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RAJAGIRI SCHOOL OF  
ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)

*Project Report On*

**Focus Sphere : The Learning Platform**

*Submitted in partial fulfillment of the requirements for the  
award of the degree of*

**Bachelor of Technology**

*in*

***Computer Science and Engineering***

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# CERTIFICATE

*This is to certify that the project report entitled "**Focus Sphere : The Learning Platform**" is a bonafide record of the work done by **Anna Maria Joseph(U2103039)** **Annu Merin Johns(U2103041)** and **Chandana V S(U2103066)** submitted to the Rajagiri School of Engineering & Technology (RSET) (Autonomous) in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology (B. Tech.) in "Computer Science and Engineering" during the academic year 2024-2025.*

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## **Abstract**

Web applications that combine educational and entertaining elements tend to abstract learning for those who are not interested in it. The reason why children get bored in learning is that sustaining concentration on a particular task is challenging for them. Imagine how much more challenging it becomes for children who have been diagnosed as having Attention Deficit Hyperactivity Disorder (ADHD). These applications assist children in absorbing educational content and language learning through dual sensory engagement. In other words, when a child finds something engaging he or she simply ‘hyperfocuses’ on it. Children with ADHD tend to hyperfocus on content related to gaming hence, blending education and video together is a great way to engage such children. As a result, this application would cater specifically to ADHD students while ensuring that the content is easily understandable while also being impactful. From auditory lessons and videos, this application would use all the necessary tools in order to reach children.

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## **List of Abbreviations**

ADHD - Attention Deficit Hyperactivity Disorder

ABA - Applied Behavior Analysis

HCD - Human-Centered Design

UI - User Interface

ASD - Autism Spectrum Disorder

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# **Chapter 1**

## **Introduction**

In the field of educational technology, the designing tools to meet the specific learning needs of children with ADHD such immense potential really. ADHD is a neurodevelopmental disorder that inhibits children from being focused, organized, and engaging with the usual learning styles. This project is intended to develop an innovative learning platform which is specially designed for children aged 3-7 who have ADHD. Modern features such as avatar creation, text-to-speech, and video integration will personalize and engage children in their education.

Young children with ADHD will struggle in traditional learning environments: have trouble concentrating; finishing projects; processing visual or textual information. This platform uses combining elements such as videos and audio to create a learning space that is easy and fun. Kids can also create their own avatars really name "personalized" engagement, while the text-to-speech features offer auditory learning support for kids struggling either with reading or comprehension.

Definitely, this project revolves around the content behavior and the gamifying reward structure which encourages children to source learning with exercise modes such as quizzes, games, and interactive assignments. This will include rewarding answers with preferred stickers of students.

Thus, this project will work on creating that space between the traditional education system and special demands for students with ADHD, encouraging focus and creativity in learning from digital platforms. The project relies on new technologies and user-centered design principles to make learning more fun, inclusive, and effective for children who need it most in their lives.

## **1.1 Background**

The proposed project ADHD learning Hub aims the educational hindrances of children with Attention Deficit Hyperactivity Disorder (ADHD). A child's attentiveness is affected because of ADHD, which at times makes classroom style learning difficult. The present educational scenario lacks attribute tools for engaging ADHD students, which will, in turn, obviously lead to gaps in their academic progress and growth.

Using this project, a personalized, interactive, and engaging learning hub will be created. This platform consists of audio-visual learning, games, and real-time attention monitoring of students. Content learning is aimed at meeting the attention span of the child with special needs and personalizes it for the child. Evaluation methods through dynamic quizzes for the assessment of performance as well as dashboards to help parents track progress are included.

It is also capable of real-time feedback adaptation through the integration of cutting-edge tools such as MediaPipe, OpenCV, and dlib for attention detection and monitoring. This would entice young learners because they will enjoy the process with customizable avatars to personalize it for them. Such entails not just meeting educational needs but also enhancing the general cognitive development of children with ADHD.

As neurodiversity continues to raise awareness and the momentum for inclusive education continues to gain ground worldwide, the project becomes important. The platform offers extremely promising ways to use technology to make education interesting, friendly, and adaptive learning environment for children with ADHD.

## **1.2 Problem Definition**

ADHD children have difficulties concentrating and interacting with conventional educational patterns, leading to gaps in learning and low motivation. The available tools do not offer the dynamism and interactivity required for such children. The project creates a personalized learning-gaming platform with real-time attention monitoring for improving engagement and supporting academic progress.

### **1.3 Scope and Motivation**

The interactive learning platform invented in the context of this project really targets children having Attention Deficit Hyperactivity Disorder and also addresses their special educational requirements to build an online learning place that does comprise audiovisual, game-based or activity-based media and real-time attention tracking to keep children continually engaged in learning sessions. The project also comprises tools creating personalized quizzes and performance monitoring through the parent dashboard. Adapting the system to the attention levels of a child and creating a dynamic learning environment is made possible through advanced technologies such as MediaPipe, OpenCV, and dlib. Thus, the solution aims to fill the gap of current educational systems by providing the most required inclusive, adaptive, and joyful platform in learning for children aged 3 to 7 years with ADHD.

This project is intended to assist children suffering from ADHD since there is an increasing prevalence of the disorder among children and no effective educational tools that facilitate its learning. Very often, regular teaching strategies do not meet specific challenges of these children, resulting in disengagement and poor learning. Such examples are also more typical of innovation, where new products or services emerge that do not only make the learning act enjoyable but also cater for neurodiverse learning patterns. This project, inspired by the power of technology combined with interactive design, seeks to empower children with ADHD so that they reach their potential. The aim ultimately would be to help transform their lives positively in such a way that they accomplish: increased confidence, improved concentration, thus, enhancing their entire learning experience.

### **1.4 Objectives**

- A complete lively online portal: Create a personalized interactive audio-visual and game-based approach to the learning sessions in order to keep ADHD children interested and focused.
- Real-Time Attention Detection Implemented: It uses MediaPipe, OpenCV, and Dlib for monitoring attention and studying the ways in which students are adapting

to this change in their attention level.

- Personalized Evaluation Frameworks: Dynamic adaptive quizzes can be generated on the basis of students' learning progress by the application of deep learning models like T5.
- Establish Full Performance Monitoring: Provide dynamic dashboards for parents to view in real time their children's engagement level, attention level, and performance grades on quizzes.
- Custom Improvement: Students can easily upload their avatars into the application for the platform to be fun and familiar for children.
- Availability and Accessibility: All these should be ensured easy and have provision for scalability by which the system may give access to several users and multiple devices thus enabling greater reach and impact.

## **1.5 Challenges**

However, setting up a learning platform for ADHD children is not just limited to monitoring their attention correctly using MediaPipe and OpenCV in this case, because the performance of these systems could be heavily affected by external factors like lighting and quality of the camera. Moreover, there are additional hurdles regarding whether integration of game-based and non-game-based engagement will be seamless as well as scalability and performance for this growing number of users.

## **1.6 Assumptions**

1. Audio-visual learning combined with game-based engagement and personalized quizzes would work for children having an age range of 3 to about 7 years old with ADHD.
2. Parents or guardians should have the necessary devices (like computers, tablets) and basic technical skills to access and monitor the platform.
3. The area for platform utilization would have abundant light with a functioning webcam to enable accurate attention monitoring.

4. The teachers or educational centers would provide structured content wherein they will need to be adapted into audiovisual formats and personalized assessment.
5. The intended audience will at least avail of a stable internet connection that they would use to maximize most of the features on the platform.
6. Attention monitoring algorithms and game-based learning will spell success toward the improvement of concentration and involvement in younger learners.

## **1.7 Societal / Industrial Relevance**

This particular project is closely related to both society as well as the education sector. It is an all-inclusive solution to children with Attention Deficit Hyperactivity Disorder (ADHD), Providing equality in learning and boosting confidence through an engaging as well as adaptive platform for the children. It also has a tool for parents through which they will keep an eye on the performance of the children and personalize the learning according to their need.

The platform, for example, brings into education real-time attention-monitoring and personalized assessments, which help support neurodiverse student groups in schools while increasing the demand for scalable, technology-oriented learning tools.

## **1.8 Organization of the Report**

- The introduction explains the project and its objective, which is fundamental to helping children suffering from learning disabilities due to ADHD.
- Problem statement: it states a need for an efficient adaptive and interesting education portal for students.
- Scope and motivation: provide margins and grounds for raising the project.
- Objectives: to state such particular aims that the project is expected to accomplish like increase concentration, personalize studies, and monitor attention.
- System design: present the architecture along with components of platform such as technologies, frontend/backend design and key features.

- Implementation steps: mention the developing beginning from environments set up through building functionalities and integrations.
- Challenges and presumptions: point out potential barriers that the project might face and assumptions made during development of the project.
- Relevance and applicability: the importance of relevance of the project towards society and education and the possible range of effects it would likely have on learners and educators.
- Conclusion and Future Scope: Discusses in conclusion the various achievements of the project and future areas where improvements can still be pursued for scalability.
- References: All sources, research materials and technologies referred to within the developing project are cited.

This would be the first step toward development of an interactive learning platform for children with Attention Deficit Hyperactivity Disorder (ADHD). The problem is clearly defined, and the project objectives and scope outlined with great emphasis on the importance of the project as it seeks to address the educational challenges that neuro-diverse learners are usually faced with. The aim of this project is to advance technology with innovations in creating an engaging and adaptable learning environment for students and parents. This chapter in particular leads into a much more detailed exposition of the design of the system then subsequent sections on the implementation.

## **Chapter 2**

### **Literature Survey**

There has been a growing interest in the application of digital systems and interactive devices in the treatment of young children with neurodevelopmental disabilities. One of the most common conditions that have substantial effects on a child's cognitive, social and behavioral development are Autistic Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD). Although standard methods of treatment facilitate good outcomes, they tend to be resource-intensive and may sometimes not be available to families who are unable to afford the time and effort involved in hiring professionals. In an attempt to solve this problem, the recent literature has focused on the use of mobile devices and apps as adjuncts in therapy that is administered at home and tailored to the specific needs of the child.

A recent paper by Mihaela Chistol, Cristina Turcu, and Mirela Danubianu describes an autism assistant platform that uses protocols for Applied Behavior Analysis (ABA) therapy combined with a mobile app. The goal of this platform is to enable the parents to participate actively in the therapy process and therefore pursue better treatment goals for Romanian children with ASD in a personalized manner using home therapy tools.

In the same vein, Sabeel Butt and co-authors devised an interactive app called "Say-It and Learn," which set out to enhance the learnability of children suffering from ADHD. This app shows significant enhancement in attempts to increase cognitive skills by making the atmosphere interactive as evaluations reveal constructive results.

In addition, Culatta and Gifford discuss the use of Information and Communication Technology (ICT) tools in treatment for children with ADHD. Their research remarks that such approaches, augmented with executive skills, attention and memory, have greatly evolved the last ten years in the fields of diagnostics, evaluation and intervention due to the usage of these tools.

This type of research attempts to answer questions regarding the use of augmented

therapy in children with ASD and ADHD on digital platforms – whether these tools may increase the availability, adherence, and effectiveness of the intervention. The aim of this review is to analyze the recent advances in the field of digital therapeutic tools and their application in treating children with neurodevelopmental disorders with an emphasis on interactive application and home use.

## **2.1 Say-It and Learn: Interactive Application for Children with ADHD**

### **Introduction:**

It can be seen that Attention Deficit Hyperactivity Disorder (ADHD) develops in an average of 3 – 9 percent of the children, thus negatively affecting their education and day to day activities. Some of the most common medications include stimulants which, along with behavioral therapies, also have challenges such as high cost, side effects, and lack of availability.[1]

To resolve these issues in a creative and stimulating manner, Say-It was designed as an app that runs on a tablet and is intended to enhance the ability to learn in children with ADHD in a pleasant and interesting interface. It uses such things as game-based approaches, facial expression technologies, speech technologies, and feedback via voice. It enables characters to perform educational activities such as learning the alphabet, counting numbers, and recognizing shapes, with the self assessment features after such activities. Other features, such as healthy habits reminders, or night mode that turns on relaxing music, make sure that engagement and focus improvement takes an all-embracing approach.

It substantiates the study by involving five children with ADHD whereby all exhibited higher engagement and satisfaction from both participants and parents. This is a great demonstration of the role of assistive technologies in enhancing the conventional techniques for the management of ADHD. "Say-It and Learn": The application offers some set of features designed fundamentally to stimulate learning and engage children with ADHD. This includes addressing attentional and focusing issues while being enjoyable and exciting-interactive. These will also include the following :

#### **1. Educational Modules**

Letter Learning: Engagingly teaches English alphabets. Basic Mathematics: Involves

counting and very simple exercises in maths. Shape Learning: Makes a child identify and learn various shapes.

## **2. Interactive Learning Design**

Activity puts learning into games which keeps it fun and lively. Speech Recognition: Encourages to repeat sounds and words for proper verbal learning. Facial Recognition allows tracking of an individual user's performance and personalized profiles on shared devices.

## **3. User Engagement Features**

Friend Reminders: Sending motivational messages to remind one to drink water, eat healthily, and take medications. Melodious Music: Brings about background music to boost dopamine release so that mood and focus are enhanced. Night mode: The setting of brightens and colors creates a calming experience at night or use just before bed.

## **4. Self-Evaluation and Progress Tracking**

Quizzes: Fun learning self-evaluation tests where the learner can assess progress. Performance Reports: Measures scores and overall performance by tracking quiz scores and has a user-friendly display format.

## **5. Health and Behavioral Support**

Embedded Encouragement Messages: Increases positive reinforcement through pop up messages like "You're brainy" or "Keep it up!" Sleep Support: Soothing night lights and music help combat sleep problems often encountered by children suffering from ADHD.

## **6. Parental and Caregiver Tools**

Progress Tracking: Guardians can also see their child's performance and receive notifications. Personalization: Parents can now set reminder features according to preferences and settings for each child. A multi-dimensional approach ensuring that learning and the behavioral needs of children with ADHD is holistic.

## **Conclusion**

The "Say-it and Learn" application is very effective and engaging for children suffering from ADHD as it features an interactive approach to improving their learning experience. The app was validated by professionals and caregivers, showing great positive impacts on children's academic activities as compared to traditional methods. These would include the potential of such applications for use in clinics, schools, and homes, suggesting that they specifically meet the needs of ADHD children while being universally acceptable

to all kids. This application is also well recognized for fulfilling user needs through the thoughtful design and features of the application which optimally enhance learning and involvement for ADHD children.

You can write and learn: an application that engages and helps children with ADHD, with an interactive element in their learning experience. Professional and caregiver validation showed positive effects on children's academic behavior against the traditional way. Such applications have potential uses in clinics, schools, and homes that would mostly meet the specific needs of ADHD children while accepting everyone. Besides having its utmost use meeting the needs of users through its extraordinarily thoughtful design and features, this application has more appraisals for enhancing both learning and involvement for ADHD children.

'Say-it and Learn' is an application with optimal efficiency and effectiveness for children suffering from ADHD because it does teach skills through an interactive application. Validation of the application was also realized through professionals and caregivers, who have perceived positive impacts in children's academic behaviors vis-a-vis other traditional means. Such applications highlight the potential in clinics, schools, and homes wherein they'll best meet the specific needs of ADHD children while acceptable of all children. Further, this application did earn some accolades for meeting user needs through the very thoughtful design and features of the application, ultimately enhancers of both learning and involvement for ADHD children.

## **2.2 aTenDerAH: a videogame to support e-Learning students with ADHD**

### **Introduction:**

Integrating video games into schools has been found to have a lot of promise in making the learning process much more exciting than pure enjoyment. According to research, video games provide students with rich, interactive environments that replicate authentic scenarios and bring learning closer to reality. These amazing tools are well known to support better engagement and motivation in learning while enhancing cognitive skills, particularly for students who reveal difficulties using other types of learning methods.[2]

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental condition that manifests, among other things, with symptoms of inattention, hyperactivity, and impulsiveness in an individual and makes them prone to face difficulties in the field of academics. Nevertheless, these individuals with ADHD have proven to be a group of people that can adapt to a new way of life-the focus on video games for extended periods, making it quite an ideal medium for therapeutic and educational intervention programs.

This paper describes aTenDerAH, that is specially designed into a 3D video game to be an e-learning process-suitable tool for young adult students with ADHD. The ATutor e-learning platform integrates it with Unity, Cinema 4D and Photoshop. It promotes attention, decision making and organization skills. aTenDerAH uses video game strength to potentially impact the experience of students with ADHD in learning, serving as an exciting and supportive tool, supplementing what is typically done with students on their educational journey.

Eventually, the study will analyze the effectiveness of aTenDerAH on students' motivation in learning outcomes, providing qualitative feedback from ADHD-affected and non-ADHD groups. Thus the finding states that incorporating such games malice education can be very promising for brain-twisted students towards engagement and retention through e-learning platforms.

The document uploaded was "aTenDerAH: A Videogame to Support e-Learning Students with ADHD' and it contains important features that are included in this paper.

## **1.Integration of Video Games for Educational Support:**

The study investigates the potential use of video games as educational tools-for purposes of interested students with Attention Deficit Hyperactivity Disorder (ADHD). The ability of video games to increase engagement, focus, and motivation is emphasized in this context, especially because people with ADHD find it very challenging to pay attention and focus on traditional learning settings.

### **Development of the aTenDerAH Game:**

This is intended to be a custom 3D videogame made in Unity, Cinema 4D and Photoshop. Specifically, this game is intended for e-learning students, having some game mechanics that train attention, decision making, and organization. It will be accessed inside an educational context as it will be implemented within the ATutor e-learning platform.[2]

## **2.Focus on ADHD-Specific Challenges:**

It aims to construct an environment that motivates students while considering the cognitive difficulties that ADHD faces through game designing. Thus, it is the activity that tries to manage a prolonged attention span for ADHD users through tempting yet engrossing gameplay mechanics to keep them interested in the longer run.

## **3.Evaluation and Impact on Learning Outcomes:**

A qualitative evaluation of student motivation and effectiveness in learning through a game is presented in the paper. The student's perspectives on how the game affects learning are evaluated along with their feedback collected from both ADHD and non-ADHD students. Measurement criteria included improvements in attention span, development of cognitive functions, and overall satisfaction with the learning process.

## **4.Use of Advanced Technologies in Game Design:**

This research project demonstrates how modern game development technologies have been employed, such as Unity for game mechanics, Cinema4D for 3D modeling, and Photoshop for graphical design. The use of these tools was to create an immersive and interactive environment tailor-made for e-learning students with ADHD.

**5.Potential for Broader Educational Applications:** It is presented that gaming tools for learning can be integrated into e-learning portals not just for ADHD students but also for other child and adult populations where engagement would be a critical factor for learning. It moves towards the role digital games will play in providing personalized learning experiences that will adapt to the learning needs of different individuals.

## **6.Encouraging Authentic Learning Experiences:**

The premise of this study is that such games, alongside the realistic environment, can simulate real situations and therefore lead towards more authentic learning experiences beyond the formal classroom context. The second point is that video games can stimulate and actively engage students towards practical cognitive skills in reality and mainly through such control, for example, applications like aTenDerAH.

## **Conclusion**

It shows that application of game-based tools, such as aTenDerAH into e-Learning platforms, will enhance engagement, motivation and enhance cognitive skills, particularly for ADHD students. It opens up the new horizon for the use of video games as assistive learning tools in specialized and mainstream learning environments.

### **2.3 Autism Assistant: A Platform for Autism Home-Based Therapeutic Intervention**

#### **Introduction**

Autism Spectrum Disorder (ASD) refers to a group of disorders characterized by a continued impairment of back-and-forth communication, social interaction, and deviant or repetitive behaviors and interests. While thought to be hereditary, ASD can be influenced by other factors and complications during pregnancy. Individuals with autism may also be afflicted by a co-condition such as learning disability, ADHD, anxiety, and depression. Autism Spectrum Disorder has no medication for its treatment; moreover, it thrives on psychosocial therapy, with applied behavior analysis (ABA) seen as the most effective. ABA is a technique in which structured strategies, such as reinforcement, are used to teach skills and behaviors. However, it can be quite demanding, needing about 20-40

hours a week of therapy and thereby, unable to reach all clients.[3]

This research introduces the Autism Assistant platform, which aims to reduce that gap. It is a novel development that will provide home-based therapeutic interventions using a combination of both a mobile app and a web application and was constructed based on the Human-Centered Design (HCD) methodology. Parents act as co-therapists by accessing valuable educational content, personalized scenarios, and guidance with the platform. The platform is based on the ASD population of Romania, focusing on providing therapy to children with ASD in their natural home context, under which unwanted environmental stimulus and hassle related to transporting children to centers are reduced. In so doing, innovative technologies will exploit the therapeutic potential that exists for children with ASD and their families.

## **Features**

### **1.Human-Centered Design (HCD) Approach:**

Establishment: Device Development through Double Diamond Model focused on the needs of the user rather than technology. It engages all end-users in the designing process - these include parents, therapists, and children with ASD. Snaps together proto-personas and user feedback for the realistic development to cater to both practicalities while using this application.

### **2.Personalized Home-Based Therapy:**

It will grant the parents the opportunity to function as co-therapists through personalized contents and therapeutic scenarios. It would support therapy in individual and group contexts. Designed for Romanian children below 8 years of age considering language and cultural aspects.

### **3.Platform Components:**

Mobile Application:

You are trained in data up to October 2023. Designed with the Unity game engine making it suitable for Android and iOS runs. Features personalized profiles, customizable therapeutic scenarios, and an intuitive UI/UX.

**Web Application:**

Created using React and Ruby on Rails. Used by therapists to define therapeutic goals, configure tasks, and provide parent guides.

**Key Modules:**

Module I: Guide parents in identifying developmental lags and giving early intervention activities to children below two years of age.

Module II: Scenarios based on learning through variable gaming environmental elements like parks, restrooms, etc.

Module III: Cooperative games to promote social skills and interactions.

Module IV: Video modeling applied to daily everyday activities by allowing interaction and decision making.

**Technological Innovations:** Makes extensive use of Unity Analytics, Doozy UI, and Spine in efficient design and interactivity crafting. Push notifications via OneSignal provide task reminders and updates. Implements a reliable database management system using MySQL.

**Therapeutic Techniques and Features:** ABA-based methods are highly recommended in the receptive and expressive learning domains. Tracks therapy progress and adapts interventions according to performance. Simulates real-life contexts by playing collaborative games and video modeling experiences.

**Accessibility and User-Friendly Design:** This is a very good interface for children and adults. Has progress monitoring and therapy planning features. Includes Romanian language options and locally stressed content.

**Evaluation and Future Development:** Module Evaluation and Development Future evaluations of the module will use the Quantitative Evaluation Framework (QEF) as per ISO 9126 standards. Next modules will be adolescent-oriented with advanced fea-

tures, such as virtual reality for skill development.

## Conclusion

What provides evidence to advance the Autism Assistant platform is making the way possible in provisioning of accessible, individualized, and effective therapeutic intervention for children within the autism spectrum disorder. The platform centers its design on human-centered design, integrates advanced technology and evidence-based Applied Behavior Analysis (ABA) within the design intent of the platform to improve therapeutic experience for children and those who take part in the intervention.

Examples of features such as customizable scenarios, cooperative games, video modeling, and intuitive interface equip this platform to suit the different needs of its users. While allowing parents to participate in the role of co-therapist and providing therapists with enough tools behind the scenes, this blend will complement the traditional, center-based therapies with flexible, at-home interventions.

The platform provides great promise from evaluations against ISO 9126 standards, and future developments will expand this platform into use for adolescents and immerse them in technology such as virtual reality. In general, the Autism Assistant platform offers a scalable and innovative panacea to remediate cognitive, social, and behavioral aspects of children suffering from ASD in familiar and friendly surroundings.

## 2.4 Summary and Gaps Identified

### Summary

Platform/Title	Advantages	Disadvantages
----------------	------------	---------------

<b>Say-it and Learn</b>	<ul style="list-style-type: none"> <li>• Interactive learning engages children with ADHD.</li> <li>• Personalized by features such as speech recognition and facial recognition technology.</li> <li>• Self-assessment tools and progress tracking are available.</li> </ul>	<ul style="list-style-type: none"> <li>• Emphasis is more on younger ADHD patients and less adaptability for the older ones.</li> <li>• Reliant on the user's tech savviness and availability of device.</li> </ul>
<b>aTenDerAH Game</b>	<ul style="list-style-type: none"> <li>• Uses 3D games to improve attention, decision making, and organization in ADHD students.</li> <li>• Combines game mechanics with instructional content.</li> <li>• Motivates ADHD learners to focus on and engage in e-learning.</li> </ul>	<ul style="list-style-type: none"> <li>• This is an incomplete evaluation and substantiation of qualitative feedback quantitatively.</li> <li>• Only caters to ATutor as the e-learning platform for integration.</li> </ul>

<b>Autism Assistant</b>	<ul style="list-style-type: none"> <li>• Provides therapy at home that is Human-Centered Design based.</li> <li>• Offers a custom-fit therapeutic content, shared games, and video modeling.</li> <li>• Provides therapists and parents with monitoring tools for determining progress.</li> </ul>	<ul style="list-style-type: none"> <li>• Limited children under 8 years' focus, that is cultural related for Romania.</li> <li>• Modules for adolescents are not yet available.</li> </ul>
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Table 2.1: comparison table of literature survey

### Gaps Identified

1. **Limited Age Adaptability:** The methods which have been placed in practice for some time now are devised for a certain age group only (like young children or students), and it does not suit equally the adolescents or adults.
2. **Cultural and Language Constraints:** Some programs like that of Autism Assistant serve a locality, for example, Romanian language, and don't have a global usage possibility.
3. **Evaluation Limitations:** Most of these platforms depend upon qualitative feedback or small sample sizes, which need more extensive and broader testing to substantiate the drug effectiveness.
4. **Technological Barriers:** Sophisticated hardware infrastructure, internet connection, and adequate user familiarity with high technology deprives them of underprivileged and non-tech-savvy populations.

**5. Focus on Core Challenges Only:** There are solutions targeting specific problems, such as attention enhancement for ADHD or basic learning for ASD, but they don't have support that is comprehensive enough for emotional, social, or life skills learning.

## 2.5 Conclusion

Interactive technologies, which include apps, games, and platforms, represent a considerable leap forward in preparedness solutions for problems experienced by persons with neurodevelopmental disorders, such as Attention Deficit Hyperactivity Disorder and Autism Spectrum Disorder. Such as not limited to "Say-it and Learn," "aTenDerAH," and "Autism Assistant," despite their few examples, are evidence of how technology[1] can deliver personalized, engaging, and effective solutions for therapeutic and educational uses.

The tools are equipped with capabilities that include: incorporating aspects such as speech recognition and facial recognition; gamification for learning; as well as in-home interventions, to meet individualized needs of children and young adults. Such interactive innovations include 3D games, video modeling, and collaborative games, scaling cognitive and social skill development while empowering caregivers and therapists with the tools to monitor and customizing.

However, scenario-based profiling, lack of applicability for certain cultural and linguistic impediments, and technological dependency indicate the necessity to develop future tools. Future research should, therefore, emphasize inclusivity, wider generalizability, and thorough assessments of efficacy validation for diverse populations and contexts.

Overall, the potential offered by such approaches will be very like the applicational technology advancements in bridging traditional education gaps and therapies, making it affordable and more adaptive options for neurodiverse people and in their families.

# Chapter 3

## System Design

The objective of this system design is to foster a system that integrates engagement and learning in a single window for children with ADHD. The approach applied here combines auditory learning and with visually stimulating activities, ensuring that the child is able to focus on the content delivered. The system monitors the attention of the child learning by This chapter delves into the architecture, modules, interactions between modules, data flow, and the reasoning behind the design so that the learning experience is seamless and customizable. The video game in this instance was designed for children diagnosed with attention deficit hyperactivity disorder, and more specifically, the video game interface was conceptualized in a way that it would help children overcome their learning obstacles.

### 3.1 System Architecture

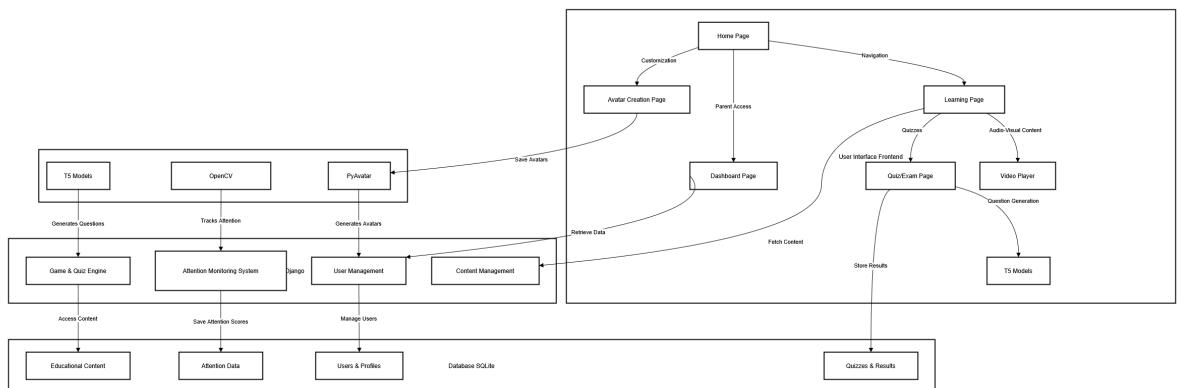


Figure 3.1: Architecture Diagram for ADHD Learning Platform

## **3.2 Component Design**

The design of the ADHD learning platform is explained in such a way that it demonstrates how the individual components of the platform work together to rationally solve the issues pupils with ADHD have. All the components are carefully conceptualized with the aim to augment the functional objectives of the platform on the improvement of the client's engagement levels and user authentication concerning the learning style. Below, I describe in detail the functional purpose of each component as modules.

### **3.2.1 Module 1: Audio Visual learning with Games**

Audio input from the user is played back along with fun game videos to help the children suffering from ADHD to be occupied with their learning. These videos include games that encourage interactivity to teach subjects like alphabets and math interactively FUN.

Input from the user gets converted to audio that is playing along with fun game videos that will keep children with ADHD occupied in their learning. This includes games that stimulate interactivity in teaching subjects like alphabets and math to be more fun for learners.

Many exciting game videos are there, in which exciting game videos are made available, synchronized with the audio input from the user, so that children having ADHD can put their learning subjects like alpha-bets and math into this fun area, as much as learning can be interactive and attractive here.

It converts your input into audible format and then merges it with very interesting game videos for children who suffer from ADHD. This can draw them into their subjects so that alphabets and mathematics become so fun and enjoyable for the students.

Young children learn better with integrated auditory or oral pictures while watching exciting video games that improve their attention span of learning in this matter. It features exciting interactive games for teaching hard subjects such as mathematics and alphabets to learn more interactively and entertainingly by children.

Audio converted according to the input by the user is played along with amazing game videos to help such children with ADHD keep them busy in learning. This includes games that could stimulate interactivity in teaching subjects like alphabets and math to be more fun for learners.

From user input, audio gets generated that plays along with exciting game videos that will keep children with ADHD occupied in their learning. This includes games that stimulate interactivity in teaching subjects like alphabets and math to be more fun for learners.

### **3.2.2 Module 2: Attention Monitoring**

This system interprets the visual signs such as eye gaze and head movements as well as facial expressions to determine when a student is actively paying attention or losing interest. This real-time analysis keeps the system activity-based changing the content, pace, and type of activities that have been presented to the student. For example, if a drop in focus is detected, the platform can time to introduce a more exciting game, switch to other learning activities, or change the visual-auditory-modalities to help the learner refocus. This is a means to ensure that the learning process is very personalized as well as creating an environment that would help the children with ADHD to concentrate more effectively.

### **3.2.3 Module 3: Custom Avatar Creation**

Creating unique student's character avatars through which learning can be tailored to personal experiences. Involvement becomes all the more heightened as it brings the choice and 'ownership' to the user-all possible only through making available such technologies as jinja, pyavatar, and pydantic in the backdrop of avatar creation, styling, and validation processes.

### **3.2.4 Module 4: Content based assessment**

The T5 model will make dynamic quizzes for every individual student based on his or her advancement. These assessments will evaluate a student's understanding and track learning progress so that appropriate tutoring can be given to areas of strength or improvement.

### **3.2.5 Module 5: Performance Evaluation dashboard for parents**

An all-inclusive or comprehensive dashboard will let parents follow the advancements of their child in real time, while also overviewing key performance indicators, levels of

engagement, and learning outcomes. This will make sure that parents are aware of their child's progress and can pinpoint the areas where they may need extra reinforcement.

### 3.3 Data flow diagram

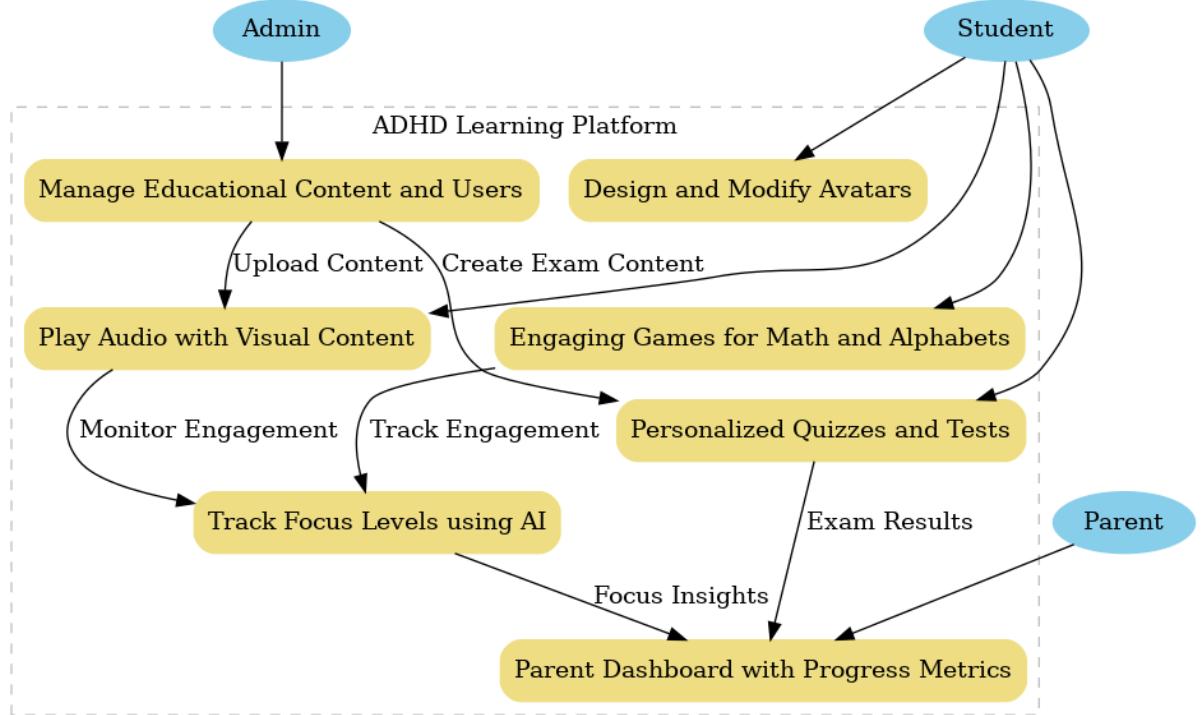


Figure 3.2: Use-Case Diagram for ADHD Learning Platform

### 3.4 Tools and Technology

Minimum processor as Intel Core i5 according to the hardware specifications of the system. However, Intel Core i7 or higher is recommended for better performance. 12GB RAM is the minimum requirement. Again, minimum would be 16GB or more for smoother multiprocessing and faster processing. The minimum storage is 500GB HDD, but an SSD would be much better as it gives access to data and processing much more quickly. The mouse and keyboard as standard peripherals would suffice for human interaction with the system. These specifications are optimal performance and efficient for the learning platform.

The software development tools for the project will include Anaconda to manage the library installation environment, as well as Visual Studio Code for the main IDE for code

development. The project is written in Python with additional libraries to enhance its use. This application will run on any Windows operating system, specifically Windows 10 or 11 (64-bit). The front end will develop the user interface using HTML and CSS, while the back end uses Python to ensure connectivity between all components and functionalities of the system.

### **3.5 Work breakdown and divisions**

#### **1.Anna Maria Joseph:**

Attention monitoring: An attention score is generated by detecting the position of the nose and chin. The video of the child is captured using the system webcam or camera. Using the frames if the face is detected, the shape predictor is used to calculate the attention score.

Multiple choice question generation: The T5-small model can be used for MCQ generation in your ADHD learning platform by analyzing the text from the context provided.

#### **2.Annu Merin Johns :**

Avatar creation:The avatar creation feature in the ADHD learning platform allows children to design personalized characters using a drag-and-drop interface. Users can choose from a variety of hairstyles, facial features, outfits, and accessories, making the experience engaging and interactive.

#### **3.Chandana V S :**

Text-to-Speech Conversion: The Google text-to-speech conversion module is used to convert text to audio with a background video.

### 3.5.1 Project timeline



### 3.6 Conclusion

The above section describes as to how the system is intended to be designed for an appealing learning platform for kids suffering from ADHD. It also points out the important aspects that were put together in the structure surrounding the center of the system. It is equipped with features of audio-visual learning, generation of dynamic quizzes, attention monitoring, and personalized avatars. Thus, this was directed towards encouraging learning in children with ADHD. Modularism of these components contributes to flexibility and scalability of the system. Development tools, programming languages, and specifications of hardware constitute the best combination for performance output. Thus, all aspects contribute to meeting the diverse needs of children's learning, especially ADHD, by maintaining focus, motivation, and progressive improvement.

# Chapter 4

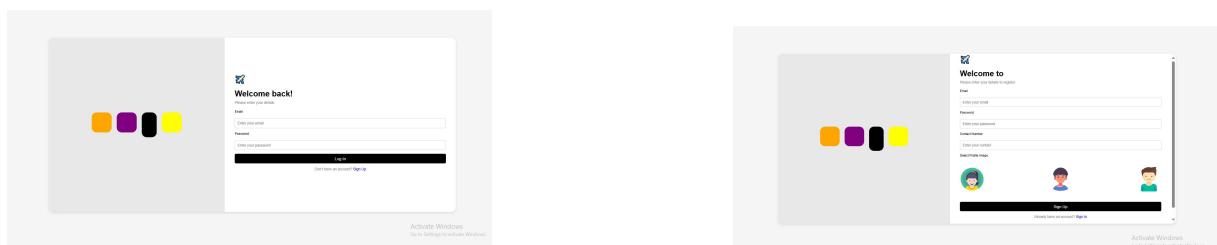
## Results and Discussions

This chapter presents the results obtained from the implementation and testing of the Focus Sphere - The Learning Platform. It elaborates upon the efficiency of the design and examines the system's performance relative to the objectives defined. The results are analyzed to identify areas of success and potential improvement, providing a holistic understanding of the capabilities and capabilities of the system.

### 4.1 User-Friendly graphical user interface



Figure 4.1: Landing Page



(a) Login Page

(b) Signup Page

Figure 4.2: Authentication pages

#### 4.2 Audio Visual learning with Games

Audio gets generated that plays along with videos that will keep children with ADHD occupied in their learning. This includes games that stimulate interactivity in teaching subjects like alphabets and math to be more fun for learners.

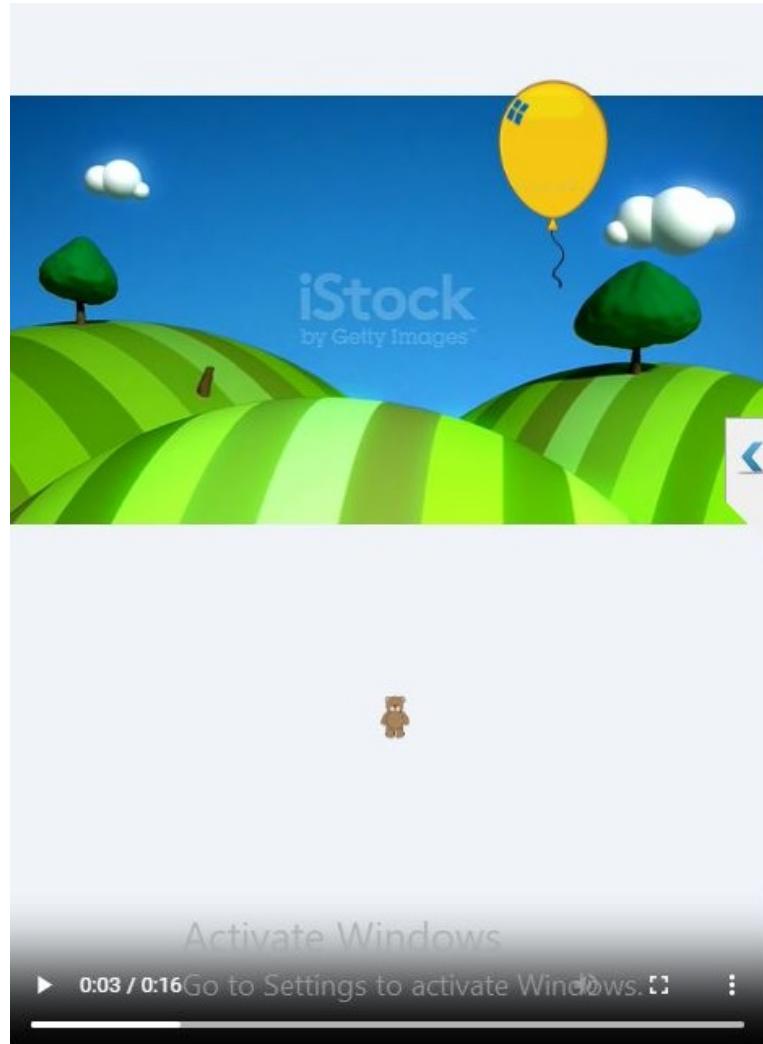


Figure 4.3: Video and audio integration

#### 4.2.1 Multiple choice question generation

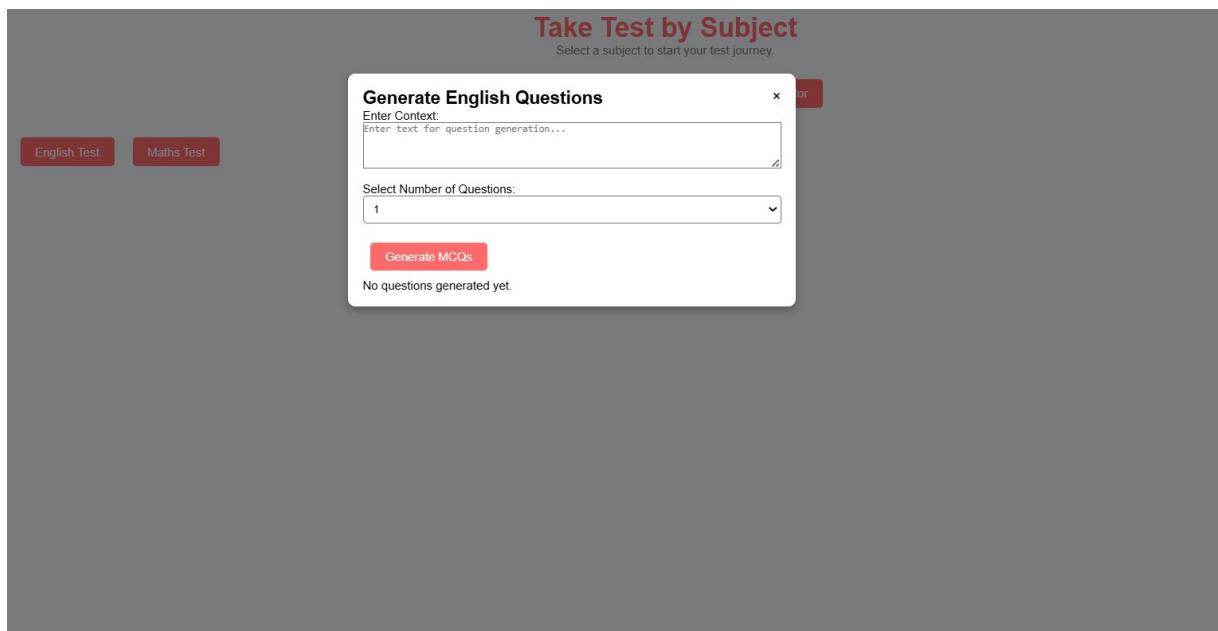


Figure 4.4: Quiz generation module

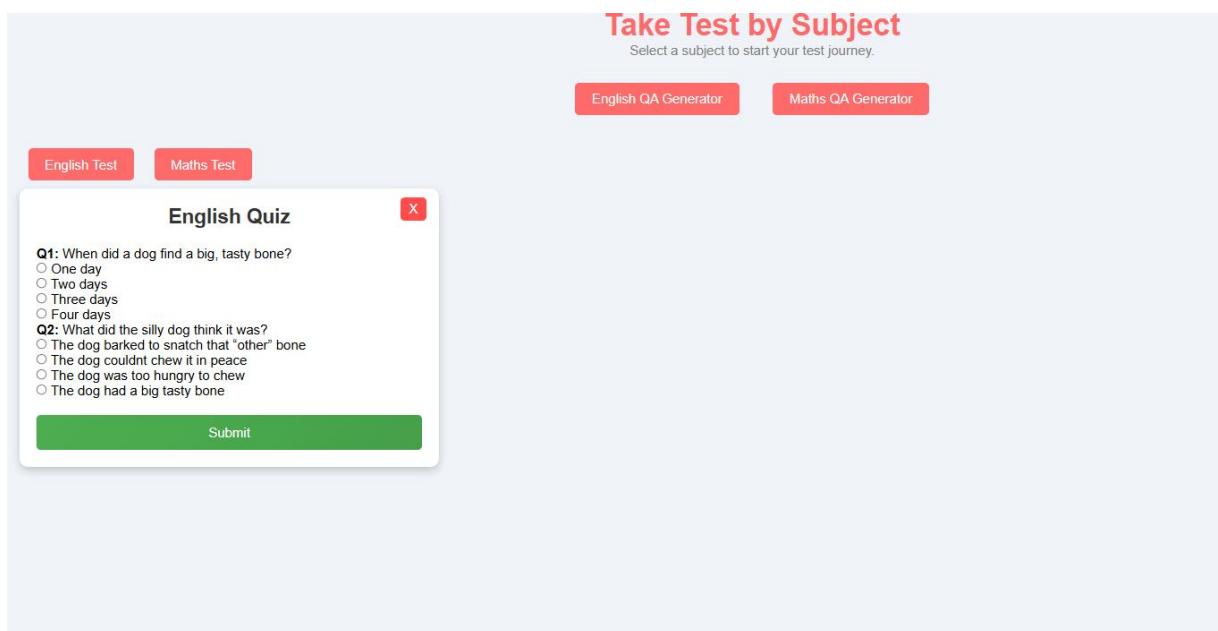


Figure 4.5: Generated questions

The MCQ Question Generation Module enhances the learning experience by engaging children with ADHD in interactive assessments. It personalizes question generation by tailoring questions based on the child's current learning progress and subject matter while

adapting to match the child's performance, ensuring a customized and engaging learning journey.

#### 4.2.2 Parent dashboard for monitoring

The Parent Dashboard provides insightful analytics and progress tracking to help parents monitor their child's learning journey. It offers a user-friendly interface with detailed reports and performance trends, allowing parents to understand their child's learning behavior more effectively. The dashboard displays the child's progress across different subjects and activities while also monitoring the time spent on each learning activity, ensuring a comprehensive overview of engagement and development.

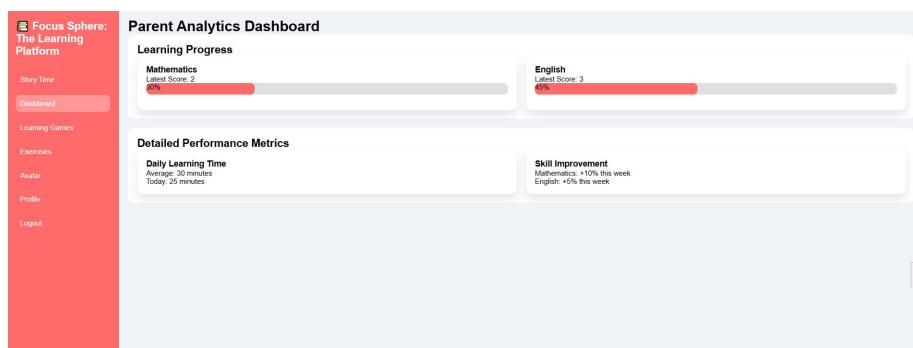


Figure 4.6: Progress tracking module

#### 4.2.3 Avatar Generation module

Kids can create their own unique avatars by dragging and dropping hairstyles, clothes, accessories, and facial expressions onto a base character. For a quick start, they can choose from a selection of pre-built avatars and customize them as they like. Any item they drag instantly updates the character, providing real-time feedback and making the experience more interactive. Once created, the avatar becomes a part of the learning games, making the experience more personal and engaging for the child.

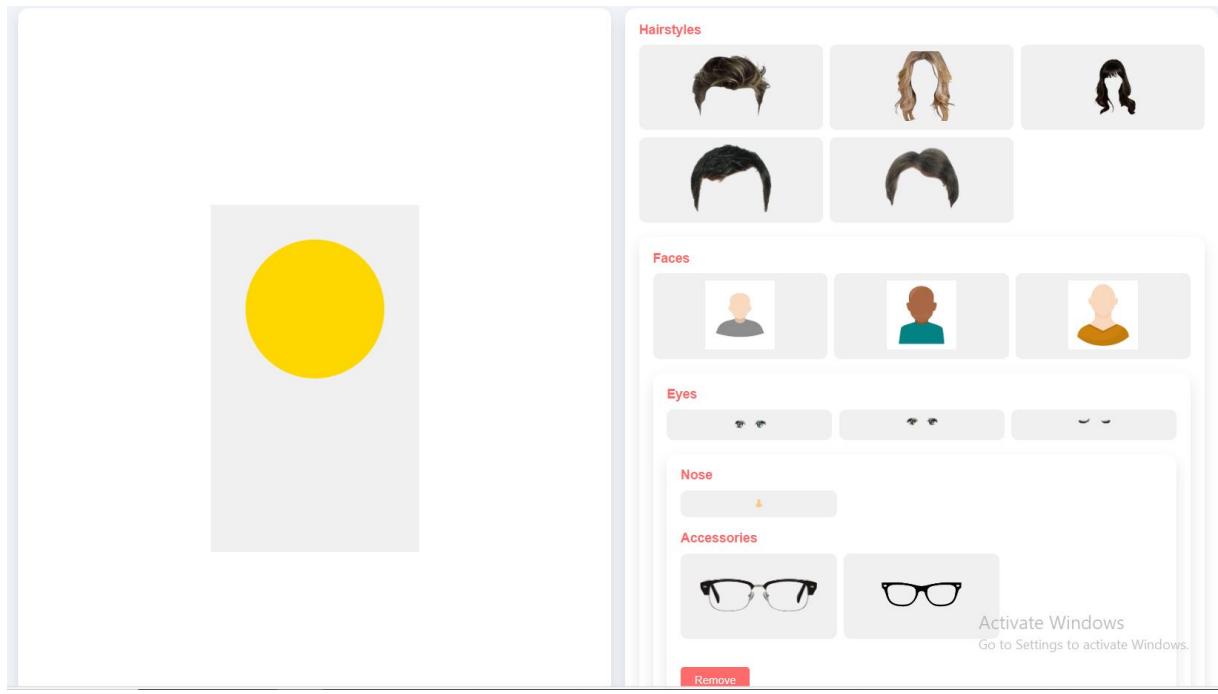


Figure 4.7: Avatar generation module

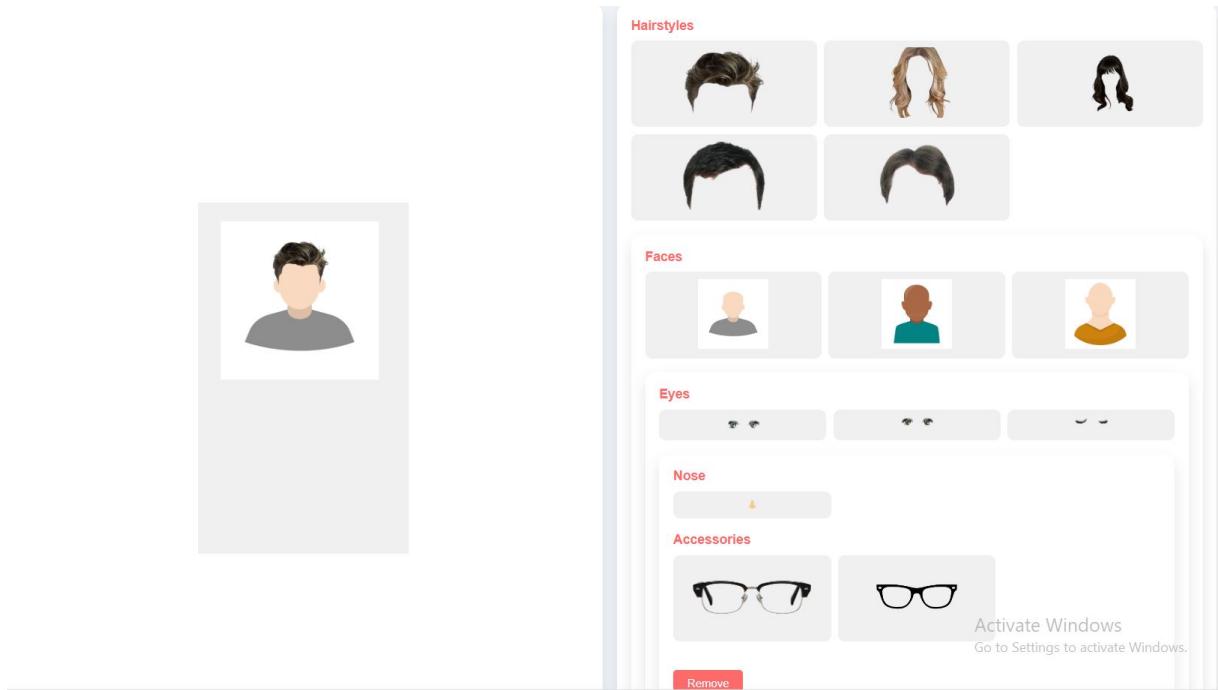


Figure 4.8: Avatar generation

# **Chapter 5**

## **Conclusions & Future Scope**

### **5.1 Future scope**

This report thoroughly investigated the construction of a learning platform which would respond to the basic needs of kids suffering from ADHD as an exciting way to improve the learning experience of such children with personalized, engaging, and interactive tools—the kind of tools that current technologies promise. In addition to these, the platform also gives insight to parents and caregivers into the children's progress, while effectively addressing some key challenges children with ADHD face, such as maintaining attention and motivation.

The future of learning platforms for children with ADHD is evolving rapidly with the integration of AI-driven adaptive learning. These platforms will analyze a child's learning patterns and dynamically adjust the content to suit their attention span and engagement levels. Real-time, personalized assessments will enable continuous progress tracking, providing instant feedback and tailored interventions. By recognizing individual strengths and challenges, the platform can recommend specific learning activities that enhance focus and retention, making education more interactive and effective.

Additionally, AI-powered predictive analytics will play a crucial role in forecasting a child's learning progress and potential difficulties before they arise. This will allow educators and parents to implement real-time attention interventions, helping children stay on track through engaging visual and auditory stimuli. Future platforms may also integrate biometric feedback (such as eye tracking or heart rate monitoring) to understand attention levels better and make adjustments in real-time. As technology advances, these platforms will continue to refine their approaches, ensuring a more inclusive and supportive learning environment for children with ADHD.

Thus, to sum it up, this is an education making a real difference in children suffering

from Attention-deficit hyperactivity disorder. Only through that transformation can the very dream even begin to be realized, as a development by innovation within an assimilative environment could have a vision of bridging the gap between tradition and new technologies; however, besides gaining stimulating engagement and learning outcome, this may also be the precursor towards what the future industry could do with harnessing and developing the teaching tools for neurodivergent learners. Truly, scaled adoption world over within homes, schools, and therapeutic spaces, can show how technology can enable these kids to flourish.

## 5.2 Conclusion

An important step towards improving the effectiveness and engagement of education for kids with attention challenges is the creation of our ADHD learning platform. The platform combines multi-sensory learning techniques with audio-based study materials, interactive games, and personalised avatars to improve focus and retention. Learning is kept fun while meeting individual needs through the use of gamified rewards, adaptive MCQs, and character-based teaching.

Furthermore, by enabling kids to customise their learning environment, the drag-and-drop avatar customisation encourages motivation and a sense of ownership. A seamless and scalable experience is guaranteed by the backend infrastructure, which is driven by AI-driven MCQ generation (T5 model) and cloud-based avatar storage.

All things considered, this platform improves their confidence and learning outcomes in addition to helping kids with ADHD stay engaged. This ADHD learning platform is designed to provide a structured yet flexible learning environment that adapts to each child's unique needs. The combination of interactive activities, engaging visuals, and personalized learning paths ensures that children remain interested and motivated throughout their educational journey. By incorporating reward-based learning, the platform encourages positive reinforcement, helping children develop a sense of accomplishment. The backend infrastructure ensures smooth operation, allowing seamless integration of new features and scalability for future improvements. With continuous enhancements and feedback-driven updates, this platform has the potential to redefine learning for children with ADHD, making education both effective and enjoyable.

## References

- [1] S. Butt, F. E. Hannan, M. Rafiq, I. Hussain, C. N. Faisal, and W. Younas, “Say-it & learn: Interactive application for children with adhd,” in *Cross-Cultural Design. Applications in Health, Learning, Communication, and Creativity: 12th International Conference, CCD 2020, Held as Part of the 22nd HCI International Conference, HCII 2020, Copenhagen, Denmark, July 19–24, 2020, Proceedings, Part II 22*. Springer, 2020, pp. 213–223.
- [2] L. Mancera, S. Baldiris, R. Fabregat, S. Gomez, and C. Mejia, “atenderah: a videogame to support e-learning students with adhd,” in *2017 IEEE 17th International Conference on Advanced Learning Technologies (ICALT)*. IEEE, 2017, pp. 438–440.
- [3] M. Chistol, C. Turcu, and M. Danubianu, “Autism assistant: A platform for autism home-based therapeutic intervention,” *IEEE Access*, vol. 11, pp. 94 188–94 204, 2023.

## **Appendix A: Presentation**

# **FOCUS SPHERE**

## **THE LEARNING PLATFORM**

### **INTERNAL PRESENTATION**

Anna Maria Joseph  
Annu Merin Johns  
Chandana V S

Guided by:  
Ms. Asna. P.K  
Asst.prof  
Dept. of CSE

## **CONTENTS**

- Introduction
- Objectives
- Proposed Methods
- Architecture Diagram
- Functionality Overview
- Work Breakdown and Responsibilities
- Hardware and software Requirements
- Gantt chart
- Risk and Challenges
- Output
- Conclusion
- References

# INTRODUCTION

- The web application is designed to cater to the educational needs of students with ADHD.
- The main goal is to provide an engaging, interactive, and personalized learning experience.
- The platform will feature a variety of functionalities, including converting educational content into audio-visual formats, creating an interactive learning environment with games, assessing student performance, monitoring attention levels, and more.

## OBJECTIVES

**01 - ENHANCE CONCENTRATION**

**02 - PERSONALIZED TRAINING**

**03 - EDUCATIONAL AUDIO CONTENT**

**04 - PROGRESS TRACKING**

**05 - ATTENTION MONITORING**

# PROPOSED METHOD

## Content Delivery and Dual Engagement



## Progress Tracking and Feedback



### Content based examination



## Attention monitoring system



### Avatar Creation and Customization



## 1 Content Delivery and Dual Engagement

- Audio - Input Converter: Create a system where educational content is converted to audio using text-to-speech.
- Video Player: Integrate a video player that plays educational games while the audio is being played.
- Game Integration: Design simple games for learning alphabets and math calculations, ensuring they are interactive and engaging.

## 2 Content based examination

A dynamic quiz generator using the T5 model will create personalized and content-based exams. These exams will help evaluate the performance and learning progress of students.

 3

## Progress Tracking and Feedback

- A comprehensive dashboard will allow parents to monitor the students progress in real-time.
- The dashboard will display performance metrics, engagement, and overall learning outcomes of the student to parents

 4

## Avatar Creation and Customization

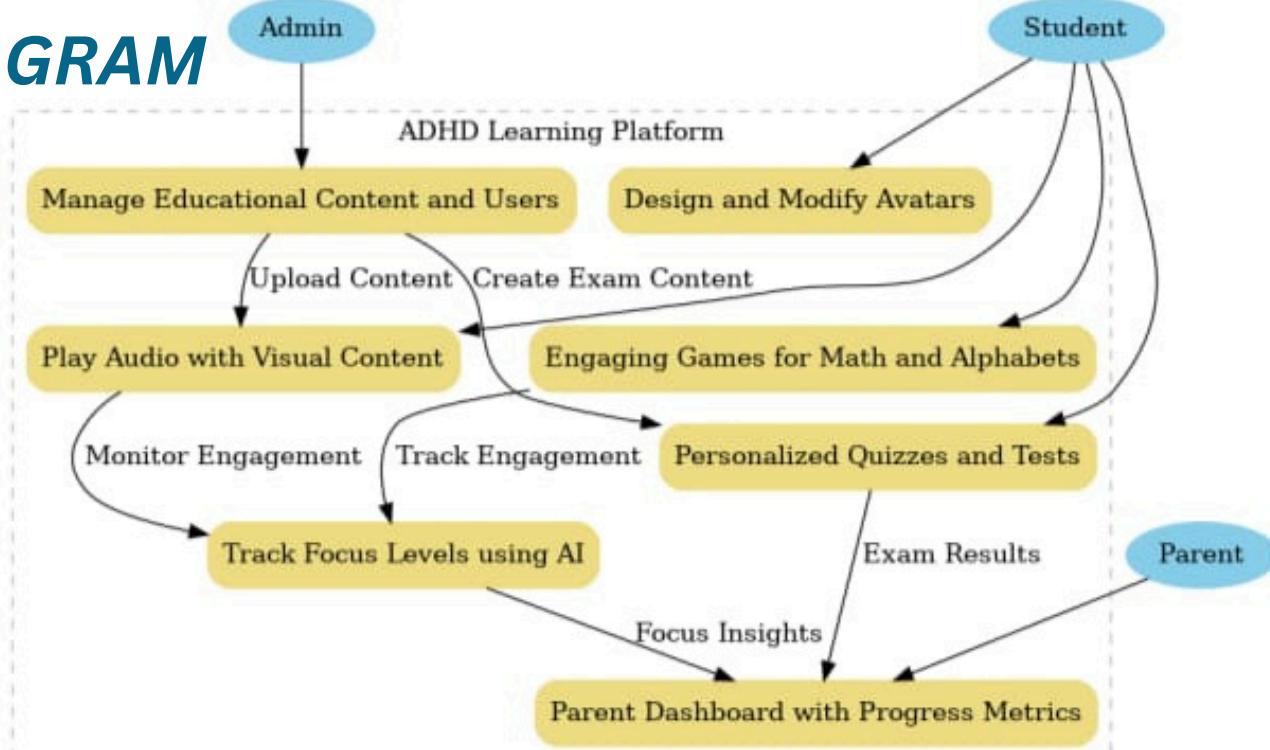
- **Avatar Design Engine:** Students can customize their avatars for a personalized learning experience.
- This feature will use Jinja, PyAvatar, and Pydantic for avatar creation and customization.

 5

## Attention monitoring system

- Using MediaPipe, OpenCV, and dlib, the system will evaluate the students attention level during study sessions.
- This data can be used to adjust content and activities to improve focus.
- Use MediaPipe to analyze facial expressions and detect attention levels

# ARCHITECTURE DIAGRAM



## Functionalities Overview

## 1.Audio-Visual Learning

Input from the user is converted to audio, which is then synchronized with a game video. This will help ADHD students stay engaged while learning.

The video will feature interactive games that encourage active participation in subjects like alphabets and math.

### **IMPLEMENTATION:-**

- Input Converter: Create a system where educational content is converted to audio using text-to-speech module.

## 2.Custom Avatar Creation

Students can customize their avatars for a personalized learning experience.

This feature will use PyAvatar for avatar creation and customization.

### **IMPLEMENTATION:-**

- PyAvatar: Use PyAvatar for creating avatars and allowing students to modify their appearance.

### 3. Attention Monitoring

Using OpenCV and dlib, the system will evaluate the student's attention level during study sessions. This data can be used to adjust content and activities to improve focus.

#### IMPLEMENTATION:-

- OpenCV and dlib: Use these libraries for further real-time attention detection, such as head pose estimation.
- Data Processing: Store and analyze attention data in real-time to adapt the learning environment and giving result.

### 4. Content-Based Exam

A dynamic quiz generator using the T5 model will create personalized and content-based exams. These exams will help evaluate the performance and learning progress of students.

#### IMPLEMENTATION:-

T5 Model: Integrate the T5 model to generate questions based on the content input.

- o Use the model to generate a set of questions that fit the student's learning level and progress.
- Quiz Engine: Create the backend logic to serve quizzes to students dynamically based on the generated content.
- Database Integration: Store quizzes and results in the database for evaluation.

## 5. Performance Evaluation Dashboard for Parents

A comprehensive dashboard will allow parents to monitor the students progress in real-time.

The dashboard will display performance metrics, engagement, and overall learning outcomes.

## WORK BREAKDOWN & RESPONSIBILITIES

>UI  
>Avatar Creation

Annu Merin  
Johns

>Text-To-Speech  
Convertor  
>Performance  
Analysis

Chandana V S

>Attention  
Monitoring  
>Content Based  
Exam

Anna Maria  
Joseph

# REQUIREMENTS

## HARDWARE

- Processor: Intel Core i5 (minimum), Intel Core i7 or higher (recommended)
- RAM: 12GB (minimum), 16GB or more (recommended)
- Storage: 500GB HDD (minimum), SSD preferred for faster data access and processing
- Peripherals: Standard mouse and keyboard

## SOFTWARE

- 1. Development Tools:

Anaconda: For environment management and library installation

Visual Studio Code: As the primary IDE for code development

- 2. Programming Languages and Libraries:

Python: Version 3.9 or higher

- 3. Operating System:

Windows: Windows 10 or 11 (64-bit)

- 4. Frontend and Backend:

Frontend: HTML, CSS

Backend: Python

## Gantt chart



## RISK AND CHALLENGES

Challenge: Children with ADHD have difficulty maintaining focus and may quickly lose interest in repetitive or unengaging content.

Risks:

- 1.Audio-Visual Synchronization Issues
- 2.Attention Monitoring Inaccuracy
- 3.Performance and Scalability
- 4.Model Performance (T5) for content generation.

## OUTPUTS

# Output of User Input Module

127.0.0.1:8000/home\_page/

**Focus Sphere:**  
The Learning Platform

**Story Time Adventures**

+ Upload Story

Story Time

Dashboard

Learning Games

Exercises

Avatar

Profile

Logout

**Ant and the grasshopper story of ant**

**The Little Cloud Who Wanted to Shine**

A heartwarming tale of a small robot's big adventure

**The Gift of the Magi**

It is a heartwarming story about a young couple who sacrifice their most prized possessions to buy each other

**The Little Cloud Who Wanted to Shine**

A heartwarming tale of a small robot's big adventure

**Magical Garden Adventure**

A colorful journey through an enchanted garden

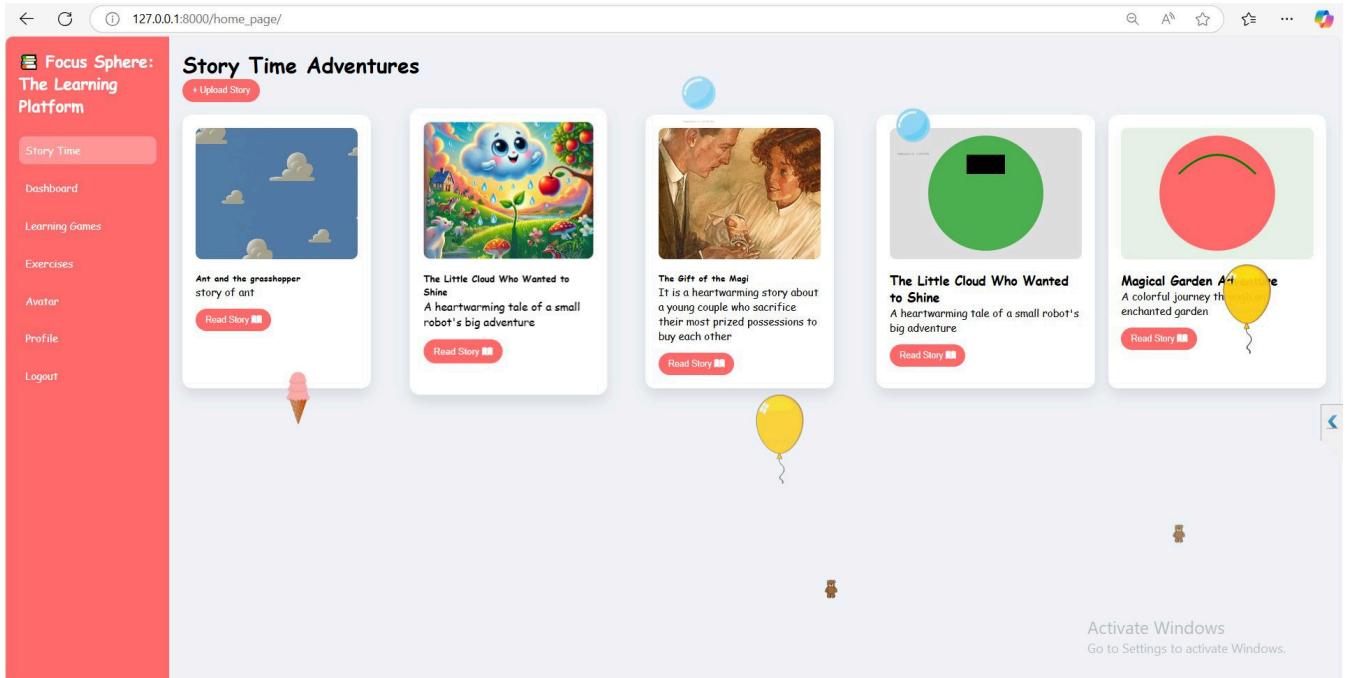
Read Story

Read Story

Read Story

Read Story

Activate Windows  
Go to Settings to activate Windows.



## Story Time Adventures

+ Upload Story



Ant and the grasshopper story of ant

Read Story



The Little Cloud Who Wanted to Shine  
A heartwarming tale of a small robot's big adventure

Read Story

### Upload Story

Title

Description

Story Text

Image

Choose File | No file chosen

Cancel

Submit

Activate Windows  
Go to Settings to activate Windows.

**The Little Cloud Who Wanted to Shine**

A heartwarming tale of a small robot's big adventure

Read Story

**Magical Garden Adventure**

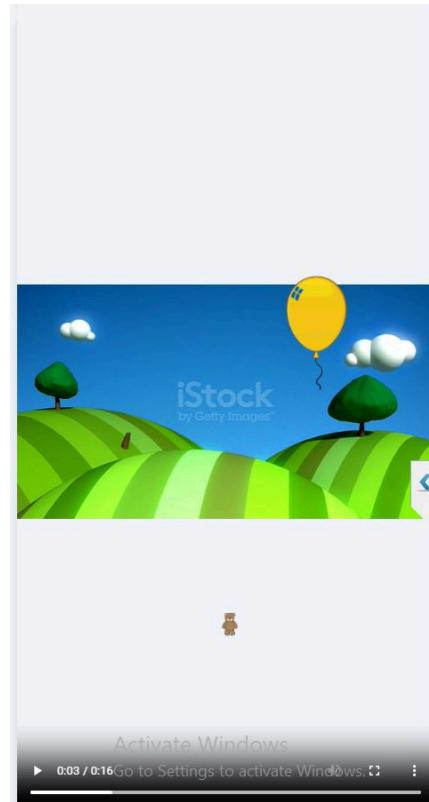
A colorful journey through an enchanted garden

Read Story



Activate Windows  
Go to Settings to activate Windows.

## Outputs of text to audio conversion



## Output For Students Progress Analysis

**Focus Sphere:**  
The Learning Platform

**Parent Analytics Dashboard**

**Learning Progress**

Subject	Latest Score	Progress (%)
Mathematics	2	30%
English	3	45%

**Detailed Performance Metrics**

**Daily Learning Time**  
Average: 30 minutes  
Today: 25 minutes

**Skill Improvement**  
Mathematics: +10% this week  
English: +5% this week

**Dashboard**

**Learning Games**

**Exercises**

**Avatar**

**Profile**

**Logout**

# Output For Question Generator

**Take Test by Subject**  
Select a subject to start your test journey.

**Generate English Questions**

Enter Context:  
Enter text for question generation...

Select Number of Questions:  
1

Generate MCQs

No questions generated yet.

**Take Test by Subject**  
Select a subject to start your test journey.

English QA Generator      Maths QA Generator

English Test

Maths Test

## English Quiz

**Q1:** When did a dog find a big, tasty bone?

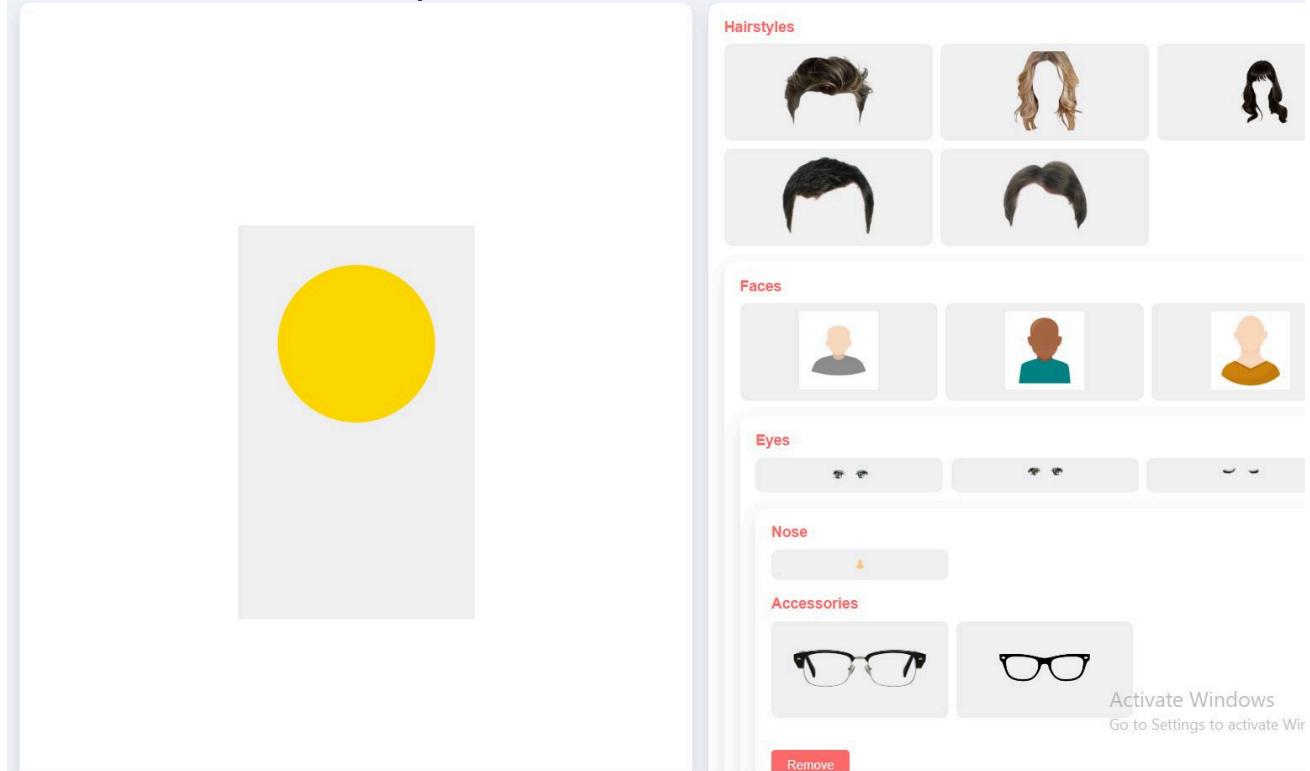
- One day
- Two days
- Three days
- Four days

**Q2:** What did the silly dog think it was?

- The dog barked to snatch that "other" bone
- The dog couldnt chew it in peace
- The dog was too hungry to chew
- The dog had a big tasty bone

Submit

## Output For Avatar Creation



# CONCLUSION

- The development of a learning application for children with ADHD is a highly impactful as it addresses a critical need in education.
- Features like dual-sensory engagement, personalized content, progress tracking, and a reward-based task system, this app is designed to help children maintain focus and motivation.
- This app can transform the learning experiences of children with ADHD

# REFERENCES

1. MIHAELA CHISTOL, CRISTINA TURCU AND MIRELA DANUBIANU Autism Assistant: A Platform for Autism Home-Based Therapeutic Intervention, Publisher: IEEE, 2020
2. Sabeel Butt, Fazal E. Hannan, Mujahid Rafiq, Ibrar Hussain, C. M. Nadeem Faisal, and Waleed Younas, Say-It and Learn: Interactive Application for Children with ADHD, Springer Nature Switzerland AG, 2023
3. Culatta, R., & Gifford, K. The Use of Digital Tools to Support Children with ADHD. *Journal of Educational Technology Development and Exchange*, 1-15, 2022
4. Sújar, Aarón; Martín-Moratinos, Marina; Rodrigo-Yanguas, María; Bella-Fernández, Marcos; González-Tardón, Carlos; Delgado Gómez, David; Blasco-Fontecilla, Hilario. Developing Serious Video Games to Treat Attention Deficit Hyperactivity Disorder: Tutorial Guide. *JMIR Serious Games*, 2022.
5. Frontiers Research Group. Serious Video Games: Angels or Demons in Patients With Attention-Deficit Hyperactivity Disorder? A Quasi-Systematic Review. *Frontiers in Psychology*, 2021.

# THANK YOU

## **Appendix B: Vision, Mission, Programme Outcomes and Course Outcomes**

# **Vision, Mission, Programme Outcomes and Course Outcomes**

## **Institute Vision**

To evolve into a premier technological institution, moulding eminent professionals with creative minds, innovative ideas and sound practical skill, and to shape a future where technology works for the enrichment of mankind.

## **Institute Mission**

To impart state-of-the-art knowledge to individuals in various technological disciplines and to inculcate in them a high degree of social consciousness and human values, thereby enabling them to face the challenges of life with courage and conviction.

## **Department Vision**

To become a centre of excellence in Computer Science and Engineering, moulding professionals catering to the research and professional needs of national and international organizations.

## **Department Mission**

To inspire and nurture students, with up-to-date knowledge in Computer Science and Engineering, ethics, team spirit, leadership abilities, innovation and creativity to come out with solutions meeting societal needs.

## **Programme Outcomes (PO)**

Engineering Graduates will be able to:

**1. Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**2. Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

- 3. Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. Conduct investigations of complex problems:** Use research-based knowledge including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- 5. Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
- 6. The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal, and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 8. Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. Individual and Team work:** Function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
- 10. Communication:** Communicate effectively with the engineering community and with society at large. Be able to comprehend and write effective reports documentation. Make effective presentations, and give and receive clear instructions.
- 11. Project management and finance:** Demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.
- 12. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

## **Programme Specific Outcomes (PSO)**

A graduate of the Computer Science and Engineering Program will demonstrate:

### **PSO1: Computer Science Specific Skills**

The ability to identify, analyze and design solutions for complex engineering problems in multidisciplinary areas by understanding the core principles and concepts of computer science and thereby engage in national grand challenges.

### **PSO2: Programming and Software Development Skills**

The ability to acquire programming efficiency by designing algorithms and applying standard practices in software project development to deliver quality software products meeting the demands of the industry.

### **PSO3: Professional Skills**

The ability to apply the fundamentals of computer science in competitive research and to develop innovative products to meet the societal needs thereby evolving as an eminent researcher and entrepreneur.

## **Course Outcomes (CO)**

**Course Outcome 1:** Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level: Apply).

**Course Outcome 2:** Develop products, processes or technologies for sustainable and socially relevant applications (Cognitive knowledge level: Apply).

**Course Outcome 3:** Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks (Cognitive knowledge level: Apply).

**Course Outcome 4:** Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).

**Course Outcome 5:** Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level: Analyze).

**Course Outcome 6:** Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level: Apply).



## **Appendix C: CO-PO-PSO Mapping**

### **COURSE OUTCOMES:**

After completion of the course the student will be able to

<b>SL.NO</b>	<b>DESCRIPTION</b>	<b>Blooms' Taxonomy Level</b>
CO1	Model and solve real world problems by applying knowledge across domains (Cognitive knowledge level:Apply).	Level 3: Apply
CO2	Develop products, processes or technologies for sustainable and socially relevant applications. (Cognitive knowledge level:Apply).	Level 3: Apply
CO3	Function effectively as an individual and as a leader in diverse teams and to comprehend and execute designated tasks. (Cognitive knowledge level:Apply).	Level 3: Apply
CO4	Plan and execute tasks utilizing available resources within timelines, following ethical and professional norms (Cognitive knowledge level: Apply).	Level 3: Apply
CO5	Identify technology/research gaps and propose innovative/creative solutions (Cognitive knowledge level:Analyze).	Level 4: Analyze
CO6	Organize and communicate technical and scientific findings effectively in written and oral forms (Cognitive knowledge level:Apply).	Level 3: Apply

### **CO-PO AND CO-PSO MAPPING**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	2	2	2	1	2	2	2	1	1	1	1	2	3		
CO 2	2	2	2		1	3	3	1	1		1	1		2	
CO 3									3	2	2	1			3
CO 4					2			3	2	2	3	2			3
CO 5	2	3	3	1	2							1	3		
CO 6					2			2	2	3	1	1			3

3/2/1: high/medium/low

### **JUSTIFICATIONS FOR CO-PO MAPPING**

<b>MAPPING</b>	<b>LOW/MEDIUM/HIGH</b>	<b>JUSTIFICATION</b>
101003/ CS722U.1- PO1	M	Knowledge in the area of technology for project development using various tools results in better modeling.
101003/ CS722U.1- PO2	M	Knowledge acquired in the selected area of project development can be used to identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions.
101003/ CS722U.1- PO3	M	Can use the acquired knowledge in designing solutions to complex problems.
101003/ CS722U.1- PO4	M	Can use the acquired knowledge in designing solutions to complex problems.
101003/ CS722U.1- PO5	H	Students are able to interpret, improve and redefine technical aspects for design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
101003/ CS722U.1- PO6	M	Students are able to interpret, improve and redefine technical aspects by applying contextual knowledge to assess societal, health and consequential responsibilities relevant to professional engineering practices.
101003/ CS722U.1- PO7	M	Project development based on societal and environmental context solution identification is the need for sustainable development.
101003/ CS722U.1- PO8	L	Project development should be based on professional ethics and responsibilities.

101003/ CS722U.1- PO9	L	Project development using a systematic approach based on well defined principles will result in teamwork.
101003/ CS722U.1- PO10	M	Project brings technological changes in society.
101003/ CS722U.1- PO11	H	Acquiring knowledge for project development gathers skills in design, analysis, development and implementation of algorithms.
101003/ CS722U.1- PO12	H	Knowledge for project development contributes engineering skills in computing & information gatherings.
101003/ CS722U.2- PO1	H	Knowledge acquired for project development will also include systematic planning, developing, testing and implementation in computer science solutions in various domains.
101003/ CS722U.2- PO2	H	Project design and development using a systematic approach brings knowledge in mathematics and engineering fundamentals.
101003/ CS722U.2- PO3	H	Identifying, formulating and analyzing the project results in a systematic approach.
101003/ CS722U.2- PO5	H	Systematic approach is the tip for solving complex problems in various domains.
101003/ CS722U.2- PO6	H	Systematic approach in the technical and design aspects provide valid conclusions.

101003/ CS722U.2- PO7	H	Systematic approach in the technical and design aspects demonstrate the knowledge of sustainable development.
101003/ CS722U.2- PO8	M	Identification and justification of technical aspects of project development demonstrates the need for sustainable development.
101003/ CS722U.2- PO9	H	Apply professional ethics and responsibilities in engineering practice of development.
101003/ CS722U.2- PO11	H	Systematic approach also includes effective reporting and documentation which gives clear instructions.
101003/ CS722U.2- PO12	M	Project development using a systematic approach based on well defined principles will result in better teamwork.
101003/ CS722U.3- PO9	H	Project development as a team brings the ability to engage in independent and lifelong learning.
101003/ CS722U.3- PO10	H	Identification, formulation and justification in technical aspects will be based on acquiring skills in design and development of algorithms.
101003/ CS722U.3- PO11	H	Identification, formulation and justification in technical aspects provides the betterment of life in various domains.
101003/ CS722U.3- PO12	H	Students are able to interpret, improve and redefine technical aspects with mathematics, science and engineering fundamentals for the solutions of complex problems.

101003/ CS722U.4- PO5	H	Students are able to interpret, improve and redefine technical aspects with identification formulation and analysis of complex problems.
101003/ CS722U.4- PO8	H	Students are able to interpret, improve and redefine technical aspects to meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
101003/ CS722U.4- PO9	H	Students are able to interpret, improve and redefine technical aspects for design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
101003/ CS722U.4- PO10	H	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools for better products.
101003/ CS722U.4- PO11	M	Students are able to interpret, improve and redefine technical aspects by applying contextual knowledge to assess societal, health and consequential responsibilities relevant to professional engineering practices.
101003/ CS722U.4- PO12	H	Students are able to interpret, improve and redefine technical aspects for demonstrating the knowledge of, and need for sustainable development.
101003/ CS722U.5- PO1	H	Students are able to interpret, improve and redefine technical aspects, apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
101003/ CS722U.5- PO2	M	Students are able to interpret, improve and redefine technical aspects, communicate effectively on complex engineering activities with the engineering community and with society at

		large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
101003/ CS722U.5- PO3	H	Students are able to interpret, improve and redefine technical aspects to demonstrate knowledge and understanding of the engineering and management principle in multidisciplinary environments.
101003/ CS722U.5- PO4	H	Students are able to interpret, improve and redefine technical aspects, recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
101003/ CS722U.5- PO5	M	Students are able to interpret, improve and redefine technical aspects in acquiring skills to design, analyze and develop algorithms and implement those using high-level programming languages.
101003/ CS722U.5- PO12	M	Students are able to interpret, improve and redefine technical aspects and contribute their engineering skills in computing and information engineering domains like network design and administration, database design and knowledge engineering.
101003/ CS722U.6- PO5	M	Students are able to interpret, improve and redefine technical aspects and develop strong skills in systematic planning, developing, testing, implementing and providing IT solutions for different domains which helps in the betterment of life.
101003/ CS722U.6- PO8	H	Students will be able to associate with a team as an effective team player for the development of technical projects by applying the knowledge of mathematics, science, engineering

		fundamentals, and an engineering specialization to the solution of complex engineering problems.
101003/ CS722U.6- PO9	H	Students will be able to associate with a team as an effective team player for Identify, formulate, review research literature, and analyze complex engineering problems
101003/ CS722U.6- PO10	M	Students will be able to associate with a team as an effective team player for designing solutions to complex engineering problems and design system components.
101003/ CS722U.6- PO11	M	Students will be able to associate with a team as an effective team player use research-based knowledge and research methods including design of experiments, analysis and interpretation of data.
101003/ CS722U.6- PO12	H	Students will be able to associate with a team as an effective team player, applying ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
101003/ CS722U.1- PSO1	H	Students are able to develop Computer Science Specific Skills by modeling and solving problems.
101003/ CS722U.2- PSO2	M	Developing products, processes or technologies for sustainable and socially relevant applications can promote Programming and Software Development Skills.
101003/ CS722U.3- PSO3	H	Working in a team can result in the effective development of Professional Skills.

101003/ CS722U.4- PSO3	H	Planning and scheduling can result in the effective development of Professional Skills.
101003/ CS722U.5- PSO1	H	Students are able to develop Computer Science Specific Skills by creating innovative solutions to problems.
101003/ CS722U.6- PSO3	H	Organizing and communicating technical and scientific findings can help in the effective development of Professional Skills.