

Integrating Innovative Technologies for Empowering Student-Centered Learning

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Abstract

The success of any Higher Education Institution (HEI) will be measured based on the adoption of Innovation in teaching, research and entrepreneurship. The percentage of Indian Institutions that are ranked in the global ranking is very less. The main focus of this paper is the introduction of new technologies with innovation in teaching, research and entrepreneurship to the students and faculty of HEI leading to better employability and entrepreneurship skills. Traditional methods of teaching and learning process may not suite the new millennium generation. The expectations of this generation of students are much more. Each and every day, they explore to find out new techniques and methods to solve problems. To meet out their expectations, the Higher Education Institution should adopt peer learning and mentoring, project based learning, gamification, and customized learning and monitoring strategy with futuristic technologies. This student-centered approach empowers students to build up their knowledge and enables them to think critically, work in teams and solve problems collectively.

Keywords: Project based learning; gamification; customized learning and monitoring; futuristic technologies.

1. Introduction

Student-centered learning is a method of learning or teaching that puts the learner at the centre [1]. Each student may require different ways of learning and analysing the information. Few students may require more support in deciding their learning paths and in analyzing the implications of any such choices. On the other hand, in "teacher-centered learning" environment, the teacher is center of the learning experience and takes the "active" role of teaching, while the students assume a more "passive" or receptive role. Student Centered Learning could be supplemented through various futuristic technologies to create interest in learning and involve the students in knowledge sharing with their peers. To be more specific, Artificial Intelligence is the most in demand technology that has a rapid growth in various industries like healthcare, banking, retail, etc. However, there is a tremendous potential for the application of AI technologies in education industry. AI-based learning systems would support the professors with useful information about their students' learning styles, abilities, creativity and progress. It also provides suggestions on how to customize their teaching methods to individual students' needs. For example, some students might be experiencing learning difficulties that require extra care and attention to keep up.

The traditional classroom teaching and learning is undergoing a rapid change. Digital Technology is the major factor impacting Indian education now. Introducing interactive classrooms, online assessments, personalised learning techniques and AI based platforms will revolutionise the Indian education system in 2020.

2. Methodologies

Traditional methods of teaching and learning process may not suite the new millennium generation. The expectations of this generation of students are much more. Each and every day, they explore to find out new techniques and methods to solve problems. To meet out their expectations, the Higher Education Institution should adopt peer learning and mentoring, project based learning, gamification, and customized learning and monitoring strategy with futuristic technologies. In addition to that, digital and online innovations will be used to support and enhance more interactive ways of teaching. With blended learning, online and digital technology the traditional

lectures could be replaced and classroom time can be used for interactive education experiences. Emerging evidence shows that digital technology innovations with interactive learning are successful in improving students learning [4].

2.1 *Peer Learning and Mentoring*

Peer-learning methodology focuses on promoting passionate student engagement. Peer instruction enhances the ability to encourage critical thinking, problem-solving and innovation. Peer-learning also includes Peer-correction as well where students correct each other. Peer Mentoring will be a healthy environment for knowledge sharing among the students. It also provides a platform to enhance their leadership qualities.

2.2 *Project-Based Learning through AR/VR*

Project-based Learning is a hands-on way to explore the passions and develop skills. Instead of learning the concepts theoretically, real-time projects could be provided to the students for better understanding of the concepts. Project-based learning could be made sophisticated through the adoption of Augmented Reality/Virtual Reality. In this context, a Virtual Reality classroom can create a livelihood in students learning pathway. AI, VR and AR are the realities of the future education system.

2.3 *Gamification*

Academic progress could be measured using experience points, which were inspired by video games. Students could develop their competencies through each project and receive experience points. Each completed project unlocks the next project(s); each successive project is increasingly more substantial and more high-rewarded. This gamification mindset allows all learning to be fun, while enhancing students' passion, persistence, and motivation to get to the next level.

Gamification of learning is an effective pedagogy, which maximises student motivation and engagement by integrating game elements in learning environments. Gamification can be defined as the use of game elements in non-game contexts [5]. Gamification explores dynamic elements of games; these are 1) freedom to fail, 2) feedback, 3) progression, 4) narrative and story-telling, and 5) choice. Freedom to fail is a trial and error dynamic in learning that can also allow the student to focus on the process of learning rather than the end-result. However, freedom to fail presumes no penalties for poor task performance, e.g. allowing students to resubmit assignments. Feedback is a common element in education as well as in games. In education, feedback is important in a learning process and may fulfill different roles such as to provide encouragement, advice, challenges and general confirmation in the learning process. Feedback in games, however, tends to be very frequent and targeted compared to that of feedback in education [6]. Thus, feedback as a game element can be used in education to promote frequent and targeted feedback to students. Closely related to feedback, a key feature of gamification is developing an understanding of learner progression. A typical game element is a progress bar that can be used together with a point system to inform the player about their performance and achievement throughout the game. This idea of progression, as a sequence of events, could be deployed in a course on Teaching with Technology. Progression was used to allow the student to move from one learning objective to another. Indeed, learning objectives can be organised to assist progressive skills development:

- Identifying, understanding and remembering
- Analysing, evaluating, critiquing and summarising
- Composing, creating and planning.

Narrative is what most games employ such as an overarching story of the game. The story telling forms foundational element of learning to create meaning and understanding. Providing a story as part of teaching can put learning into a realistic context. People learn facts better when these are presented as a part of a story rather than as an abstract list of bullet points [6].

The next Gamification element is Choice. In many video games, players can choose a character in the game. Furthermore, players may also choose their path through a game. This idea of choosing charactering and/ or path through a game can also be applied in non-game contexts, e.g. educational settings. The choice element can also be applied in an educational setting to open up various options to achieve identified learning objectives.

Table 1. Game elements, contexts and practical use

Game elements	Meaning in game context for players	How it can be used in a teaching and learning situation
Trial and error	Game players have multiple-lives, which allow them to play again and again	It can be used to encourage learning by allowing the student to explore a topic, make analytical decisions and be exposed to the consequences of decisions made
Feedback	Game players tend to receive frequent and targeted feedback related to their performance and/or achievements through the game	While feedback is common in teaching, the use of frequent and targeted feedback during learning (i.e. formative assessment) may enhance students motivation in a learning activity
Progression	The use of game levels or sequence of missions informs the player about their progression in a game	Can be used in teaching to inform the students about their progression, e.g. presenting students with progressive learning objectives with increased difficulty
Narrative	The overarching story that grabs hold of the player through the game	Stories (e.g. case studies or scenarios) can be used in teaching to make links between theories and realworld situations
Multiple Choice	Game players can select between various paths, including level of difficulty, when playing a game.	In a teaching situation, multiple choice can be presented to students to select a path appropriate for them in achieving their learning objectives
Role play	Game players can choose both character (who they want to be) as well as selecting a path to complete a game	In a teaching situation, students can be asked to take on different roles to encourage discussion and debate

2.4 Customized Learning and Monitoring Strategy through AI

Customized learning refers to instruction in which the pace of learning and the instructional approach are optimized for the needs of each learner. Learning objectives, instructional approaches, and instructional content (and its sequencing) may all vary based on learner needs. In addition, in personalized learning, learning activities are made available that are meaningful and relevant to learners, driven by their interests and often self-initiated. Customized learning strategy is the need of the hour. Every student needs individual attention with appropriate feedback and corrective actions. A machine-learning model could be developed for each and every student to analyze their own skillsets and provide necessary suggestions for improvements. The mapping of customized learning system along with Artificial intelligence and data science can enable a transparent growth of individuals.

Artificial Intelligence has made a remarkable stride in the education industry. AI is the new T.A. in the classroom [2].

Woolf and colleagues propose “5 AI Grand Challenges for Education” which include [3]:

1. Mentors for Every Learner – Designing and building systems that can interact with learners in natural ways and act as mentors to individuals and collaborative groups when a teacher is not available.
2. Learning 21st Century Skills – A rapid revision of what is taught and how it is presented to take advantage of evolving knowledge in a field where technology changes every few years, which includes improved and expanded competencies in modern skill areas, and research on how learner can use technology to develop these competencies.

3. Interaction Data to Support Learning – Exploring and leveraging the unique types of data available from educational settings, and the use of this data to better understand students, groups, and the settings in which they learn. Building on the work of existing fields of learning analytics (LA) and educational data mining (EDM), this must include analysis of systems thinking, critical thinking, self-regulation, and active listening, and data analysis should move across individual tutoring systems, games, classes, to evaluate students' general competencies.
4. Universal Access to Global Classrooms – Providing learning that is universal, inclusive, available any time/anywhere, and free at the point of use. Global classrooms could potentially support individuals and groups to learn remarkably better than if they were taught by a single human teacher. Recent implementations of this vision are in their infancy, where the work is becoming increasingly complex and computational.
5. Lifelong and Lifewide Learning – Learning continuously over the entirety of one's life (lifelong) and across all aspects of that life (lifewide); this includes the need not just for research on technologies that enable this, but on the very nature and process of supporting individuals in learning that is both lifelong and lifewide.

3. Discussion and Conclusions

This student-centered approach empowers students to build up their knowledge and enables them to think critically, work in teams and solve problems collectively. Students are always enthusiastic and demonstrate positive attitudes towards the student-centered learning environment. The student-centered learning approach enables students to visualize a problem with multiple perspectives and allows them to participate in their own learning process. Students are now challenged to develop skills in problem solving and to exercise analytical, critical and creative thinking in their work and are encouraged to learn more about their subjects. The role of the faculty now alters to being a facilitator and a consultant to the students, supporting them throughout their learning process, rather than just being a dictator in the entire process. Faculty should teach how to learn, how to exercise creativity, collaboration, and problem solving to tackle various challenges.

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