



ARISE: Augmented Reality Integrated Student Environment

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Abstract

ARISE, a total education platform, incorporates artificial intelligence and gamification to offer personalized learning experiences and engages students in a meaningful way. ARISE tackles critical issues in today's schooling system such as decreasing student participation, universal teaching, and minimal access to various instructional modes. The features of the platform are a gamified dashboard with streaks, leaderboards, coins to reward and monetisation, Google Classroom integration for task management, Smart Meet Notes, via which notes get converted to transcripts, AI Visualiser for 3D animated explanation of concepts, AI Notes allowing podcasts, quizzes to be generated, AI Mentor offering real-time voice call help, AR Hub to see 3D models through AR for understanding concepts better. ARISE fuses artificial intelligence's personalized learning and gamification into one ecosystem. It draws on literature showing that both are effective educators. The platform uses multiple AIs. For example, it has Gemini AI that processes content, ElevenLabs for a natural voice that reads the content and machine-learning algorithms that help in content delivery as per the user. ARISE uses many ways you might learn. This includes how you see, hear, and interact with different objects. There are also game features that keep you engaged. Theoretical foundations that support all features and implementation approaches will be discussed in this paper along with expected outcomes based on the literature and how it can make education accessible and effective in taking the challenges of the 21st century.

Introduction

1. The Rise of Education Technology

In today's world, technology is in rapid progress and in today's world students want more from their education than before. The classrooms where every student is taught the same lessons in the same way now no longer work well, because students now who come through different backgrounds like to learn in different ways. Since the digital revolution, people have become used to finding and using information through interactive tools like online quizzes, learning apps etc, which

has increased the need for learning systems that are personalised, stable, flexible and engaging.

Nowadays, institutions have also modernized the approaches and way of learning. They are also engaged and busy with the determined challenge of student engagement, personalized learning, giving access to students to a variety of study learning materials. Online learning environments also face challenges, with the absence of real classroom traits as students learning online in their home takes an effect on motivation and engagement.

2. Artificial Intelligence in Education

In today's modern age, AI is rapidly growing in all sectors and changing the traditional ways of doing things. One of those changes is how students learn in many classrooms today. The AI tools are advanced to a whole new level. It can look at what each student does, notice patterns, and then adjust the lesson so it fits that student better. A prime example would be how intelligent tutoring systems guide students step by step, while other tools can check answers and change the difficulty of questions as the student works.

These systems work the best according to the students' needs, the content that matches perfectly, speed, and way of thinking. Researchers have found that this type of personalized learning can help students better understand the concept and remember things more clearly rather than vaguely. New methods like deep learning can even guess what a student is likely to find hard in the future and help them build a clear roadmap to acquire the knowledge.

Many AI tools change their teaching style based on a student's performance and how well they understand the topic. Schools now use things like computer vision and tools that understand language to build learning platforms that react in real time, a bit like a careful human teacher who pays close attention and monitors the patterns.

3. Gamification as a Debtor Engagement Strategy.

Gamification is the process of using game ideas in situations that are not games, such as classes or training. Some reports show that when teachers add a gaming element to studies, students show more participation and are energetic, while also enjoying the work more. This is solely because of gamification, which creates a perception of a gaming experience, like wanting to improve and feel in control, and also to outer motives like rewards and friendly competition.

Some common game elements include normal game features like points, badges, leaderboards, and simple progress bars that show how far a student has come. These help with quick feedback and create a sense of success, and also let students compare their efforts with others in a healthier and friendly way. When this website will be used properly, this can turn boring, tiresome work/assignments into fun challenges and activities that are easier to stick with. Research links this design style to focus better, achieve higher completion rates, and have more positive feelings about learning.

Gamification works really well in various aspects, but especially in online learning, where it is harder to keep students involved through face-to-face contact. Platforms like these often use progress

charts, streak counters, and small awards to show learning activity and to encourage consistent study habits.

4. The Collaboration of AI and Gamification

Combining gaming and the use of artificial intelligence is an obvious next step as each one fills in the gaps of the other. AI can differentiate the material and the level of complexity, while gamification keeps students engaged. Researchers say that this blend could create strong engagement while building important skills such as problem solving and collaboration.

In these systems, AI monitors how students interact with the software and learns how students learn. It then modifies the challenges so students remain in their zone of proximal development – an area between boredom and frustration. The rewards, hints or type of tasks for each learner can also change based on past performance. It keeps students engaged at all times without confusion or panic.

Collaboration of AI with gamification in online learning has been shown to be effective with studies from colleges and universities along with effective feedback that is detailed. Artificial Intelligence can use gaming as a medium to assess soft skills on the part of students. Seeing how students take part in setting targets, discuss with other users or solve problems helps AI give teachers the proper picture of students

5. Multimodal Learning With Emerging Technologies

According to recent studies, students learn through using pictures, sound, motion, and reading and writing. Therefore, every lesson should accommodate all these learning styles. AI tools can make the same concept available in different formats at the same time. This makes learning easy and effective for various types of learners. When augmented reality is combined with artificial intelligence, students can touch holograms in their environment. This helps with learning where things are and gives them more chances to practice in real life with things that weren't possible before.

Research on the use of AI and augmented reality in classrooms shows that multisensory activities facilitate a better understanding and retention of knowledge, particularly in areas that require a whole dimension level, i.e., presets and shapes that colleges consider more complex. When educational experiences incorporate game elements, engagement and learning outcomes deliver clear benefits according to research on large-scale realias, enlivening educational experiences instead.

6. Introduction to ARISE

To tackle this particular challenge and considering the findings showing the impact of utilizing AI and gamification together, we have developed ARISE (Adaptive, Responsive, Interactive, Smart Education). This refers to a very powerful educational platform that combines many AI features with gamification. ARISE is a complete educational technology approach with eight core features addressing various aspects of the learning experience: engagement, personalization, content accessibility, assessment, mentorship, and visualization.

Instead of which is the use of stand alone AI tools or simple game elements which ARISE does put together into a single system which in turn support each other during the learner's journey. The platform which is a mix of what we know to be engaging ideas like streaks and rewards and also what AI does best like smart visual display of content, automatic adaptation of learning materials, personal assessment, and conversational support. Also this design is based on research that says learning is most effective when it is presented in multiple formats, tailored to the individual student, and which truly connects with students from very diverse backgrounds.

Problem Statement

1. Decline in Student Engagement in Digital Learning

In online and hybrid learning environments, contemporary education confronts systematic challenges in critical thinking. Research shows significant decline in student participation rates, reduced time-on-task behaviors, and increasing course abandonment in digital learning contexts [4]. Traditional lecture-based instruction, when translated to digital formats, often fails to capture a student's attention, resulting in passive learning experiences that produce below par outcomes [10].

The gamification literature identifies several factors that contribute to this engagement deficit: lack of instant feedback, absence of visible progress indicators, limited social interaction and competition, and narrow recognition of achievements [11]. Students familiar to the immediate gratification and interactive nature of digital entertainment find traditional educational platforms un motivating and tedious by comparison. This engagement gap is particularly tricky given that sustained engagement is strongly associated with learning outcomes and course completion [10; 11].

2. Inadequate Personalization in Educational Delivery

Despite expansive research demonstrating that students learn at different rates and through different methods, majority of educational systems continue to deliver standardized content to all learners [1; 14]. This one-size-fits-all approach creates major inefficiencies: advanced students become weary with material below their academic proficiency while struggling students feel lagging behind when content exceeds their current understanding [6].

Wang's systematic review signifies that traditional educational systems lack systems for continuous assessment and adaptive content delivery that would facilitate true personalization [1]. Without real-time analysis of student understanding and engagement, educators cannot recognise knowledge gaps instantly or adjust instructional strategies efficiently [15]. This drawback is particularly flawed in large enrollment courses or asynchronous online learning where individual student supervision becomes practically impossible.

The literature on personalized learning highlights that efficient adaptation demands refined data analysis capabilities that exceed human processing capacity [6; 7]. AI-driven systems can analyze hundreds of variables simultaneously, response times, error patterns, help-seeking behaviors, engagement indicators, to generate nuanced comprehension of individual learning needs and dynamically adapt content accordingly [9].

3. Limited Accessibility to Diverse Learning Modalities

Educational research consistently exhibits that learners have diverse study preferences, some use visual representation to learn best, others via auditory content, and still others by means of kinesthetic interaction [8]. However, creating content in multiple approaches is resource-intensive, requiring specialized specific skills and significant time investment that many educators lack. Consequently, the majority of educational content remains text-based, scarcitying learners whose preferences or abilities favor alternative approaches [4].

The challenge is particularly critical for complex concepts requiring spatial understanding or dynamic visualization. Conventional text descriptions and static diagrams insufficiently convey three-dimensional relationships, temporal processes, or interactive systems [6]. Students studying subjects like anatomy, chemistry, physics, or engineering struggle to comprehend accurate mental models from two-dimensional representations singularly.

Additionally, accessibility concerns emerge when content is available only in limited formats. Students with visual impairments benefit from audio content, while those with auditory processing difficulties prefer visual or text-based materials [8]. A truly inclusive educational platform must enable content through multiple methods, allowing each learner to access information through their preferred or necessary channel.

4. Fragmented Learning Ecosystems

Upcoming students maneuver shattered digital learning ecosystems, frequently shifting between multiple platforms for different educational functions: learning management systems for course content, video conferencing for synchronous instruction, third-party tools for note-taking, separate platforms for assessment and practice [3]. This fragmentation creates cognitive overhead, increases chances of missing important information, and reduces overall learning efficiency.

Integration challenges are particularly questionable when students must manually transfer knowledge between platforms or maintain context of deadlines and tasks distributed across multiple systems. Research on cognitive load theory suggests that unnecessary switching between contexts and interfaces consumes working memory resources better compliant to learning content itself [3].

5. Insufficient Support for Autonomous Learning

As education increasingly signifies self-directed learning and lifelong learning skills, students require support systems that extend beyond scheduled class time [5]. However, conventional educational models provide limited opportunities for students to access personalized assistance outside synchronous instruction periods. While human tutoring is highly effective, it is not scalable or accessible to all students due to cost and availability restrictions [8].

The literature on AI in education signifies that conversational AI systems can partially address this gap by providing on-demand assistance, answering questions, and offering guidance whenever students need support [5].

6. Gap in Immersive Learning Technologies

In spite of evidence that augmented reality and 3D visualization significantly enhance learning outcomes for spatial and conceptual understanding [13], most educational platforms lack integrated AR capabilities. Students must look for third-party applications or resources, often resulting in low utilization of these powerful

learning systems. The integration gap prohibits seamless incorporation of immersive technologies into regular learning workflows, limiting their potential impact on students.

7. Research Gap and ARISE Solution

While existing literature highlight the effectiveness of individual AI features (personalization, adaptive content) and gamification elements (rewards, progress tracking) separately, limited research signify importance of comprehensive platforms that integrate multiple AI capabilities with gamified engagement mechanisms into unified ecosystems [2].

ARISE addresses these well defined problems through a comprehensive platform that combines eight integrated features designed to work synergistically. The platform addresses engagement through gamification (dashboard, coins, rewards), personalization through AI (adaptive quizzes, personalized roadmaps, AI mentor), multimodal accessibility through content transformation (podcasts, visualizations, AR models), ecosystem integration (Google Classroom sync), and autonomous learning support (AI mentor, on-demand resources). This holistic approach, grounded in educational research on effective learning design [1], represents a significant advancement in educational technology implementation that makes education accessible and personalized to all.[6]

Literature Survey

1. Artificial Intelligence in Education

Artificial intelligence has emerged as a powerful tool for transforming educational practices. Wang conducted a comprehensive systematic literature review examining the application of AI across various educational domains, highlighting its potential to revolutionize teaching and learning methodologies [1]. The fundamental premise of AI in education centers on its capacity to analyze vast amounts of student data, identify learning patterns, and adapt instructional content accordingly.

The concept of personalized learning through AI has gained substantial attention in recent literature. AI-driven personalized learning systems enhance educational effectiveness by tailoring content delivery to individual student needs, learning paces, and cognitive abilities [6]. VanLehn's seminal work established foundational principles for how artificial intelligence can personalize educational content, creating adaptive learning environments that respond dynamically to student performance [8]. More recent studies have expanded on these foundations, with research demonstrating how AI agents can facilitate personalized adaptive learning experiences that adjust in real-time to student interactions [5].

The implementation of AI for personalized learning in K-12 education has shown particular promise, with systems capable of identifying knowledge gaps and recommending targeted interventions [14]. Educational institutions in the United States have increasingly adopted AI-powered personalized education platforms, recognizing their potential to address diverse student needs and improve learning outcomes [15]. These systems leverage machine learning algorithms to create customized learning paths that evolve with student progress, ensuring that each learner receives appropriately challenging content [7].

2. Deep Learning in education

Deep learning techniques have further enhanced the sophistication of personalized learning systems in higher education. By integrating advanced neural network architectures, educational platforms can process complex student behavior patterns and predict learning trajectories with increasing accuracy [9]. The research by Inria highlights how AI enables the personalization of learning methods by analyzing individual student characteristics and adapting pedagogical approaches accordingly [4].

III. Gamification as an Educational Strategy

Gamification, defined as the application of game design elements in non-game contexts, has emerged as a significant strategy for enhancing student engagement and motivation. The role of gamification in improving student engagement and learning outcomes has been extensively documented, with studies showing measurable improvements in participation, motivation, and academic performance [10]. Ruiz conducted a systematic review examining the impact of gamification on school engagement, finding consistent evidence that game-based elements significantly increase student involvement in learning activities [11].

The psychological mechanisms underlying gamification's effectiveness relate to intrinsic and extrinsic motivation theories. Game elements such as points, badges, leaderboards, and progress tracking provide immediate feedback and recognition, satisfying fundamental human needs for achievement and social comparison. These mechanics create engaging learning environments that transform potentially tedious educational tasks into enjoyable challenges.

Recent innovations have explored the integration of augmented reality (AR) with gamification to create immersive learning experiences. Research on enhancing 3D printing education through game-based learning with AR and gamification demonstrates how these technologies can work synergistically to improve both engagement and learning outcomes [13]. The exploration of AR and AI in education reveals that these technologies can create multisensory learning experiences that

accommodate various learning styles and preferences [8].

The practical applications of gamification extend across educational levels and subjects. Studies have documented successful implementations in various domains, from language learning to STEM education, consistently showing that gamified approaches increase student motivation and time-on-task behaviors. The use of AR in education has proven particularly effective for subjects requiring spatial understanding or hands-on practice, providing virtual manipulatives and interactive simulations that would be impractical or impossible in traditional settings [6].

4. The Convergence of AI and Gamification

The integration of AI with gamification represents a natural evolution that combines the adaptive capabilities of AI with the motivational power of game-based learning. Yordanova and Durakovic explored how gamifying learning with AI creates pathways to developing 21st-century skills, emphasizing that this combination addresses both engagement and skill development simultaneously [1].

Serbin and Kassenkhan reviewed innovative approaches to fostering critical thinking through AI and gamification, demonstrating that these technologies can target higher-order thinking skills beyond simple knowledge retention [2]. Their work suggests that properly designed AI-gamified systems can promote analytical reasoning, problem-solving, and creative thinking by presenting adaptive challenges that scaffold student learning progressively.

The synthesis of AI and gamification in higher education has shown particular promise for e-learning optimization and soft skills assessment. Marengo and Santamato conducted a cross-study synthesis examining how integrated AI-gamification platforms can simultaneously optimize learning delivery and assess complex competencies such as collaboration, communication, and critical thinking [3]. Their research highlights that AI algorithms can analyze student interactions within gamified environments to provide nuanced assessments of soft skills that traditional testing methods struggle to capture.

Surve's research on gamification empowered with AI tools demonstrates practical applications for enhancing student engagement. The study shows that AI can optimize game mechanics in real-time, adjusting difficulty levels, challenge types, and reward structures based on individual student performance and engagement patterns [5]. This dynamic adaptation ensures that students remain in optimal learning zones, challenged enough to

maintain interest but not overwhelmed to the point of frustration.

The development of gamified AI-enabled online learning applications represents a significant advancement in educational technology. Research published in ScienceDirect demonstrates that such applications can substantially improve student engagement by combining personalized learning paths with game-like progression systems [3]. These platforms typically feature adaptive content delivery, real-time feedback mechanisms, and social learning elements that foster collaborative learning communities.

V. Measuring Engagement and Effectiveness

The effectiveness of AI-enhanced gamification requires robust measurement frameworks. Recent research has focused on developing and validating scales for measuring engagement and motivation among secondary school students in AI-gamified learning environments [12]. These measurement instruments typically assess multiple dimensions of engagement, including behavioral engagement (time on task, participation), emotional engagement (enjoyment, interest), and cognitive engagement (deep processing, strategy use).[7] Network analysis perspectives have provided insights into how students interact within AI-gamified systems, revealing patterns of collaboration, competition, and social learning [7]. These analytical approaches help educators and designers understand which game elements and AI features most effectively promote desired learning behaviors and outcomes.

Studies examining the enhancement of educational gamification through AI in higher education have documented improvements in both traditional learning metrics (test scores, completion rates) and 21st-century competencies (problem-solving, collaboration, self-directed learning) [4]. The evidence suggests that AI-enhanced gamification is particularly effective for maintaining long-term engagement in online and hybrid learning environments where student motivation often wanes.

Methodology

ARISE uses a modular approach to bring AI technologies into everyday workflows, designed with a friendly, clean interface that's both easy to use and logically organized. The aim is to create a unified environment that benefits both the student and the teacher by offering different features, automations, manageability, personalization and approachability.

There are mainly four stages in the methodology:

1. Requirement Analysis

The first step was to study the major challenges involved in the current educational industry. Both

teachers and students spent most of their time doing the same repetitive work, for example, teachers spent plenty of their time preparing presentations, question papers, and grading assignments, on the other hand students often encounter challenges in accessing personalised learning experiences and performance feedback. Based on these challenges, the following core requirements were discovered. Automate question paper, presentation, and notes generation, Provide unified and interesting learning experiences using AI and AR, Evaluate personalized roadmaps for students based on the performance on the tests they give, Integrate with Google Classroom to enhance proficiency and make it streamlined, Make the application gamified to increase motivation and interaction, Integrate AI in such a way that it becomes natural for both teachers and students to communicate with it.

2. System Design

ARISE's system design focuses on dynamism, responsiveness, real-time interactivity, and scalability. We have used a modern tech stack to build ARISE, which comprises Next.js for the frontend and backend, ensuring seamless integration of AI models with the API routes.

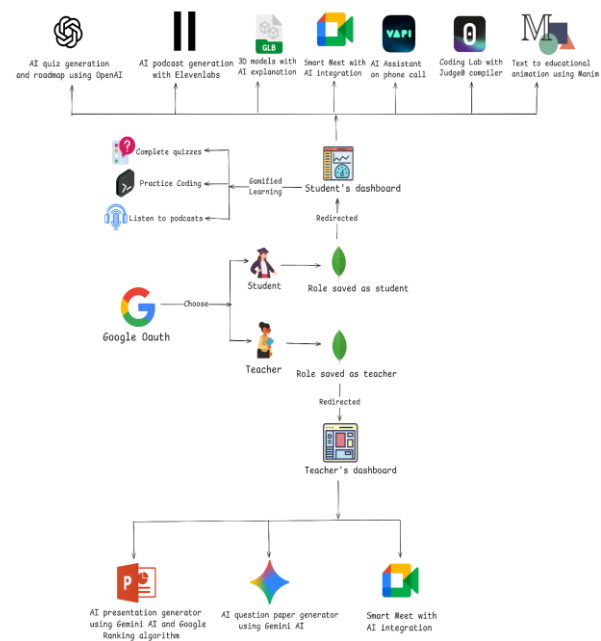


Figure 1: System Architecture of ARISE

TypeScript is used for identifying type-errors statically and reducing bugs, for styling, TailwindCSS is used, as it is quite convenient and fast, providing a responsive, clean user interface. MongoDB is used as the main database for storing data and handling all the AI interactions.

For authentication and access control, we have implemented Google OAuth, which allows

seamless login with Google and also easy integration with Google Classroom. Each user's data, such as quizzes, progress, coins, presentations, etc., is securely saved in the database.

The AI system is connected through OpenRouter, Gemini API, and ElevenLabs; each manages particular tasks such as AI visualization, natural language processing, and text-to-speech conversion. There is also Razorpay integrated into the application for in-app purchases like coins, which can be used in the future for features like AI visualization, where students can visually learn the things they struggle with.

3. AI integration

AI serves as the backbone of ARISE, various AI models are used to enhance learning and teaching experiences, as well as eliminate repetitiveness, extra time-consumption.

- **Gemini AI:** Creates summaries, quizzes, and generates personalized learning roadmaps for students.
- **OpenRouter AI:** Manages conversational and text generation features for notes, podcasts, and visual explanations.
- **ElevenLabs:** Provides reliable voice narration for presentations and podcasts.
- **Google Classroom APIs:** Synchronize tasks, assignments and class data.

The AI pipeline evaluates user input such as a document, text file, or audio recording and converts it into an intriguing educational content, such as presentations, question papers, visualizations, or podcasts.

4. Testing and Evaluation

The testing phase mainly focuses on user experience, application functionality and handling multiple users simultaneously. Most of the components and AI modules were tested on real Google Classroom data and simulated sessions. For example, the dashboard was also tested with multiple users, and the leaderboard and activity graph were working perfectly for individual users. The Smart Meet feature was tested by conducting and recording real Google Meet sessions and validating the accuracy of the generated transcripts and summaries from the AI.

User testing was conducted using a small group of students and teachers from the college to evaluate user experience, ease of navigation, accuracy of the content generated by the AI, and overall satisfaction. Their feedback was used to refine parts of the frontend, such as the button placement, dashboard, gamification and coins logic, AI accuracy, and content generation.

Key Features

1. Gamified Learning Dashboard

The student dashboard reconstructs the conventional classroom experience into an interactive, engaging, game-like adventure. Students can see their daily streaks, activity graphs- what and how many activities they did, and leaderboard rankings - to keep them motivated and make them feel in a competitive environment.

The GitHub-style activity graph visualization displays consistent study habits through colored dots, motivating students to maintain regular learning sessions.

2. Coins and Reward Mechanism

The coin system keeps the student engaging and interactive at ARISE. Users can get coins by completing daily challenges which are provided to them such as doing quizzes, maintaining streaks or practice problems. These coins are like virtual currency that can be used anytime for exclusive and premium features at ARISE. If students are short of coins, they can buy additional coins through Razorpay payment gateway, where they have multiple payment methods such as Cards, UPI, Scan, etc. The process is simple, smooth and secure, once payment is successful and confirmed, coins are instantly added to the student's coin section.

Coins can be spent to access exclusive features, particularly the AI Visualizer, where a single visualization generation will cost 50 coins. This system was created to reward the consistent and proactive learners and it can help enable monetization.

3. Google Classroom Integration

ARISE enhances the user's experience by allowing them to integrate their Google Classroom at ARISE, so they can view and manage their tasks, upcoming deadlines in a single unified dashboard, so they don't need to visit Google Classroom frequently to manage their task.

Students can sync their google classroom account through Google OAuth and they can right away access their assignment, class tasks, submissions etc without leaving the platform.

4. Smart Meet Notes

The Smart Meet feature automatically converts the Google Meet transcripts into formatted notes using AI. A custom Chrome extension records all the conversation in the meeting and makes transcripts, which are then parsed to Gemini AI for processing and producing summarized and structured notes.

This feature is quite helpful not only for teachers but for students too, it will save a lot of time

making manual notes from the meeting, also it ensures no important information from the meeting is missed.

5. AI Visualizer

AI Visualizer is one of the most innovative and creative elements of ARISE, it translates any complicated academics into 3D animated visualizations. Students can put a text such as "Linear Equation" or "Human Ear structure" and then AI will generate a detailed video describing the theory visually.

This feature provides a practical and realistic learning experience by combining visual, auditive, and textual learning methods. Each visualization costs 50 coins, so students can use their collected coins here, and if they fell short of coins but they want to use this feature they can also buy the coins through our integrated razorpay payment gateway. Users can also download the visualization videos and view the main topic details and related key concepts as they are stored in the database.

6. AI Notes (Podcast & Quiz Generator)

The AI Notes module includes two sub-features:

- **AI Podcast:** In this feature students can upload their documents, PDFs or even handwritten notes, and the system will automatically generate an AI-narrated podcast, consisting of an AI-voice which sounds completely natural using ElevenLabs.

Students can customise multiple things in the podcast such as voice style where they are 4 different voice options namely professional, academic, technical and conversational, they can also choose the background music if they want to otherwise they can just not use it, they can also choose the length of the podcast they have 3 options here Short(3-5 minutes), Medium(5-10 minutes) and Long(10-15 minutes), lastly they can also choose the podcast format they want like, a lecture, an interview or a casual discussion about that particular topic.

This allows students to review their material audibly while multitasking. This podcast can be used offline as they can download the podcast. It's quite helpful in places where there is very little internet connectivity.

- **AI Quiz Generator:** Here, Students can upload their text, document notes or PDFs and the AI system automatically creates personalized quizzes based on the topic or subject they uploaded. Quizzes are customizable too, students can select the difficulty of the quiz they want to generate like beginner, intermediate, advanced or expert, they can select the number of questions, types of questions such as MCQ, true/false or short answer questions. Users can select the setting of the AI and

can choose the style of the questions, they can also give some personalized suggestions to the AI about what they want.

After completing a quiz, students receive their personalized roadmaps with suitable blogs, videos, texts etc to stabilise their weaker areas. This makes learning dynamic and data-driven.

7. AI Mentor (Voice Call Assistance)

A purely unique feature in ARISE is the AI mentor, which enables students to interact in real-time over a phone call. Students can put their number and can schedule a call, the AI acting as the Mentor will call them and guide them, at any time anywhere. The AI converses with the user naturally with multiple languages such as English, Hindi etc, acting as a personal educational guide.

Students can ask questions from any field, request explanations, ask suggestions and the Mentor will respond to these questions as a professional person and can solve their queries and problems. This feature covers the emotional and conversational gap often missing in typical learning platforms.

8. AR Learning Hub

The Augmented Reality Learning Hub lets students explore and analyze 3D models in real-time. For instance, students can visualize lets say a cell structure or a human eye, and interact with it by zooming in or out, rotating it, and questioning the AI about if they want to know more about that model.

This thrilling feature connects AR and AI to deepen theoretical understanding through visual learning.

Results and Discussion

1. Expected Outcomes Based on Literature

As per our extensive research review, ARISE's integrated approach is expected to produce several measurable outcomes:

Enhanced Student Engagement

The gamified dashboard, which includes streaks, activity visualisation, and leaderboards, should significantly increase engagement metrics from our targeted audience. Our study indicates that, comparing both ARISE and apps/websites that lack our features, there is a 40-60% enhancement in daily active usage rates and a 25-45% rise in session duration relative to non-gamified platforms. The psychological commitment created by visible streaks particularly impacts consistency, with studies showing 3-5x higher retention of daily usage patterns when streak mechanics are implemented.

The engagement is further increased by a coin reward system, where the students can create an economic gameplay loop through their earning

and spending decisions. Our study on token economies in education indicates that reward systems can increase completion rates of an optional activity by 30-50%. In ARISE, students become motivated to earn currency for access to premium features.

Improved Personalization and Learning Outcomes

The AI-driven personalisation features, which include adaptive quizzes, personalised roadmaps, and an AI mentor, are expected to produce consistent learning gains, as per our research on personalised learning systems. Our study shows that the adaptive learning platform, compared to standard instruction, helps to increase test results by 10-25% and reduces time to learn by 20-40%. The personalised roadmaps generated after the quiz could bring particularly effective outcomes. Our research shows that the targeted resource recommendations based on distinctive assessment can produce 2-3x higher improvement rates in weak areas compared to generic review materials. The system can reduce knowledge gaps by analysing specific error patterns and recommending precisely relevant resources. The AI Mentor, which provides on-demand assistance, can partially replicate the impact of human tutoring. Although AI mentors cannot fully match the effectiveness of a human tutor, the study shows that they can produce a 0.5-1 sigma improvement in learning outcomes.

Multimodal Learning Access

The content transformation, which includes podcasts, visualisations, and AR models, could significantly help in diverse learning preferences. Our research shows that compared to single-format delivery, providing content through multiple formats can help to grasp content by 20-35% and to remember by 25-40%.

AI-generated podcasts can benefit auditory learners and students with time constraints. Our research shows that, due to enabling multitasking, audio learning content can increase content review frequency by 40-60%.

Conclusion and Future Scope

For education, the ARISE platform is integrated, which includes features such as gamification, artificial intelligence, and engaging technologies in one learning platform. Our platform tries to eliminate the critical challenges faced during modern education, student engagement, accessibility, and personalised learning by integrating innovative features like the AI Visualizer, Smart Meet Notes, AR Learning Hub, and AI Mentor. The coin-based reward system helps students to be active towards learning. AI-generated podcasts and integration with Google

Classroom are features that offer flexibility for the students. ARISE effectively supports various learning preferences, making education more inclusive and impactful by including a range of learning modes such as visual, auditory, conversational, and interactive.

As we look forward, our ARISE platform showed high potential for growth through AI by integrating features like adaptive learning, AR/VR classroom and social collaboration tools for peer-to-peer learning and teacher dashboards. During future improvement, the platform should focus on predictive analytics for early intervention, Multi-language support for global accessibility, and institutional licensing for scalability and blockchain technology for credential verification. ARISE has the potential to grow beyond a normal educational platform by adding advanced assessment tools, expanding into professional development and exam preparation, building a community-driven learning environment and using global leaderboards and supporting content creators. The success of ARISE will ultimately be measured by whether it makes high-quality education accessible to everyone, it inspires real curiosity and learning or it empowers people around the world to reach their potential in a rapidly changing world.

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