



Short Communication

Role of AI to support Secondary School students Personalized learning journeys and Holistic development

Susant Kumar Daxinray

Dhabaleswar govt. High School, Kalinga, Keonjhar, Odisha, India
daxinraysusant78@gmail.com

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Abstract

Artificial Intelligence (AI) is transforming secondary education by enabling modified learning and promoting holistic development. AI-driven tools and platforms like Khan Academy and Alcumus adapt to individual learning styles, paces, and goals, offering tailored content, real-time feedback, and targeted interventions. Beyond academics, AI like Craiyon, ChatGPT supports students' emotional, social, and cognitive growth through mental health resources, social-emotional learning programs, and career guidance tools. By enhancing teacher effectiveness through automated assessments and classroom analytics, AI-chatbot fosters a more inclusive and adaptive environment. It also ensures accessibility for diverse learners, including those with special needs or language barriers. However, ethical considerations such as data privacy and equitable access must guide AI's integration in education. AI tools enable large-scale implementation of personalized learning, making quality education accessible to a broader population. By blending personalization with holistic support, AI equips students with the skills and resilience required for lifelong learning and to face future challenges.

Keywords: Artificial Intelligence (AI), personalized learning, Holistic development, Adaptive learning platforms.

Introduction

Artificial Intelligence (AI) has emerged as a revolutionary tool for education, playing a significant role in shaping personalized learning journeys and fostering the overall development of secondary school students¹. AI is creating tailored educational opportunities that address the unique requirements, strengths, and preferences of individual learners. AI-driven systems can analyze students' academic achievements, learning styles, as well as areas of interest to design customized educational paths². These technologies get used to individual learning paces, afford real-time feedback, and offer targeted resources to bridge knowledge gaps. For instance, intelligent tutoring systems and AI-driven platforms like adaptive learning apps can guide students through subjects in ways that resonate with their understanding, ensuring they remain engaged and motivated³.

Beyond academic, AI supports the broader development of secondary school students by addressing their social, emotional, and cognitive growth. Tools such as AI-based mentoring apps, emotional intelligence trackers, and career guidance systems provide insights into student's critical thinking, creativity, and interpersonal skills⁴.

Furthermore, AI facilitates better communication between educators, parents, and students, creating a collaborative environment that supports a well-rounded education experience⁵. By integrating AI into education, secondary schools can foster an environment that promotes both academic

excellence and the personal growth of students, equipping them to face the challenges of the contemporary world.

Objective: i. Create customized educational plans that adapt to each student learning style, pace, and proficiency levels. ii. Use AI to provide dynamic assessments that evolve based on the students' performance, ensuring a better understanding of their progress. iii. To support emotional well-being through AI-driven mental health tools that detect stress, anxiety, or disengagement. iv. Encourage the enhancement of critical life competencies including analytical thinking, creativity, collaboration, and adaptability using AI-supported programs. v. To connect students from diverse educational contents and global perspectives through AI-enhanced platforms. vi. Improve communication between schools and parents through AI-powered apps that provide insights into students' progress and well-being. vii. Use AI to examine large datasets to make out patterns and trends in student learning behavior.

Methodology

The methodology for integrating Artificial Intelligence (AI) to support secondary school students personalized learning journeys and holistic development involves a systematic approach combining technology, pedagogy, and collaboration^{6,7}. Two govt. High school students are participating in my study. Dhabaleswar Govt. High School, Kalinga and Asanpat Govt. High School, Asanpat. Total of 160 secondary students take part on my study.

Adaptive learning platform: Khan Academy: The searcher created teacher Id and Password, and then created Id and Password of class 9th and class 10th students in Khan Academy. Teacher Email isteacherId and automatically platform created their password, class 9th password is classix123 and according their name their Id created automatically. Similarly, class 10th password is classx123 and according their name their Id created automatically. All the students to get activated on Khan Academy platform by logging their Id and Password. Then the searcher gave Assignment and set goal to the students, and advised to follow, and then check progress students Assignment scores and Mastery progress report in every week⁸.

AI-learning platform: Alcumus: The searcher registered class 9th and class 10th students at AOPS (Art of problem solving) for math problem solving, then through students mail create Id and Password. The students asked to search the class and topic, the difficult math's problems can be asked and solved. This platform will provide personalized guidance, answering question and offering alternative explanation⁹.

AI-text genitor: chatGPT: The searcher introduced another AI-application chatGPT to the students, All the 9th and 10th students advised to download chatGPT from play store and open. This App helped the students to improve the communication skill and language text skill. It also helped to improve grammatical, contextual errors, and brainstorm ideas for content.

AI-application: computer vision technology: The researcher shown a photo in the school panel, then asked the students to classify computer vision. Using a model to find a range of objects in a photo or video. The model is trained with images of individual objects and of multiple objects, like this image. Classes like Shoe confidence%, Person confidence%, Dog confidence%, Bicycle confidence %, Wheel confidence%. The students can identify multiple objects in an image- useful for technological advancements such as driverless cars.

AI-application: Teachable Machine: The researcher gave some image Of healthy cassava plant, then the students asked to Recognising images as Healthy or Diseased as follow Train (collect examples of what you want the computer to recognise), Learn and Test(use the examples to train the computer to recognise image),Make(use the machine learning model you are trained to make a game or app in scratch).The students advised for Testing their model.

AI-application: Google Assistance: The researcher introduced AI-application. Voice assistance. It helped in interpret voice commands and answer question. The secondary school students are advised to use Google text to speech (TTS) for answer a question, play a song or set an alarm.

AI-applications generations art task: Craiyon: The researcher used the AI application to generate art work for students, a

poster on climate change, Deforestation or celebrating Earth-day, Cover page for a story book or magazine. All the secondary school students are advised to follow it and open the app Craiyon from Google free AI image generator. Then the students asked to enter a search term, select preferred style, and then click on draw.

AI-model: AI-Chatbot: All the students are advised to open Kisan-emitra from Google, then asked to put question about what you want to know for farmer. Students asked to follow likewise. Again all the students are advised to open IndiGo from Google, then asked to put question about the journey schedule from one place to another place. All the students advised to create, A model of a chess player.

AI Experiment: Google Quick Draw!: The researcher introduces Google Quick Draw to sketch a picture of an object or idea, and then Artificial Intelligence estimate what the picture represents. The AI learns from each sketch, improving its ability to guess correctly in the future. All the students asked to draw a mobile, calculator in Quick Draw.

AI-driven Activity: A model: A model is a version of a real-world context. As part of secondary school student's science project, the students are asked to make model of photosynthesis, the greenhouse effect, and solar-powered villages. The researcher made all arrangement of science kits, equipment's, wooden box, plastics, rubbers, solar-panel etc.

Data-driven model: Weather forecasting: A data-driven model is used to work out a problem based on data inputs. Generally, they rely on a huge number of examples (lots of data), to spot patterns to create the representation. All the students are advised to create a weather forecasting using AI. Training data (temperature, pressure, wind speed), predict (future weather events).

Results and Discussions

The secondary school students have shown better academic performance due to AI-driven personalized content and adaptive learning system Khan Academy, that addresses individual learning gaps¹⁰. AI-powered interactive tools, such as ALCUMUS learning platforms, AOPS(Art of problem solving), have increased student motivation and interest in subjects, with real-time feedback and targeted support, students can be taught at their individual pace, leading to quicker mastery of concepts¹¹. AI-driven activities and simulations like secondary school student's science model photosynthesis, the green house effect and solar-power villages encourage analytical thinking and creative problem-solving. AI-chat-bot like IndiGo, Kisan-emitra help students identify and develop skills aligned with their aspirations, preparing them for future opportunities. AI-text generator chatGPT help to improve grammatical communication skill, contextual errors, and to help brainstorm ideas for content. Using chatGPT not only encourages critical

thinking about class concepts, but also motivates secondary school students to be technologically learned in course. AI tools CRAIYON, QUICK DRAW! Monitor emotional states, have helped identify and address issues like stress, anxiety, or disengagement, contributing to better mental health. AI-driven communication platform google Text-to-speech (TTS) have improved collaboration between students, teachers, and parents, fostering a supportive learning environment. Personalized progress tracking and achievements build students self-esteem and confidence in their abilities. Teachers benefit from reduced administrative workloads and data-driven insights, permit them to focus on mentoring and innovative teaching strategies. AI analytics provide actionable insights into student performance, helping secondary schools design better educational programs and interventions¹². AI tools enable large scale implementation of personalized learning, making quality education accessible to a broader population.

Discussion: AI enables personalized learning by adopting content, pace, and resources to each secondary school students' unique needs. Tools like flexible learning platforms KHAN ACADEMY and bright tutoring system ALCUMUS help students achieve better outcomes by addressing their individual gaps. AI contributes to emotional and social well-being by identifying stress, anxiety, or disengagement through sentiment analysis and behavioural tracking¹³. It also promotes skills like critical thinking, creativity, and career readiness through tailored programs. AI reduces administrative burdens for teachers, permits them to focus on modified instruction and mentoring¹⁴. It also strengthens parent-teacher communication by offering detailed insights into student performance and well-being. AI has the potential to operate within ethical boundaries when designed responsibly, safeguarding student data and ensuring unbiased outcomes¹⁵. AI exposes secondary school students to emerging technologies, preparing them for careers in an increasingly digital world. It also fosters continuous educational growth patterns through encouraging students to assume ownership over their education.

Conclusion

Artificial Intelligence (AI) is revolutionizing secondary education by enabling modified learning journeys and fostering holistic development¹⁶. Through adaptive learning platforms, synchronized feedback, and data-driven insights, AI empowers secondary school students to achieve academic excellence while addressing their unique needs and interests. Additionally, AI supports emotional well-being, skill development, and career readiness, contributing to the comprehensive growth of learners¹⁷. However, the effective use of AI demands close attention to moral responsibilities, information security, and equitable access. While AI can enhance education, it must support—not substitute—the contributions of teachers and human interactions that are vital for fostering empathy, collaboration, and social skills. By adopting a balanced and

inclusive approach, AI has the likely to transform education into a more vibrant, student-centered system, equipping secondary school learners with the understanding, competencies and mindset essential to future success in a changing world.

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