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Revolutionizing Personalised Learning: The Convergence of Artificial Intelligence and Collaborative Tools

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ABSTRACT

The teaching and learning process is continuously being enhanced and given more depth by the advancement and development of new technologies along with the quick growth of artificial intelligence. Not only has artificial intelligence revolutionized education, it also has altered knowledge sharing strategies for learning, cognition and civilization advancements, which focusses on personalised learning of an individual. Personalised learning environment is a novel and dynamic method that facilitates student's academic abilities with practical knowledge through exploration, investigation and collaboration. Artificial intelligence has radically transformed the education sector with focussing more on each individual's needs, collaborative tools has further enhanced the process. Digital collaborative tools turn out to be beneficial in teaching learning, both in synchronous and asynchronous process. There exists an array of collaborative tools that offers a plethora of opportunities for production, modification and sharing of content facilitating seamless and efficient learning. This study is qualitative in nature and focuses on personalised leaning. To find out how artificial intelligence and different collaborative tools promote personalised leaning a systematic

literature review is done.

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"The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn."

Alvin Toffler

Introduction

The Hindustan Times published, *'Contrary to conventional wisdom, learners do not all start and end simultaneously. Within any group, a spectrum of latent knowledge levels exists, necessitating a personalised approach to education.'* (Subramaniam, 2024). It is this personalized approach to education that adjusts the curriculum, speed, and teaching strategies to each student's unique requirements, interests, and ability levels. Rather than employing a curriculum which is meant to accommodate every student, personalized learning takes into account the different learning styles and abilities of each student and makes adjustments to optimize the learning process.

Personalized Learning

In today's classroom personalization is valued more than ever. It is recognized as a catch-all phrase that encompasses a number of ideas, including learner profiles, individualization, student agency, and a flexible learning environment. In order to provide flexibility and support to achieve mastery of the highest standards possible, e-personalized learning is defined as "tailoring learning for each student's strengths, needs and interests including enabling students' voices and choices in what, how, when and where they learn." (Patrick et al., 2013). This stands in contrast to traditional education, which employs a "one-size-fits-all" approach, offering uniform instruction, assignments, and assessments without taking into account individual differences and specific needs. Personalized learning aims to promote self-realization rather than marketize education, with students being viewed as accountable and engaged co-authors of their educational narrative. Students were therefore able to establish their own learning objectives, engage in continuous internal assessment for learning, and develop greater flexibility in their study outside of the traditional school day.

By putting the learner at the center of the educational process, personalised learning is achieved. (Leadbeater, 2004). A personalized learning environment's main objective is to provide an educational framework that directly attends to each student's particular needs rather than using a general strategy for

every student (Bates, 2014). Students who receive personalised learning are no longer merely "consumers" of education; instead, they grow into "coproducers and contributors" in their own educational process (Bates, 2014).

Six fundamental features that are necessary for a productive learning environment were identified by Williams (2013) after synthesizing a body of research on personalised learning approaches.

1. **Locus of control:** A learner-centered approach will not work if there is not a strong commitment to letting students take some ownership of their education.
2. **Understanding students as learners:** To implement a personalized learning strategy, teachers must be aware of each student's accomplishments and development. This can be made scalable for big student groups by using learning analytics (Deakin Crick, Goldspink, & Foster, 2013; Buckingham Shum, 2014).
3. **Student engagement:** Giving students a purpose and driving force to acquire new information and abilities can be achieved by relating their learning to their lives and goals through real-world activities.
4. **Collaboration:** Learners who perceive themselves as both subjects and contributors to the instruction process are more likely to thrive in personalized learning settings.
5. **Classroom culture:** In a personalized learning environment, the teacher-student interaction is highly valued. The instructor needs to be aware of each student's interests, preferred methods of learning, and degree of preparation in order to ensure that each student's needs are met. Large classes are made more difficult by this, but it also presents an opportunity to support educators using learning analytics and instructional technologies.

Personalized learning is not about abandoning a national curriculum, it is not about dividing students so they can study on their own, it is not about going back to child-centered ideas, and it is not an excuse to let students learn at their own pace. Personalised learning aims to enhance student achievement by adjusting the curriculum to each student's interests and ability level.

The National Education Policy 2020 (NEP 2020) emphasizes that personalized learning can have a big impact on India's educational system. Its main goal is to provide students greater freedom to select their own educational pathways. NEP 2020 pushes schools to implement strategies that address students' unique learning requirements and preferences by highlighting flexibility.

Literature Review

There are quite a few research studies done on personalized learning and AI. According to Basham (2018), personalized learning is an educational strategy that attempts to adjust learning opportunities and curriculum to each student's unique requirements, interests, and learning inclinations. Lambert (2018) addressed concerns regarding data privacy and the responsible use of student data, along with issues pertaining to fairness in having access to technology and tailored learning materials. An extensive amount of information on student interactions and achievement is analyzed by algorithms on AI-driven adaptive learning systems, according to the research by Baker and Inventado (2014). Zhao and Du (2017) talked about how artificial intelligence (AI) algorithms can find trends in student data to forecast future learning requirements and provide relevant learning materials or activities. In addition to improving the effectiveness of individualized learning, this predictive analytics capacity gives teachers the knowledge they need to alter the course of student' education proactively.

Baepler et al. (2014) claimed that AI-driven analytics can examine how students collaborate with one another to reveal information on both individual and group contributions. With the help of this integration, teachers may better fulfill the requirements of a diverse student body, enhance group projects, and promote productive teamwork.

Online collaboration tools, according to Lou et al. (2017), improve engagement among learners and critical thinking abilities by encouraging peer interaction and cooperative problem-solving.

Dillenbourg (1999) stated that collaborative learning is when students actively participate in group projects, conversations, or problem-solving exercises. This type of learning can be improved with the use of technology-mediated collaboration tools. According to Kafai and Resnick (1996), collaborative technologies help students engage in more participatory learning by enabling them to work together on coding or design projects, produce multimedia products, and pursue their interests in the digital realm.

Objective of the Study

The objective is to explore AI-driven technologies and collaborative tools which are transforming educational frameworks by boosting and cultivating personalized learning experiences.

Methodology

Qualitative research is used for this study, focusing on synthesizing existing literature and theoretical frameworks by completing an in-depth review and analysis of pertinent papers, books, reports, and peer-reviewed articles.

Personalized Learning Through Artificial Intelligence

Technology has a long history of being used in education. The introduction of digital technology in the classroom was one tipping moment. In the 1980s, the introduction of desktop computers to the classroom marked the beginning of this. Since then, digitization has gotten into every aspect of schooling. Apart from the desktop computer, an increasing number of additional gadgets have been introduced into education to either supplement or replace it. Artificial intelligence (AI) has gained traction in education, permeating many educational philosophies and improving assessment, learning, and student management. AI technology has the potential to completely change education by altering learning environments, teacher preparation programs, information access, and teaching and learning resources. According to Microsoft, this modernization might combine AI and learning data to improve student understanding and tailor instruction.

Artificial intelligence (AI) has the potential to drastically alter how we teach and learn in educational institutions (Jaiswal & Arun, 2021). The potential of AI to deliver individualized learning experiences is one of the primary advantages of education (Akgun & Greenhow, 2022). While the use of artificial intelligence in education has the potential to revolutionize the sector, it is important to recognize that it also raises important ethical questions (Holmes et al., 2022). These include worries about prejudice, privacy, and how technology might affect people's values and views. In order to guarantee that AI is applied equitably, openly, and responsibly while advancing educational objectives, it is imperative to address these ethical issues. AI-powered personalized learning has the potential to change education into a dynamic, adaptive process. More adaptable, individualized learning made possible by AI will revolutionize instructors and learners (Ahmad et al., 2022).

Collaborative online learning tools

According to Heritage (2011), the term "collaborative" refers to working together to achieve a common goal. Computer programs called collaborative tools are made to assist individuals working on a project together in achieving their objectives. It is typically connected to people collaborating virtually rather than in person using an Internet connection. Online collaboration tools are web-based programs that provide basic functions like group instant messaging, file sharing, and collaborative search engines (CSE) to locate information dispersed throughout the community, team, or organization's system. An astonishing array of online collaboration tools are accessible. Their focus spans the spectrum from open source to commercial, from cheap to expensive, locally installed to remotely hosted, and from simple to complicated. Collaborative learning activities, including group projects, presentations, group

discussions, and peer evaluations, are commonplace for students and call for a lot of communication and teamwork with their peers. It could be challenging for a course instructor to select an appropriate online platform from all available online collaborative programs to promote collaboration with and among students. Online collaborative tools have fundamentally transformed personalized learning by enabling interactive and tailored educational experiences. These online learning environments comprise an array of resources, including chat rooms, shared documents, video conferences, and online classrooms, that enable students and teachers to work together in real time, regardless of where they are physically located.

Additionally, online collaborative tools cater to diverse learning styles and preferences by offering flexibility in how information is accessed and processed. Students with varying communication preferences can join in discussions via written, spoken or video forms. Furthermore, these tools support asynchronous learning, enabling learners to engage with course materials and contribute to discussions at their own pace, which is beneficial for individuals with varying schedules or learning needs. Furthermore, by granting everyone equal access to academic opportunities and resources, the integration of online collaborative tools fosters inclusion in education. These tools break down geographical barriers and ensure that students from different backgrounds have access to high-quality learning experiences and educational support. A few important collaborative tools are discussed below:

1. **Google Workspace-** It includes

- Google Docs: Edit documents together
- Google Sheets: Edit spreadsheets together
- Google Slides: allows users to create presentations together
- Google Classroom: An online learning platform for handling assignments, correspondence and evaluations.

Google Workspace is a key component of personalized learning since it offers instructors and students a range of venues and tools for collaboration. Education may be more inclusive and flexible by allowing flexible learning styles and preferences. This is made possible by seamless interaction with other Google services and device accessibility. Google Workspace improves learning experiences by giving teachers the tools they need to design dynamic, personalized classrooms that maximize student engagement and academic results.

2. **Padlet-** Padlet is an adaptable web application that functions as an electronic whiteboard, enabling users to work together, exchange concepts and graphically arrange texts, photos and multimedia information.

Padlet enhances personalised learning with its flexible digital platform, allowing teachers and students to collaborate and exchange ideas. Through the customization of Padlet boards to accommodate students with various styles of learning and interests, educators can encourage active participation from their students by giving them the opportunity to produce multimedia content and interact with one another. Padlet is useful for fostering inclusive learning settings and enabling self-paced exploration of educational information because of its user-friendly interface and device accessibility.

3. **Kahoot-** With Kahoot teachers may design interactive tests and polls to get students involved in entertaining and instructive activities.

Kahoot enhances personalised learning by providing instructors with an innovative and intriguing platform to design interactive tests, questionnaires, and challenges catered to the needs of specific students. Kahoot encourages learners to take an active role in learning activities by using a game-based framework, which increases comprehension and memory of the material. By supporting diversified instruction, this adaptive strategy enables teachers to accommodate students' various learning preferences and rates of progress.

4. **Edmodo-** Edmodo is a social learning platform that allows educators, students and parents to work together on assignments and discuss.

Edmodo promotes individualized learning by giving teachers access to a safe, collaborative platform where they may modify lesson plans and activities to suit the requirements of specific students. Edmodo encourages student connection by facilitating idea sharing, project collaboration, and peer review through its social learning tools. Educators have the ability to track the growth and achievements of their pupils in real time, offering tailored assistance and support as needed. Edmodo enables teachers to design individualized learning experiences by supporting a student-centered approach to education.

5. **Flipgrid-** Flipgrid is a platform for video discussion; students may make and share short films encouraging peer-to-peer participation and improving communication skills.

Flipgrid facilitates peer-to-peer communication and cooperation by letting students watch and comment on one another's videos, offer helpful criticism, and gain insight from one another's viewpoints. With Flipgrid, teachers can monitor student progress individually, give customized feedback, and modify course materials in response to their responses, ensuring every student has an exciting and relevant learning experience.

6. **Canvas-** Canvas is a learning management system that creates dynamic and captivating classes with conversations, multimedia, assignments, tests, and announcements.

Teachers use Canvas to effectively manage and arrange course materials, such as readings, assignments, multimedia resources, and syllabi. Additionally, Canvas encourages collaboration and peer learning among students by supporting collaborative activities with features like group conversations and collaborative document editing. Its utility is expanded by its ability to integrate with different educational tools and platforms, giving teachers the freedom to customize learning experiences to fit the needs of a wide range of student

7. **Seesaw-** Seesaw is a digital portfolio application that encourages cooperation and communication among students by allowing them to produce, contribute, and reflect on their educational experiences via images, videos, and drawings.

Seesaw facilitates differentiated instruction by giving teachers the freedom to design personalized tasks that address a range of learning requirements. This encourages participation and guarantees that every student's particular learning needs are satisfied. Its versatility in learning situations is further enhanced by its user-friendly interface and cross-platform accessibility, which allow for smooth integration into both conventional classrooms and distance-learning settings.

8. **Zoom-** Zoom is a platform for video conferences that includes tools for online meetings, virtual classrooms, and student-teacher collaboration on debates.

Zoom enhances learning opportunities by introducing students to a range of viewpoints and business knowledge. Zoom is a mainstay of contemporary education, enabling teachers to create dynamic and captivating learning experiences that cut over geographical barriers thanks to its adaptability, accessibility, and extensive feature set.

Fostering positive Classroom Culture

A vital component of education is classroom culture, which impacts the learning environment, affects student involvement and ultimately helps students succeed academically. Teachers need to create an environment in the classroom that promotes intellectual development, peer support, and open interaction in order to foster a positive classroom culture.

Studies indicate that a classroom setting that is welcoming and inclusive can have a big impact on a student's capacity to learn and feel like they belong (Bucholz & Sheffler, 2009).

According to Schmuck and Schmuck (1966), a positive social climate is one in which students support and encourage one another to do their best intellectual work; students share high levels of potential influence both with the teacher and with one another; there is high levels of attraction among

classmates and the group as a whole; norms are supportive of maximizing individual differences and completing academic work; and interaction is open and primarily in the manner of dialogue.

The classroom culture significantly impacts the learning environment and the intellectual, social, and emotional growth of the students. A supportive environment where students feel comfortable voicing their thoughts and opinions is one way that a great classroom culture encourages student participation. It fosters social and emotional development by fostering connections, empathy, and cooperation between peers and between kids and teachers. Strong classroom cultures encourage kids to participate fully, set higher standards, and persevere through difficulties, which supports academic progress. Furthermore, the classroom culture is essential to fostering equity and inclusion because it makes all students feel appreciated and respected, irrespective of their background. Teachers create conditions that support learning and ensure that children are ready for success in the classroom, on the social and emotional fronts, and in the long run. They do this by setting clear behavioural norms and encouraging a sense of belonging.

Personalised learning in schools Vs Personalised learning in higher education

Personalised learning in schools- In schools, personalized learning emphasizes the development of fundamental information and skills by customizing learning experiences to meet the needs of each student. By conducting preliminary evaluations of each student's ability, teachers are able to pinpoint particular deficiencies in basic knowledge and create individualized learning plans in response.

Core subject proficiency in math, language arts, social sciences, and sciences is prioritized in schools through personalized learning, which adapts education to each student's unique strengths and limitations. This method guarantees that students receive focused assistance and the opportunity to explore important ideas in depth, promoting a thorough comprehension and application of core knowledge across these vital academic subjects.

Assessments are regular and formative in personalized learning settings, intending to give continuous feedback that informs and modifies learning tactics in real-time. With this method, teachers can better adapt their training to the needs of each unique student, encouraging ongoing development and concept and skill mastery. Specifically, strengths-based individualized learning helps students identify and capitalize on their abilities so they may set meaningful goals and select learning experiences that suit their interests (McCarthy et al., 2020).

Personalised learning in higher education- Creating learning experiences that are especially suited to every university and college student's requirements, preferences, and learning styles is known as

personalized learning in higher education. Assessments in higher education are usually of summative type, with a greater emphasis on assignments, presentations, projects, research papers and practical applications. The whole purpose is to develop in depth understanding and critical thinking. According to Baepler and Murdoch, 2010 personalized learning encourages a learner-centric atmosphere where students have more control over their learning trajectories, leading to deeper comprehension and retention of the course material. Depending on their degree of "prior knowledge," students react differently to scaffolds and feedback (Bulu & Pedersen, 201).

Encouraging students of higher education to use AI for their personalised learning

1. ***Integration in curriculum***- Personalized learning with AI curriculum integration supports more general educational objectives of increasing student engagement, enhancing learning outcomes, and equipping learners for success in a fast-changing technology environment.
2. ***Awareness and Training***- Universities can enable teachers and students to use cutting-edge teaching and learning strategies by incorporating AI. This method not only improves academic results but also equips students for lifetime learning in the digital age when individualized, flexible learning opportunities are becoming more and more important.
3. ***Support and Guidance***- Through numerous cutting-edge applications, artificial intelligence (AI) plays a critical role in delivering individualized assistance in higher education.
4. ***Encouraging Exploration and Collaboration with Tech Companies***- Our students are the future members of an AI-driven society. Higher education institutions that want to equip future employees with 21st-century skills must collaborate with tech businesses. Liang and Hu (2021) discussed enhancing collaborative learning experiences in education platforms by integrating AI-driven technology like recommendation algorithms and chatbots.

Role of administration in creating effective classroom culture

In today's educational environments, the administration's role in creating a productive classroom culture reinforced through artificial intelligence (AI) is becoming increasingly important. Empirical findings suggest that implementing AI technologies that improve classroom dynamics and pupil participation is significantly dependent on administrative support. Administrators may track school dynamics in real-time with AI-driven analytics tools, identifying areas where teacher-student relations need to be improved and creating a good learning environment. AI-driven automation of organizational processes,

like scheduling, grading, and student monitoring, has great potential to revolutionize education by increasing productivity and saving up employees' time for other worthwhile endeavours.

Plethoric administrative responsibilities that result in burnout among teachers is a thoroughly studied subject in education. According to research by Maheshwari and Singh (2021), administrative responsibilities, including managing exams, keeping records, and filing compliance reports, significantly burden instructors and raise their stress and emotional tiredness levels. Reddy and Reddy (2019), claim that administrative inefficiencies and bureaucratic impediments raise the workload demands placed on Indian teachers, potentially leading to burnout symptoms like a decrease in engagement with work and job satisfaction.

Interplay of artificial intelligence, online collaborative tools and personalized learning

For modern education, the integration of online collaborative technologies, artificial intelligence, and individualized learning is essential. AI's capacity to assess data and offer tailored recommendations guarantees that instructional material successfully satisfies each student's demands. By encouraging peer-to-peer contact and group knowledge-building, collaborative platforms improve this by cultivating critical thinking and communication skills that are crucial in today's linked society. Artificial intelligence (AI) has the potential to enhance learning efficacy by tailoring instructional materials to individual student needs through the analysis of vast volumes of data. Conversely, online collaboration tools foster dynamic learning environments where students collaborate on assignments, share resources, and engage in real-time discussions. These technologies use AI algorithms to monitor development, pinpoint areas of strength, and suggest individual learning courses.

In addition to accommodating a range of learning styles, this synergy equips learners for collaborative work settings. Educators can use these components to create more engaging learning opportunities that enable students to experiment, create, and succeed, ultimately forming a more flexible and inclusive educational environment.

Conclusion

The combination of AI and collaboration tools promises to revolutionize the way higher education students are able to receive individualized instruction. In order to personalize educational experiences, this synergy makes use of AI's analytical capabilities, and collaborative platforms enable dynamic interactions and group learning. By implementing these developments, educators may enhance student engagement, better meet the needs of pupils from various backgrounds, and help students acquire the

critical thinking and problem-solving skills that are essential in today's complex world. As we navigate the coming years of education, integrating such technology promises to enhance learning outcomes and provide students with the skills they need to actively participate in their education and flourish in an age which continues to grow more and more connected and digitized.

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