, review questions, procedural questions, brainstorming questions, code analysis, and code creation questions. According to the author, by proceeding in this way there is no need to provide definitions of new concepts, because students are guided to generate these definitions themselves. The practical part was carried out by providing the students with a hardware kit containing an Arduino board and other elements. The hands-on experiments were integrated into the Moodle learning activities, so students were often required to check their answers by running the code on the microcontroller. According to the students' performance recorded by the platform and a survey conducted at the end of the course, the author reported strong student engagement.

The authors of the present article chose peer instruction over other active learning methods for mainly practical reasons related to two main design constraints: the high number of participating students (more than one hundred) and the requirement of providing online live lectures. First of all, the active learning methods involving teamwork were discarded, because, in an online class of more than 100 students, it would have been difficult to monitor the individual contribution within each group, whereas the goal was to engage all the students participating in the lecture in the classroom activities. Second, the students would have followed the lectures from home, without the personal contact that a face-to-face class is able to offer. Therefore, it was important to the authors to establish an interaction between students during the lecture time, in order to foster a sense of belonging to the class and make them feel less isolated.

It was necessary to find an active learning method that would promote interaction between students, but also encourage them to take action individually to participate. Among the methods envisaging peer interaction, from the beginning the most adequate solution appeared to be peer instruction, because the students read the teaching materials beforehand and the peer interaction takes place during the lecture time: this enables the engagement of all the students following the lecture from home in the activities of the online classroom.

This is the case of the distributed active learning integrated technology environment (DALITE) platform, a free tool that can be integrated into other MOOC platforms, making it possible to have an asynchronous OPI. The studies analyzed show that longer answers seem to have greater persuasive potential, compared to short ones. They also show that the platform is not really used to stimulate a discussion on concepts that are absolutely true or with an exact answer regardless, but rather to analyze the discussion that emerges. Another study highlights how Peer Wise, a further useful tool for OPI, can have a positive impact on motivation and learning. What emerges is a good degree of student engagement and positive feelings in using the tool. The need to review the study material and the consequent knowledge forces students to open their notes in order to be able to explain themselves better. The peer context eliminates the anxiety of making mistakes when asking questions directly to the teacher. Furthermore, the explanation provided by classmates using simpler terms appears effective. It is worth noting that, in this context, the students themselves can ask questions, therefore it is not necessarily the teachers who do this. Nerantzi's study shows how peer education and flipped classroom are suitable and crucial active blended learning (ABL) tools in the pandemic situation, since they create an engaging and self-empowering environment, in which active learning is continuously stimulated through the action of peers and tutors.

### 3. Methodology

**User-Friendly Interface:** Any student can use this website in an easy and effective way. It's got a navigation menu that allows students to easily access courses, materials, assignments and quizzes. The dashboard is designed to display the enrolled courses, videos and assignments of each student. Videos and assignments may also be uploaded easily by the instructors. Instructors can check students' assignments with the help of an assignment grading system.

**Video Conferencing and Collaboration capabilities:** The video lectures are made available to students on this platform. The videos can be viewed by learners at any time for in-person classes, debates, and team projects that use reliable videoconferencing capabilities. On the basis of their subject, instructors may upload videos.

**Real-Time Chat and Quizzes:** By integrating real time chat features into quizzes, it enables students and professors to communicate instantly. Chatbots, which can be used by teachers to answer students' questions, are available. Quizzes are a way of testing students' knowledge in the course.

**Mobile Accessibility:** . You can view the website on any device. A number of devices, such as tablets, desktops, laptops and smartphones are supported by the Virtual Learning Platform to support various types of education..

## Technologies and Tools:

### 1. Frontend Development:

- **HTML, CSS, Java Script:** These tools are used to create user interface platform for providing adaptability, compatibility.
- **Django Templates:** It is used to generate dynamic content on the server side, allowing for easy interaction with data and logic from the backend.

### 2. Backend Development:

- **Python(Django):** It is the major web framework and programming language for backend development.
- **Database:**  
**Prograde:** It is the database management system that is used to store and manage user data, assignment files, course materials, and other necessary data.

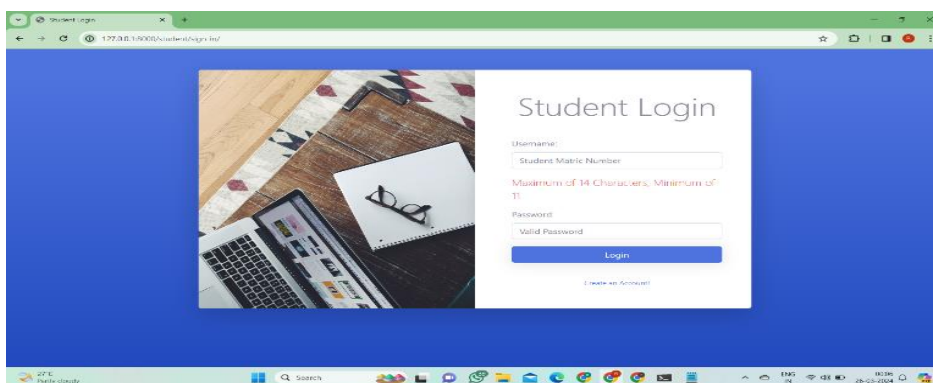
### 4. Results

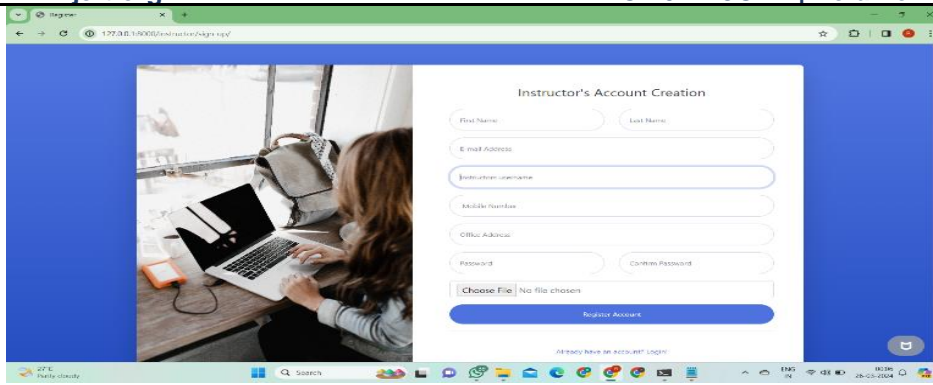
With its user friendly interface and broad capabilities, the interactive learning platform provides a dynamic virtual classroom environment to deliver seamless education for both teachers and students.



### Student and Instructor Portals:

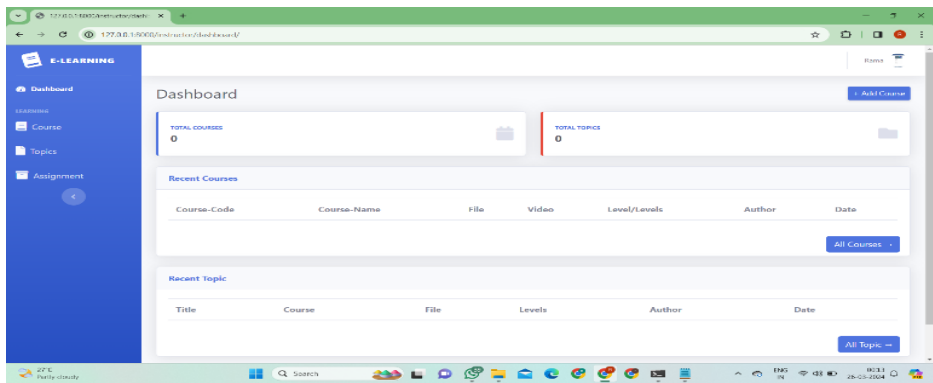
In Interactive Learn, two modules are used to fulfil each user's particular needs. In addition to the assignments, quizzes and performances of students, the instructor portal is also offering courses, captured and Live videos. On the other hand, learners can access courses, videos and submit assignments in a student portal. In addition, you can take part in the Quizzes and know their results





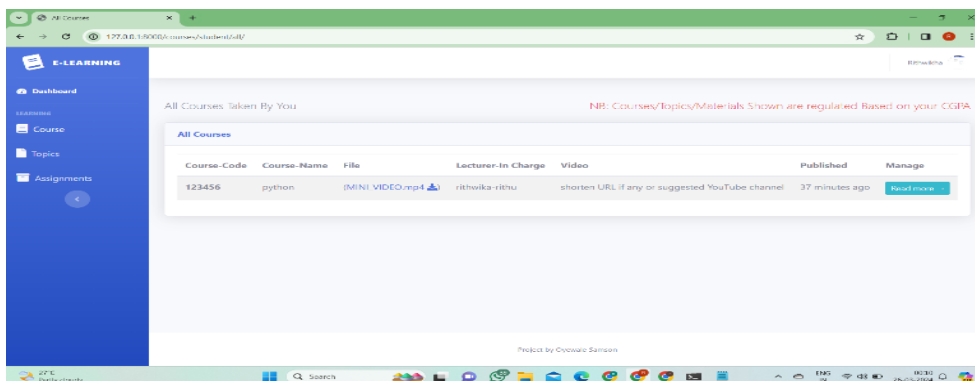
### Courses and Topics:

A large number of courses are available for students which focus on a variety of subjects and areas that matter to them in their studies. You can also find these materials in the form of a PDF, doc, jpg or whatever format you prefer. Through the curation of topics by experts in their respective fields, this website offers a wide range of content.



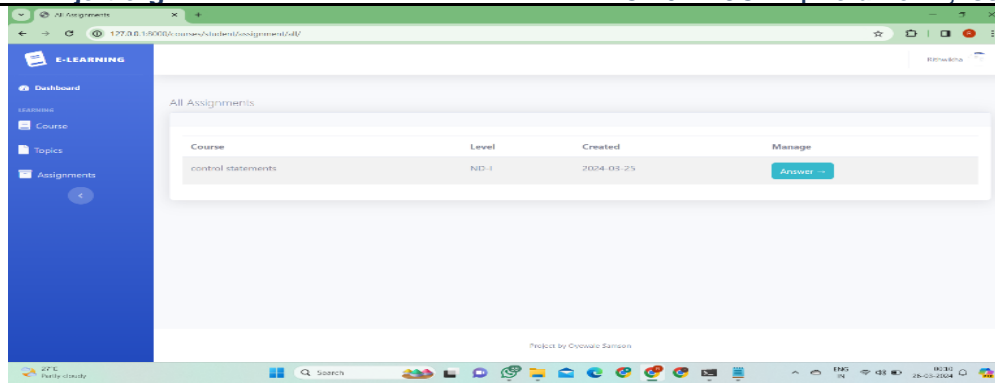
### Access to Recorded Video Lectures:

In order to provide the flexibility in schedule, students can watch recorded lectures whenever they want. These recorded sessions offer important lessons learned, as well as supplementary learning material.



### Assignment Submission and Grading System:

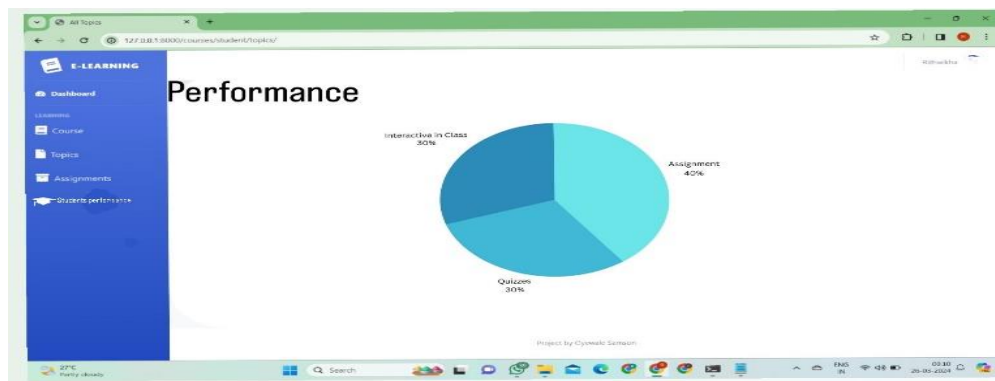
It provides for the submission of assignments, allowing students to submit their work by sitting at home. Instructors are able to quickly and effectively evaluate assignments, as well as receive feedback from students, by means of an Integrated Grading System on the Web site.



### Interactive Quizzes and Chatbot for Student Support:

To determine how well students understood and retained course information, the platform provides tests and quizzes. In order to assess knowledge, students will be able to participate in the quizzes offered by their tutor. The chatbot is capable of responding to most common questions, providing assistance using the website, and sending more resources as needed.

**Analytics for Monitoring Student Performance:** With the help of the website's powerful Analytics capabilities, instructors can monitor students' progress and achievements in real time. The tutors shall be able to monitor trends in student performance, involvement and engagement for the purposes of decision making and targeted intervention where appropriate.



## 5. Conclusion

The interactive learning approach has emerged as a new model for education institutions at all levels, e.g. schools, universities and training centers. COVID-19 faced new challenges, opportunities, strengths and weaknesses while transforming traditional face to face learning into online learning. Digital technology is leading to massive changes in education, skills and employment. Through eLearning Platforms, teaching professionals and students are virtually connected. The interactive learning platform facilitates effective course management, content delivery and student engagement by providing a dedicated portal for students and teachers. These improvements make it possible to provide students and teachers with more engaging, efficient learning experiences in line with the challenges faced by existing teaching platforms. Likewise, teachers have access to simple course management tools within the instructor portal that allow them to create and organize courses in an easy way. It provides students with personalized learning experiences, increases their engagement and improves educational outcomes while teachers gain insight into how to provide the most effective guidance and support. In order to refine and improve the platform on the basis of user needs and preferences, user feedback and continuous improvement cycles are integrated. To prioritize features, address problems and improve user satisfaction, it is important to set up feedback mechanisms, carry out user surveys and continuously update the platform based on users' input.

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