InstaCourse: An AI-driven platform for the automatic course creation.

Empowering Educators with Instant, Intelligent, and Customized Course Generation

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Abstract—**In todays fast changing world it is important, the knowledge is up to date and new skills are acquired. However, designing a well structured and personalized course is a nightmare for many learners and educators, when there are constraints of time, guidance and funds. InstaCourse is an operational, yet user friendly platform which is created to close this gap. It allows users to build full fledged topical learning courses within the span of their choosing the area of interest in adding basic settings. The platform takes care of the rest by gathering and putting together great content from credible online sources and fusing the content into a course with lessons, an overview and interactive quizzes. The simplicity distinguishes them from InstaCourse users don't need any expertise to get started. Both as a student who wants to discover a new topic, a teacher constructing a module or even as a self-learner who finds their own road, InstaCourse is there for users and fulfils their requirements. Discounted on current web technologies it offers a smooth, easy and adaptable experience.InstaCourse makes it easy for anyone to create, share, or follow structured learning paths.**

Index Terms—**InstaCourse, personalised course, well structured learning, online sources, educators, self learners, interactive quizzing.**

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I. INTRODUCTION

In ever evolving world the lifelong learning is essential for success. As there is an increased demand of flexible customizable and self-ascendant form of learning, sites like Udemy and Coursera have not been able to provide customized options to the learner. There are many courses that can be offered in these platforms, but they lack when it comes to personalized learning paths targeting individual likes, goals and speeds.

The gap is going to be closed by presenting InstaCourse as the way to go state of the art AI driven course generator. This platform makes easy the development of learning paths tailored to each learner with the least user involvement. InstaCourse identifies and structures topic-worthy areas; locates credible learning materials and makes lessons, summaries and quizzes entertaining. By automating instructional design process, InstaCourse removes the ability to create the perfect learning experience from both the technical skills and instructional design skill, and instead puts that ability into the hands of the students, educators and self-learners.

InstaCourse is aimed at democratizing access to education by complementing the United Nation's (UN) Sustainable Development Goal (SDG) 4 and reiteration of inclusive, equitable and quality education for all. The platform breaks down barriers of time, cost and complexity and allows users to take ownership of their learning path and create the framework for lifelong learning for a diverse set of learners.

The main focus in the goals of the project InstaCourse is:

- Course generation through intelligent algorithms based on a user's topics and preferences.
- How do I curate high quality and relevant content on the subject of external APIs (i.e youtube , gemini).
- To be able to offer adaptive quizzes that are supportive of learning with individual feedback.
- To provide a straight forward intuitive user interface and intuitive navigation.

II. EXISTING SYSTEMS

There are various platforms in the landscape of the educational technology that is suitable for some purposes but limited in terms of others. We compare the main course platforms, as well as the AI-powered materials, but focus on their limitations comparing to the solution of InstaCourse.

A. Learning Management Systems (LMS)

The academic institutions also rely on Moodle, Canvas and Blackboard to provide the hosting for the course management. Teachers are in a position to distribute materials, allocate dates for the assignment and oversee the students' accomplishments through such systems. However, such platforms have not got dynamic content generating power and course provided personalization facility. Instructors spend a lot of time in compiling course contents hence these tools are burdensome to new and free learners.

B. MOOCs and Learning Platforms

A large number of topics are available for the users to learn from these sites such as Udemy, Coursera, Khan Academy and edx. These are platforms that are on Courses that have been previously recorded and have fixed contents created and compiled by instructors or the institutions concerned themselves. Even though they brag about having a huge user base, the level of personalization at their disposal is to a limited extent. Since users are trapped relating to the developing inside pre-existing template structures thus, they cannot proceed on developing courses that express their unique objectives of learning.

C. AI Content Generators

Other than chatgpt, chatbots apart from Jasper and Notion AI can allow the user to produce content with the help of AI-generated prompts.They lack structure.Whereas, it is possible to develop the lesson materials and the material's summaries, these tools cannot offer a systematic way of arranging the content in the curriculum. Even more, there is no assurance that materials created meet educational goals and contain assessment aspects and have a systematic format.

D. AI in Modern Tools

Sana, Socratic, and the Turing College all attempt to integrate the artificial intelligence in the landscape of the educational tools. However, such actions promise, but are not available for non-industry individuals, they are restricted to some issues, or they are limited by one firm. The majority of the platforms offer limited user choices on how they can change and organize lesson content structure.

Limitations of Existing Systems

- Limited ability for personalization and customization
- Current system heavily relies on pre-made materials
- Poor adaptability to learners' needs and new information.
- No room for students and faculty to influence learning experience.

III. LITERATURE SURVEY

[1] GAIDE is a functional reference book for instructors who wish to implement Generative AI in the creation of their classes.
The GAIDE framework as described in this article provides a plan to assist educators integrate generative AI into course design. It introduces a simple method of creation and revision of instructional content authored, revised and published by educators with support from AI-generated instructions.The framework promotes co-created constructivist learning that empowers instructors to co-create effective engaging and appealing learning resources to improve students' engagement and speed the development process. What makes the framework different is its strategic and painstaking iterative approach built upon a principle of teacher autonomy that fits seamlessly with the InstaCourse mission to combine ai-generated resources and educator guidance.

[2] Advanced Language models as a design tool for courses to support Adult Learning.

This investigation is about LLMs being used in supporting the development of efficient asynchronous training courses for adult learners of adult learning programs. The methodology suggests the implantation of human intervention in the process to facilitate direction in both accuracy and course content clarity[2]. The research shows that AI improves the development of course material while ensuring instructional excellence is retained. The research substantiates InstaCourse's goals to quickly develop huge volumes of courses, keeping their integrity and connection to learning resources.

[3] Development of a Multimedia Databases course with ChatGPT
In this case study, ChatGPT was used for the development of a complete Multimedia Databases course consisting of lectures, assignment, and exam. The completion time of the material was under 24 hours with iterative adjustments and continuous validation when required. Speaking of the quality of the course, feedback from experts confirmed it, and plagiarism search showed high original content level. This research demonstrates that AI technology is not only implementable, but also highly efficient in the development of courses which is not far from the InstaCourse features and goals.

[4] Using AI Planning to Create Real-Time Course
This research presents an AI-fueled framework that helps develop individualized courses in real time for individual learners' needs. This approach separates domain knowledge from instructional strategy and, in turn, enables adaptive delivery that will tailor itself to student advancement. The implementation of ontologies and intelligent tutoring ideas is a cornerstone of the modular and adaptive generation of a learning path in InstaCourse.

[5] Artificial Intelligence in Education : Emerging Trends
A detailed analysis of many publications on AI in education identifies essential applications, such as adaptive learning, intelligent assessment, learner profiling, and upcoming AI technologies.Lack of applicable suggestions on ways of successfully implementing AI in education, a process supported in existing academic research, is addressed in InstaCourse's approach where AI concepts are embedded into teaching procedures.

[6] Systematic Review of GenAI in Higher Education
After the analysis of many scholarly articles, this work gives an overview of generative AI's position in higher education. The review highlights deficiencies in the development of policy and framework, emphasizing the necessity of cutting across disciplines. The results highlight for InstaCourse the importance of transparency, ethical implementation, and cooperative development in developing educational software based on AI.

[7] Application of AI in Education,this paper discusses the major changes that AI is creating in education, ranging from AI-driven assessment tools to creation of personalised content. Whereas it has identified the benefits of AI, the paper also discusses ethical issues attached. The paper corresponds to InstaCourse's aim of increasing access and course design simplification thanks to responsible AI usage.

[8] Smart Learning Systems,this paper addresses the topic of the application of AI in tutoring, adaptative learning's flexibility, and personalization of education. It marks how the shift has happened from static course content to interactive resources and from authoritative to collaborative learning spaces. This change is reflected in the approach InstaCourse takes to offer interactive and user-centered learning.

[9] Rouabhia-AI Multimedia Course case Study
This case study follows the path of InstaCourse in using AI (ChatGPT) to develop a whole university course. It demonstrates that when accurately supervised; AI is able to achieve the required quality standards. This work proves that AI does not only help as a supportive resource, it is able to guide course development on its own.

[10] Education Sciences-Systematic Review
A look at the contemporary effect of generative AI on practices of teaching and learning. Several major policy issues, professionals' teamwork, and successful implementation are mentioned as significant findings. A collaboration between teachers and technology specialists in this project is advised so that AI tools are ethical and scalable. By promoting collaboration, accepting transparency and fighting for pervasive usage, InstaCourse intends to make these tools accessible and effective throughout.

IV. PROPOSED SYSTEM:INSTACOURSE

Unlike the traditional methods, which require huge manual labor and initial video lessons, InstaCourse seeks to streamline and individualize course development. With InstaCourse, instructors and students alike can successfully develop entire courses without any coding, graphic design, and education requirement.

InstaCourse is based on an AI algorithm that gauges users' learning or teaching goals and creates a well-defined, objectives-based curriculum from that data. Teachers can use InstaCourse to easily construct new courses, organize content, evaluate students work, and progress tracking in one interface.

A. Key Features of InstaCourse

The objective of InstaCourse is to make a simple process of building and learning courses through streamlining processes and empowering anyone to do more using less effort. Here are some of the best InstaCourse features:

Smart Course Builder It is as easy as it can possibly get when you start a course on InstaCourse. The first step is selecting a topic you desire whether you want a high subject area such as "Web Development" or a niche area such as "Machine Learning with Python". After that choose your language skill level (beginner, intermediate, or advanced) and the length of your course. Straightaway, InstaCourse creates a learning course plan that has sections, lessons and learning objectives, all of which are such that it is modelled around your personal preferences.

Integrated Learning Content Forget about how many hours users would spend browsing the web for content. With the help of InstaCourse all your learning resources are kept in a single central location. It combines itself with such sites as YouTube, numerous open educational resources providing users with the best videos, articles, and tutorials specific for user, for users particular topic and level of learning. The platform collects and organizes online resources in easily navigated lessons which makes is very easy for users to apply the content immediately after signing up saving time that would otherwise be vampire for one to look for other content.

Adaptive Quizzes for More Effective Learning The instacourse quiz system is tailored to each learner's unique needs. Instead of being fixed, it modifies according to how well the learner answers. Increased proficiency makes you answer tougher questions on subjects you get wrong, making it difficult just to smoothly pass lessons. If you're struggling, then the system presents the simpler, more helpful questions in attempting to catch up. InstaCourse succeeds in maintaining the momentum and the curiosity for students through its personalized quizzes thus, motivating and interested students.

Edit and Customize with Ease InstaCourse published courses are not locked. Learners can at any time view and reorganize the full outlines of the courses in their way. The freedom is present for the Instructors to add in their own lessons, integrate content to fit their classes, or simply address topics in a way which best fits with their philosophy of teaching. Installed with neat, visual, and collaborative editing abilities, InstaCourse provides great help for expert teachers as well as to self-taught.

AI That Understands You: Built-In Intelligence

- *Personalized Intent Detection*

Personality learning plays a crucial role for us – investigation of user specific needs goes first. Our state-of-the art system monitors users most effective learning practices, analyses user goals, and adjusts their learning speed to suit them the most. The As borrowed aspect of our mentorship approach revolves around preference towards speedy outcomes or users urge to learn leisurely at a self determined pace to achieve goals. We are not interested in a universal approach, and what we offer our learners is a personalized and individualized experience.

- *Smart Content Matching*

Don't ever again waste precious hours browsing through content to find what suits you. Our sophisticated systems and tutors alternate in recognizing and providing users with personalized content that interests them, making their learning experience easier. Whether a video, a tutorial, or an article or guide, what will be given will be unique to the relevant content only omitting any unnecessary information. We are interested in efficiency and progress and we take care that each step is precisely customized, according to the way users are changing in their journey of learning.

- *Step-by-Step Learning*

Our courses are connected nicely so that the step that user take is seamless and advances their progress because they read into an exciting story. Users understanding picks up as they move along just as a train climbing slowly ahead than lagging behind gives an incremental rise in understanding. Reviewing what lessons they have learned and progress in the future makes their motivation alive and grounds their sense of achievement in advancing path.

C. What Makes InstaCourse Unique

InstaCourse doesn't just provide a free course builder—it is intended to be your perfect education partner. What sets it apart?

- No teaching experience needed; just decide what you want to teach and you're good to go.
- It quickly builds a well-structured course in minutes instead of weeks.
- Courses prepare to adapt to individual learners, based on their unique needs, they offer content and support.
- It serves all categories of learners, both the students, the teachers, the freelancers, the professionals and the lifelong learners.
- It removes the burden of extensive preparations, and provides more energy for connecting and facilitating learning for educators.

V. SYSTEM ARCHITECTURE

InstaCourse's system architecture has been implemented with modularity, scalability, and efficiency in mind, making it appropriate for all user groups: learners, educators, and administrators. The system uses a microservices-inspired organization, where frontend, backend, AI, and content management have individual layers.

A. Technologies Used to Build InstaCourse

we have curated the technology we will use, to create the most seamless, fast and instinctual course building, or consumption experience possible.
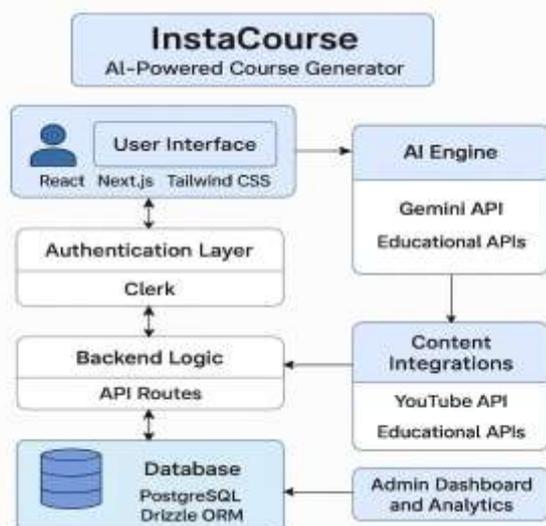

Figure 1:Technologies used to build InstaCourse

Frontend- Seamless, fast, and intrinsic We built our front-end UI using React.js and Next.js, which allows our pages to load quickly and look amazing on any device (phones, tablets, desktops). All of our designs present as fully responsive and mobile-first design

using TailwindCSS, so navigating the site is easy and simple. What you see is truly what you get, with no surprises around any screen size.

Backend- Structured and reliable data (course materials, quiz answers, etc.) live in a PostgreSQL database behind the scenes. We use Drizzle ORM, in a way that is cleanly organized, so it is user friendly to move data to and from your database and app.

User Authentication- For secure and role-based security, we use the services of Clerk for signups, logins, and user management. User access, whether user is a student, instructor or admin, is secure to them; which means user see only what they are intended to see and all things are safe.

AI Engine- Intelligent learning, personable we utilize the Gemini API which creates a lot of our AI magic, like generating custom course content, lesson plans and quizzes to meet every learner's needs.Smart Content Integration Simply put, to create the richest learning experience possible.

Technical Workflow

1.Client Layer : Where Learning Begins
Because of our choice to develop with React.js and Next.js, InstaCourse delivers fast and seamless usage across all devices.
Effortless Course Uploading: People who are not technology experts are also able to quickly build lessons and describe learning objectives on our platform.
Easy Progress Tracking: Viewing both finished work and met learning milestones is straightforward for users through the lists and summary available in the application.
Personalizable Dashboards: Each user has the ability to personalize their dashboard, which simplifies their ability to keep track of assignments and learning content.
Secure Role-based Access: Only permitted users may use premium resources, and each group is given the functionalities it needs.

2.Application Layer : The Brain Behind the Scenes
The architecture set up on the backend controls both user course and profile information, and uses PostgreSQL and Drizzle ORM to track all learners' progress. This layer also manages:
API Routing: All API requests are routed immediately to the part of the system responsible for processing them.
Content Caching: Enhanced user experience results from the immediate delivery of learning content.
User Sessions with Clerk: It handles the initiation as well as the conclusion of user sessions.

3. AI Integration Layer: Bringing Intelligence to Learning
The interaction of this part of the framework with the Gemini API together with selected AI systems is responsible for implementing these features:
Natural Language Understanding (NLU): Changes what users say into content that represents their intended goals.
Structured Course Outlines: Each learning resource is constructed to specifically support the levels of Bloom's taxonomy.
Adaptive Quizzes: Provides learners with adaptive quizzes that reliably assess their learning and inspire improved performance.

4. Content and Media: Enriching the Learning Experience
Using MEGI's API lets us discover and deliver the correct video tutorials, and both our PDF and article summarizers simplify lengthy reading for users. Caching and indexing all course media means users can find and use the content without obstacle.

5.Storage and Security: Safeguarding Data and Content
Firebase: We store and keep track of course documents and user-uploaded content, along with the required metadata here.
Clerk: Clerk's features allow us to govern user authentication and take care of user sessions and role assignments.

6.Deployment and Hosting: Ensuring Scalability and Performance
We designed InstaCourse so cloud deployment could be achieved quickly while supporting scaling.
Frontend Hosting: Vercel hosting is leveraged to raise frontend efficiency by enabling server-side rendering and the benefits of serverless functions.
Backend Services: The Firebase platform is utilized by our system to manage live data transfer and to provide secure user authentication.

VI. BENEFITS OF INSTACOURSE

A.Speed
The course-building step is finished in a short period, which frees up both teachers' and students' time for other activities.
B.Accessibility
Since it is available on all devices, students from any location may access their materials.
C.Customization
It is a simple matter for educators to rework AI-generated materials to better suit what their students need.
D.Scalability
The system's cloud basis enables it to effectively support massive deployments on both a local and international scale.
E.Security
The system's security features support a secure login process and maintain the safety of its data, in accordance with ongoing protection standards.

VII. SNAPSHOTS AND RESULTS

The foundation of InstaCourse project is to simplify, speed up, and personalize the learning journey for many users, from official teachers to self-directed learners and independent educators. InstaCourse provides an efficient web-based platform that uses artificial intelligence to allow users to swiftly build tailored learning courses. When users submit their topic, set the level's difficulty, and define what they want to learn, they should automatically obtain a structured course outline that covers modules, lessons, summaries, and supplied resources. Each course is intended to comprise interactive content created using the Gemini API along with handpicked media resources taken from YouTube and similar platforms. In addition, the system delivers tailored quizzes and an interface for monitoring learning, making learning more engaging and attuned to particular learners.

1] HOME PAGE

Fig 1.1 Home Page

The above image is the main landing page of the application, prominently titled "AI Course Generator" with the tagline "Custom Learning paths, Powered By AI." The layout is clean and modern, with a central call-to-action button labeled "Explore Now." A GitHub link appears in the upper-right corner, emphasizing transparency and encouraging open-source engagement.

2]SIGN IN PAGE

Fig 1.2 Sign in Page

In the above snapshot, a user authentication model powered by Clerk is visible. The interface offers users the option to sign in using Google or through an email-based flow. This modal is cleanly styled and includes a "Continue" button, ensuring a smooth and secure login experience for both new and existing users.
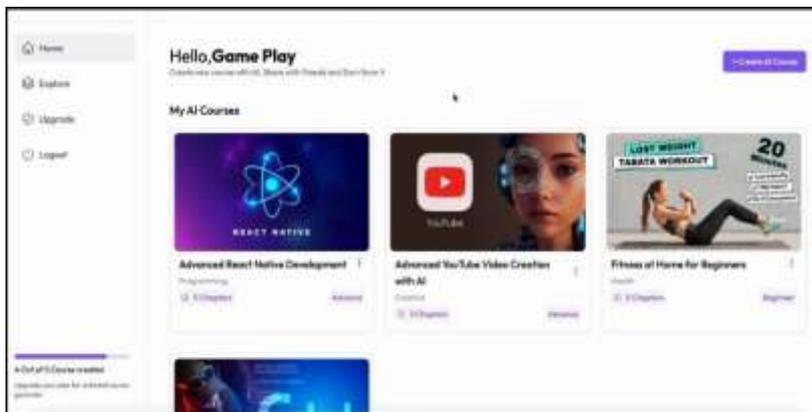
3]USER DASHBOARD

Fig 1.3 User dashboard

In the above image, we see a user dashboard where different courses have been created. The dashboard greets the user by name.It also features a sidebar with navigation options like home, explore, upgrade, and logout. The minimal and clean design makes it easy for users to get started.
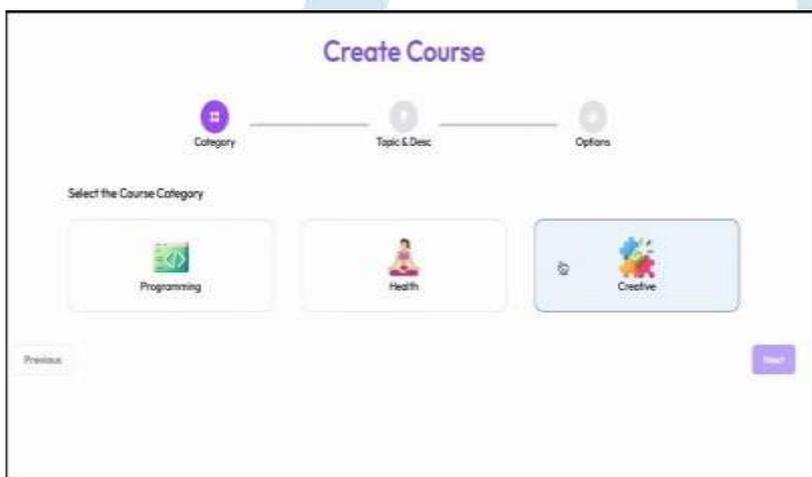
4]COURSE CATEGORY SELECTION

Fig 1.4 Course Category Selection

In the above snapshot the user is presented with three categories to choose from – Programming, Health, and Creative – as the first step in the course creation process.

5]USER INPUT PAGE

Fig 1.5 User Input Page

The above image showcases the next step in the process, where users are asked to set options for difficulty, duration, video inclusion, and the number of chapters. The form uses intuitive dropdowns and input fields, making it simple to specify how detailed or long the course should be. A "Generate Course Layout" button sits at the bottom, signaling the transition to AI-powered generation.

6]COURSE TOPIC AND DESCRIPTION

Fig 1.6 Course Topic and Description

In the above image, the user enters "SQL" as the course topic and is optionally prompted to provide more details about what the course will include.

7]COURSE GENERATION CONFIRMATION

Fig 1.7 Course Generation Confirmation

In the above snapshot,the platform displays a success message indicating that the SQL course has been generated, along with a unique course URL for sharing or access.

8]COURSE CONTENT OVERVIEW

Fig 1.8 Course Content Overview

A complete list of the 5 chapters is shown, covering core SQL topics like basic commands, data manipulation, joins, and project-based exercises, each with an estimated time for completion.

9]CHAPTER 1 OVERVIEW

Fig 1.9 Chapter 1 Overview

In the above image,the course begins with an engaging explanation of SQL and relational databases, featuring an introductory YouTube video and a short write-up describing SQL as a language for managing structured data.

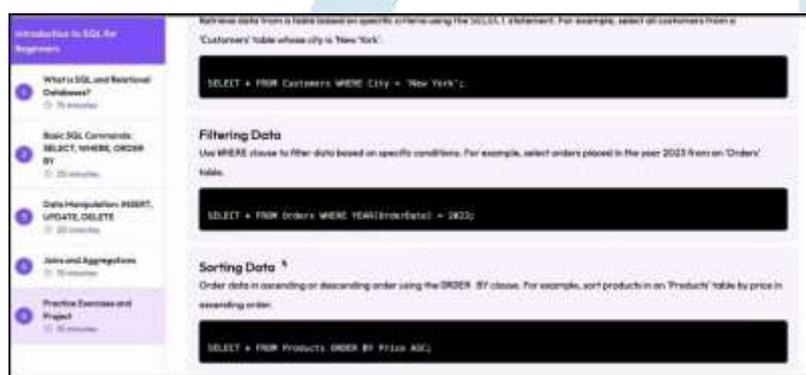## 10]HANDS-ON SQL EXAMPLES WITH CODE SNIPPETS

Fig 1.10 SQL Examples

In the above snapshot,real SQL code examples are provided to demonstrate how to use SELECT, WHERE, and ORDER BY clauses for querying and sorting data, offering practical learning for beginners.

VIII. CONCLUSION

InstaCourse is not just an application, it is a giant leap forward in being able to make personalized learning achievable, actionable, and meaningful. Early research showed us how teachers, students, and independent learners all can personalize learning. This is a result of combining accessible tech like React.js, Next.js, Clerk, Firebase, and Drizzle ORM with the leading edge of AI and tools like the Gemini API, to make a platform that feels simple but has a lot happening under the hood. We used real users' feedback at every point in the development process so what we ended up with is a product that functions as people wanted. All of the early testing showed us that not only does InstaCourse have usability, but it is highly practical and very helpful. However, we know that is where our journey starts. From this point on, we are excited to build out features such as collaborative learning; live classes; and multilingual functionality, because learning should be available for everyone. With many of the features that will support real-time personalization of content and learner pace, InstaCourse isn't just keeping up, it's providing a foundation with a future looking trajectory for the future of learning and education. It supports the global ambitious mission of Sustainable Development Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities to all.

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