

Innovations in Higher Education Industry – Shaping the Future

P. S. Aithal¹ & Adithya Kumar Maiya²

¹ Professor, Institute of Management & Commerce, Srinivas University, Mangalore, India,
OrcidID: 0000-0002-4691-8736; E-mail: psaithal@gmail.com

² Research Scholar, Institute of Management & Commerce, Srinivas University, Mangalore –
575 001, India,
OrcidID: 0009-0004-2760-2471; E-mail: adithyamaaiya@gmail.com

Area of the Paper: Education Management

Type of the Paper: Exploratory Research.

Type of Review: Peer Reviewed as per [|C|O|P|E|](#) guidance.

Indexed In: OpenAIRE.

DOI: <https://doi.org/10.5281/zenodo.10396770>

Google Scholar Citation: [IJCSBE](#)

How to Cite this Paper:

Aithal, P. S. & Maiya, A. K. (2023). Innovations in Higher Education Industry – Shaping the Future. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, 7(4), 294-322. DOI: <https://doi.org/10.5281/zenodo.10396770>

International Journal of Case Studies in Business, IT and Education (IJCSBE)

A Refereed International Journal of Srinivas University, India.

Crossref DOI: <https://doi.org/10.47992/IJCSBE.2581.6942.0321>

Paper Submission: 10/11/2023

Paper Publication: 18/12/2023

© With Authors.



This work is licensed under a [Creative Commons Attribution Non-Commercial 4.0 International License](#) subject to proper citation to the publication source of the work.

Disclaimer: The scholarly papers as reviewed and published by Srinivas Publications (S.P.), India are the views and opinions of their respective authors and are not the views or opinions of the S.P. The S.P. disclaims of any harm or loss caused due to the published content to any party.

Innovations in Higher Education Industry – Shaping the Future

P. S. Aithal¹ & Adithya Kumar Maiya²

¹ Professor, Institute of Management & Commerce, Srinivas University, Mangalore, India,
OrcidID: 0000-0002-4691-8736; E-mail: psaithal@gmail.com

² Research Scholar, Institute of Management & Commerce, Srinivas University, Mangalore –
575 001, India,
OrcidID: 0009-0004-2760-2471; E-mail: adithyamaiya@gmail.com

ABSTRACT

Purpose: *The purpose is to comprehensively explore the multifaceted landscape of innovations within the higher education system. Through a systematic investigation, this study aims to introduce, define, and delineate various types of innovation prevalent in academia, spanning from policy-driven reforms to technological advancements, pedagogical evolution, stakeholder-centric approaches, and beyond.*

Methodology: *Information is collected using identified keywords using various search engines like Google, Google Scholar, and AI-based GPTs and analysed using various research analysis frameworks to identify, explore, and interpret various types of innovations under different areas of the higher education industry.*

Results/Analysis: *The paper examined the global trends, dissecting the nuances of these innovations and their impact on reshaping educational paradigms. Additionally, this research endeavoured to highlight the role of collaboration and partnership, uncovering their significance in fostering innovation, and shedding light on 'super innovations' that transcend conventional boundaries, setting new benchmarks for excellence.*

Outcome/Value: *Ultimately, the paper proposed pathways for exploratory research, emphasizing the identification of innovations, best practices, and institutional distinctiveness, with a vision to propel the evolution of higher education toward a future defined by transformative and inclusive innovation.*

Type of the paper: *Exploratory Research.*

Keywords: Innovation, Super innovation, Higher education, Higher education industry, Quality in academics, Quality in research and extension, Types of innovation in education, Collaboration and Partnership, Exploratory research.

1. INTRODUCTION :

Innovation stands as the cornerstone of progress, revolutionizing industries and reshaping societal landscapes by ushering in unprecedented advancements and transformative changes. Its essence lies in the relentless pursuit of improvement, driving industries to reimagine processes, products, and services in ways that redefine norms and elevate standards. Across industries, innovation serves as a catalyst for evolution, propelling technology to new heights, optimizing operational efficiency, and fostering the development of groundbreaking solutions. Whether it's the disruptive impact of artificial intelligence in automation, the sustainable initiatives revolutionizing renewable energy, or the fusion of technology and finance in the realm of fintech, innovation continually reshapes the competitive terrain and underpins economic growth.

However, the profound impact of innovation transcends the confines of industries, extending its influence deep into the fabric of society. It responds to pressing societal needs, addressing global challenges like climate change, healthcare accessibility, and socio-economic inequalities. Innovation fuels the creation of solutions that strive not only for profitability but also for inclusivity and sustainability, driving meaningful change that touches the lives of individuals worldwide. It is in this intersection between societal needs and innovative solutions that we witness groundbreaking

advancements, from the democratization of information through digital connectivity to the development of smart cities designed for sustainability and enhanced living standards.

In the contemporary landscape, the interplay between industries and society catalyzes innovation further. Collaborations between diverse sectors foster cross-pollination of ideas, leading to exponential growth and multifaceted solutions that address complex challenges. Moreover, the digital era has democratized innovation, empowering individuals and small entities to contribute to transformative changes previously reserved for larger corporations. This democratization not only accelerates the pace of innovation but also diversifies its sources, tapping into a broader pool of creativity and expertise to drive progress. As industries and societies continue to evolve, innovation remains the linchpin, driving synergies that propel people toward a more interconnected, sustainable, and equitable future.

In this paper, an introductory exploration of innovations in Higher Education Institutions including global trends, types, role of collaboration and partnership, and possible super innovations are analysed, evaluated and interpreted.

2. OBJECTIVES OF THE PAPER :

- (1) To introduce the concept of innovation along with its definitions.
- (2) To generate an overview of innovation in the Education industry.
- (3) To discuss the Global Trends in Educational Innovation.
- (4) To analyse types of innovation based on Driver-Impact (technology-market) strategy.
- (5) To identify and evaluate the types of Innovations in Higher Education Industry.
- (6) To explore the Role of Collaboration and partnership.
- (7) To discuss Super Innovations and its characteristics.
- (8) To propose doing further exploratory research on Innovations in the quality of Higher Education.

3. WHAT IS INNOVATION :

Innovation refers to the creation or introduction of something new or significantly improved, whether it's a product, process, method, or idea, that adds value or solves a problem in a novel way.

The outcome of Innovation is a new process, or product, or service, or application or solution. Thus, innovation is the process of creating new ideas, methods, products, or services that bring about significant positive change or address specific needs or challenges in novel ways. It involves taking existing concepts, technologies, or practices and transforming or combining them in innovative ways to create something valuable and impactful.

Some of the systematic steps to foster innovation are:

- (1) Identify a Need or Problem: Innovation often starts by recognizing a need or a problem. This can be anything from improving an existing product/service, addressing inefficiencies, or meeting unmet demands in the market or society.
- (2) Research and comprehension: Get a thorough grasp of the problem or field in which you wish to innovate. Investigate current approaches, fads, and developments in the field you are interested in. Determine any weaknesses or places that could use improvement.
- (3) Creativity and Idea Generation: Come up with ideas by letting your imagination run wild, thinking outside the box, and conducting brainstorming sessions. Promote a range of viewpoints and methods to inspire creative thought.
- (4) Prototype and Testing: To test your ideas, create MVPs, or minimal viable products. This enables you to get input, polish ideas, and recognize your project's advantages and disadvantages early on.
- (5) Iterate and Improve: Make necessary improvements to your prototypes based on test results. Iterate through your concepts, adjusting and improving as needed. This iterative procedure aids in refining and enhancing invention.
- (6) Collaboration and Diverse Perspectives: Work together, get advice from a range of sources, and foster an environment that respects opposing points of view. Environments where people feel encouraged to challenge the status quo and contribute ideas are frequently fertile ground for innovation.
- (7) Embrace Risk and Learn from Failure: Innovation involves taking risks. Embrace the possibility of failure as a learning opportunity. Failure often leads to insights that drive future success.
- (8) Adapt and Implement: Once you've refined your innovation, prepare it for implementation. Ensure scalability, sustainability, and feasibility in real-world applications.

(9) Continuous Improvement: Innovation is an ongoing process. Continuously seek ways to improve, evolve, and build upon your innovations based on changing needs, technologies, and feedback.

Hence, innovation can occur in various aspects of life, not just in products or technologies. It can apply to processes, business models, social initiatives, and more. Cultivating a mindset that embraces change, creativity, and problem-solving is key to fostering innovation.

4. INNOVATION IN EDUCATION INDUSTRY - AN OVERVIEW :

Innovation within the education industry represents a dynamic and evolving landscape, driven by a confluence of technological advancements, pedagogical research, and a commitment to redefining the learning experience. This transformative journey encompasses a multifaceted approach aimed at revolutionizing traditional educational paradigms, fostering student engagement, and preparing learners for an increasingly complex and interconnected world. There are many scholarly published papers in the field of innovations in higher education systems [1-52].

The cornerstone of innovative education is technology. The widespread adoption of digital tools and platforms has facilitated more equitable access to knowledge by allowing for customized learning experiences that cater to the specific needs of each learner. Each learner will have a unique learning path thanks to adaptive learning systems, AI-powered tutoring, and machine learning algorithms that evaluate student performance data to provide individualized feedback and dynamically modify coursework. Furthermore, the emergence of immersive simulations, augmented reality (AR), and virtual classrooms has broadened the scope of experiential learning by giving students access to dynamic and interesting learning opportunities outside of traditional classroom settings.

Innovations in education cover a wider range of educational approaches and structural modifications than only technology. Collaborative group activities, project-based learning, and flipped classroom formats all promote critical thinking, problem-solving abilities, and active engagement. In addition, incorporating interdisciplinary studies and practical applications into curricula promotes a comprehensive comprehension of ideas and equips students to handle challenging global issues.

Professional development for educators is also a focal point of educational innovation. Training programs geared towards innovative teaching methodologies, data-driven instruction, and the utilization of educational technology empower teachers to create inclusive and adaptive learning environments. Moreover, initiatives promoting teacher-student relationships, social-emotional learning, and mental health support underline the holistic approach to education, recognizing the importance of emotional well-being in the learning process.

The evolving landscape of educational innovation is characterized by its commitment to inclusivity and accessibility. Efforts to bridge the digital divide, provide equitable access to educational resources, and accommodate diverse learning styles and abilities reinforce the industry's dedication to ensuring that all learners have the opportunity to thrive. As education continues to evolve, driven by innovation, it aims not only to impart knowledge but also to cultivate adaptable skills, critical thinking abilities, and a passion for lifelong learning among students, preparing them to navigate the complexities of the future.

Innovation in education is paramount in driving progress, shaping mindsets, and preparing individuals for the complexities of the modern world. Its significance is multifaceted and pivotal in several aspects: (1) Adapting to Changing Needs: Education must evolve to meet the changing demands of society. Innovation enables educational systems to stay relevant by integrating new technologies, teaching methodologies, and interdisciplinary approaches, ensuring that learning remains engaging and pertinent.

(2) Encouraging Diverse Learners: Every person has different requirements and learning methods. Thanks to innovations in education, students can have individualized learning experiences that suit their interests, backgrounds, and skills. It encourages diversity and guarantees that every student has an equal chance to succeed.

(3) Promoting Critical Skills: Innovation places a strong emphasis on the development of critical skills in addition to academic knowledge. It fosters digital literacy, creativity, problem-solving, teamwork, and adaptability—skills necessary for success in a world that is changing quickly.

(4) Preparation for Future Challenges: The world is continually evolving, and education needs to equip learners with the tools to thrive in this dynamic landscape. Innovation prepares individuals for the

workforce by instilling not just subject expertise but also the ability to navigate uncertainty and complexity.

(5) **Catalyzing Societal Progress:** Education is a catalyst for societal change. Innovative educational approaches promote social awareness, empathy, and global citizenship, fostering a generation capable of addressing pressing societal challenges.

(6) **Encouraging Lifelong Learning:** Innovation in education instills a passion for lifelong learning. It encourages individuals to embrace continuous self-improvement, adapt to new technologies, and engage with new ideas beyond the classroom.

(7) **Driving Economic Growth:** A well-educated and skilled workforce is crucial for economic growth. Innovation in education cultivates the talents and abilities needed to drive innovation, entrepreneurship, and sustainable development in various industries.

In essence, the importance of innovation in education lies in its transformative power. It not only shapes the educational experience but also has a profound impact on society, economies, and the future of humanity by empowering individuals to navigate a complex world and contribute meaningfully to its progress.

5. GLOBAL TRENDS IN EDUCATIONAL INNOVATION :

The landscape of education is undergoing profound transformations globally, spurred by an ever-evolving amalgamation of technological advancements, socio-economic changes, and pedagogical advancements. Educational innovation is no longer confined to localized initiatives; it's a dynamic global phenomenon that reshapes learning paradigms, redefines skill development, and aims to equip learners for an interconnected and rapidly changing world. This investigatory note aims to explore and delineate the prominent trends driving educational innovation on a global scale.

(1) **Technological Integration:** One of the foremost trends in educational innovation worldwide revolves around the integration of technology in learning. From developed nations to emerging economies, the adoption of digital tools, online platforms, and educational apps is reshaping how knowledge is disseminated and acquired. The advent of artificial intelligence (AI) is revolutionizing personalized learning, offering adaptive lesson plans and individualized feedback, thereby catering to diverse learning styles and speeds. Additionally, the proliferation of mobile devices and internet accessibility has led to the democratization of education, making learning resources more accessible to remote and marginalized communities across the globe.

(2) **Shift to Competency-Based Education:** A global shift is evident towards competency-based education (CBE) that focuses on mastering specific skills and competencies rather than traditional rote memorization of information. This movement places a strong emphasis on creativity, critical thinking, problem-solving, and practical application. Curricula and assessments are being reoriented by educational institutions to test and validate these competences, thereby preparing students to meet the needs of a work market that is always changing and necessitates flexibility and varied skills.

(3) **Stressing Upskilling and Lifelong Learning:** Globally, the idea of lifelong learning is gaining traction as societies realize how important it is to continuously adapt to changing economic conditions and progress their skills in light of rapid technology breakthroughs. A culture of lifelong learning is being promoted by educational innovation, which encourages people of all ages to pursue continuing education and upskilling. With the increasing prevalence of online courses, micro-credentials, and flexible learning pathways, professionals can change careers or learn new skills without being constrained by traditional educational.

(4) **Cultural Relevance and Inclusivity:** These two aspects are becoming more and more important in educational innovation. In an effort to promote empathy, cross-cultural understanding, and global citizenship, efforts are being made to integrate various viewpoints, indigenous knowledge, and global consciousness into the curriculum. Moreover, there's a growing emphasis on inclusive education that caters to diverse learning needs, ensuring equitable access and support for students with disabilities, differing learning paces, or socio-economic challenges.

Thus, the global trends in educational innovation underscore a fundamental shift towards inclusive, technology-integrated, competency-focused, and lifelong learning-oriented approaches. These trends are not isolated phenomena but interconnected facets driving a transformative revolution in education worldwide. As these trends continue to evolve, they promise to shape a future where education is more

accessible, adaptable, and tailored to the needs of diverse learners, preparing individuals to thrive in an ever-changing global landscape.

These categories help classify innovations based on their nature, impact, and the degree of change they bring to industries, from gradual improvements to transformative changes that redefine markets and industries.

6. TYPES OF INNOVATIONS BASED IN A SPECIFIC INDUSTRY :

The Innovation Matrix is a conceptual framework that plots different types of innovation based on two key axes: the Driver of Innovation and the Impact of Innovation. Here's how these types of innovation—incremental, sustainable, radical, and disruptive—fit into this matrix:

Driver of Innovation:

This axis represents the force or motivation behind the innovation, ranging from internal factors within an organization to external influences in the market or industry.

Impact of Innovation:

This axis signifies the extent or magnitude of change brought about by the innovation, ranging from incremental changes to substantial transformations that disrupt existing norms or industries.

Types of Innovation in the Matrix:

(1) Incremental Innovation:

Driver: Often internally motivated, driven by a desire to improve existing products, processes, or services within an organization. It can stem from customer feedback, efficiency goals, or incremental advancements in technology.

Impact: Results in gradual improvements without fundamentally altering the industry landscape. It's about making small, continuous changes that enhance current offerings without radical shifts.

(2) Sustainable Innovation:

Driver: Focused on balancing economic, social, and environmental considerations. Motivated by a long-term perspective that aims to create solutions that meet present needs without compromising future generations' ability to meet theirs.

Impact: Aims for lasting positive change by addressing sustainability challenges. It seeks to bring about innovations that not only benefit the current ecosystem but also have a positive impact on the environment and society over time.

(3) Radical Innovation:

Driver: Often emerges from disruptive technologies, major shifts in market demand, or breakthrough inventions. It's characterized by a desire to create significant change, often with a focus on leapfrogging existing solutions or paradigms.

Impact: Results in substantial transformations, introducing entirely new products, services, or business models that redefine industries or create new markets.

(4) Disruptive Innovation:

Driver: Typically driven by external factors or emerging technologies that disrupt established markets, often challenging traditional business models or norms.

Impact: Highly transformative, causing major upheaval in industries by offering simpler, more affordable, or more accessible alternatives to existing products or services, thereby displacing established market leaders.

Illustrating the Matrix:

(i) Incremental innovation might lie closer to the bottom left of the matrix, representing moderate impact and internal drivers.

(ii) Sustainable innovation could be situated towards the middle-left, indicating a balanced impact and a mix of internal and external motivations.

(iii) Radical innovation may be placed towards the top-right, showcasing high impact and potentially significant external driving forces.

(iv) Disruptive innovation might be positioned towards the top-left or top-right, signifying high impact and strong external drivers leading to industry disruptions.

This matrix helps visualize and categorize various types of innovation based on their driving forces and the scale of their impact, providing insights into their characteristics and implications within different contexts.

6.1 Incremental Innovations:

Definition: Incremental innovations involve gradual improvements or advancements made to existing products, services, or processes. They aim to refine or optimize current offerings without fundamentally altering them. Enhancing software features in a mobile app, refining manufacturing processes for efficiency gains, or upgrading components in an existing product to improve performance.

Incremental innovations are small, iterative changes that improve existing products, services, or processes. In the higher education industry, the examples for incremental innovations might include:

- (1) Flipped classrooms: In this method, traditional lectures are delivered virtually, freeing up class time for group projects, debates, and problem-solving.
- (2) Adaptive learning software leverages artificial intelligence to customize training to meet the unique needs of every learner.
- (3) Online tutoring: With this option, students can receive individualized guidance from certified tutors.
- (4) Online assessment tools: With the help of these resources, students can complete tests and quizzes online and get instant feedback.
- (5) Upgrades to the Learning Management System (LMS): gradual upgrades to an already-existing LMS, such as bettering the user experience, introducing new collaborative tools, or boosting data analytics.
- (6) Curriculum Refinement: Consistently revising and modifying the content and format of courses in response to student input, market trends, or industry advancements without radically altering the pedagogical methodology.
- (7) Teaching Methodology Tweaks: Small modifications to teaching techniques, such as introducing active learning strategies or incorporating multimedia elements into lectures to improve student engagement.

6.2 Sustainable Innovations:

Definition: Sustainable innovations focus on creating solutions that address present needs without compromising the ability of future generations to meet their own needs. These innovations aim to reduce environmental impact, promote social responsibility, and ensure economic viability.

Innovations that enhance an industry's or organization's long-term viability are considered sustainable. Advancing biodegradable packaging materials, adopting eco-friendly manufacturing techniques, or developing renewable energy technology. The following are some instances of sustainable developments in the higher education sector:

- (1) Green buildings: In order to comply with green building requirements, universities are constructing or remodeling their buildings more frequently. This can result in lower energy usage and a smaller carbon impact.
- (2) Curriculum with an emphasis on sustainability: A lot of colleges now have programs and courses on sustainability, which aid in preparing students for jobs in this industry.
- (3) Research focused on sustainability: Academic institutions are also engaged in sustainability-related research, which contributes to the creation of fresh approaches to societal and environmental problems.
- (4) Campus sustainability initiatives: Academic institutions are implementing several measures to foster campus sustainability, including but not limited to composting food waste, recycling materials, and offering incentives to students who opt for public transportation.
- (5) Green Campus Initiatives: Including eco-friendly transit options, trash reduction initiatives, and energy-efficient building techniques in campus operations.
- (6) Environmental Studies Programs: These programs and courses prepare students to tackle global sustainability issues by focusing on environmental conservation, climate change mitigation, and sustainability.
- (7) Research on Renewable Energy: Provide financial support for studies that investigate sustainable technology or renewable energy sources in an effort to address environmental problems.

6.3 Radical Innovations:

Definition: Radical innovations represent significant and fundamental changes, introducing entirely new concepts, products, or processes that often disrupt industries or create new markets.

New and revolutionary concepts that present completely new goods, services, or procedures are known as radical innovations. Some radical inventions that completely changed industry and society include the emergence of electric vehicles, the internet, and personal computers. Radical innovations in the higher education sector could include:

- (1) Simulations with virtual reality (VR) and augmented reality (AR): VR and AR can be utilized to create immersive learning environments that aid in students' comprehension of difficult ideas.
- (2) Personalized instruction and feedback can be given to students via artificial intelligence (AI) tutors.
- (3) Blockchain-based educational platforms: Blockchain technology can be applied to develop transparent, safe systems for credentialing and managing student data.
- (4) Open-source textbooks: These can give pupils reasonably priced access to learning resources.
- (5) Competency-Based Education Overhaul: A full change from traditional time-based courses to competency-based models, in which students advance only after they have mastered particular skills.
- (6) Virtual Reality Learning Environments: Creating fully immersive VR learning experiences that replace traditional lectures, enabling students to explore historical events or complex concepts interactively.
- (7) Global Collaborative Research Platform: Establishing a platform that connects researchers worldwide for real-time collaboration on multidisciplinary projects, transcending geographical boundaries.

6.4 Disruptive Innovations:

Definition: Disruptive innovations are groundbreaking innovations that initially may seem inferior or niche but eventually disrupt established markets or industries by creating new value networks or markets.

Disruptive innovations are innovations that create new markets or businesses by making existing products, services, or processes obsolete. Streaming services disrupting traditional television, online marketplaces changing retail landscapes, or ride-sharing apps transforming the transportation sector are considered disruptive innovations. In the higher education industry, some of the examples of disruptive innovations might include:

- (1) Massive open online courses (MOOCs): MOOCs offer free online courses to students around the world, making higher education more accessible to a wider audience.
- (2) Micro-credentials: Micro-credentials are small, focused credentials that certify a specific skill or competency.
- (3) Income-share agreements (ISAs): ISAs allow students to pay for college after they graduate and have secured a job.
- (4) Bootcamps: Bootcamps are intensive training programs that teach students the skills they need to start a career in a particular field.
- (5) Massive Open Online Courses (MOOCs): MOOC platforms offering free or low-cost courses from prestigious institutions, disrupting traditional classroom-based education by providing access to quality education worldwide.
- (6) Blockchain-Based Credentialing: Introducing blockchain technology for secure and transparent verification of academic credentials, potentially disrupting traditional verification methods.
- (7) Micro-Credentialing and Badging: Disrupting the concept of traditional degrees by offering smaller, skill-specific certifications or badges that validate competencies more granularly.
- (8) Artificial Intelligence in Education: Leveraging AI for personalized learning experiences, adaptive assessments, and smart content delivery, transforming the way students learn and interact with educational content.

7. TYPES OF INNOVATIONS IN HIGHER EDUCATION :

- (1) Policy Based Innovations
- (2) Technological Innovations
- (3) Pedagogical Innovations
- (4) Stakeholders Perception based Innovations

- (5) Infrastructure based Innovations
- (6) Credentialing and Assessment Innovations
- (7) Access and Inclusivity Innovation
- (8) Quality related Innovations
- (9) Networking & Extension related Innovations
- (10) Research & Publication based Innovations

7.1. Policy-Based Innovations in Higher Education Industry based on Indian National Education Policy 2020:

A number of policy-based reforms were proposed under the Indian National Education Policy (NEP) 2020 with the goal of changing the country's higher education system. These innovations' salient features include the following:

(1) Multidisciplinary Approach:

- (i) The NEP places a strong emphasis on a multidisciplinary approach, enabling students to select classes from a range of fields and promoting learning that is holistic.
- (ii) Educational establishments are urged to provide greater latitude in the planning of curricula so that students can study a variety of courses and gain multidisciplinary knowledge.

(2) Various Entry-Exit Points and the Academic Credit Bank:

- (i) The policy creates an Academic Credit Bank, which enables smooth movement between schools or courses and lets students save credits they've accrued over time.
- (ii) It encourages a variety of entry and departure points for degree programs, allowing students to obtain degrees, certificates, or diplomas contingent upon meeting certain credit criteria.

(3) Promotion of Innovation and Research:

- (i) The NEP places a strong emphasis on the creation of the National Research Foundation (NRF), which will support and encourage research across a range of fields and encourage an innovative culture.
- (ii) In order to address societal issues, higher education institutions are urged to establish research ecosystems, work with business, and concentrate on applied research.

(4) Utilizing Online Education and Technology:

- (i) The strategy places a strong emphasis on encouraging online education, giving access to top-notch educational resources, and utilizing technology to improve learning experiences.
- (ii) To promote blended learning strategies, educational institutions are urged to provide strong online learning environments and support networks.

(5) Autonomy and Faculty Development:

- (i) In order to stay up to date with changing teaching techniques and technological advancements, faculty members should prioritize ongoing professional development, according to the NEP.
- (ii) To promote an environment of academic freedom, institutions are urged to provide faculty members greater latitude in developing curricula, choosing evaluation strategies, and starting new research projects.

(6) Promotion of Languages and Cultural Heritage:

- (i) The policy advocates for the preservation and promotion of regional languages and cultural heritage by offering more courses in local languages and integrating cultural studies into the curriculum.
- (ii) It supports the establishment of language institutes and cultural centers to facilitate the study and preservation of diverse linguistic and cultural traditions.

(7) Internationalization and Global Collaborations:

- (i) The NEP encourages internationalization by promoting collaborations between Indian and foreign institutions, facilitating student and faculty exchange programs, and fostering global perspectives.
- (ii) It supports joint degree programs, mutual recognition of academic qualifications, and the establishment of campuses of foreign universities in India.

These policy-based innovations outlined in the NEP 2020 aim to revamp higher education in India by promoting flexibility, innovation, research, cultural diversity, and global engagement, intending to create a more inclusive, holistic, and globally competitive higher education system.

7.2 Technological Innovations in Higher Education Industry:

Technological innovations in higher education have transformed the learning experience, making education more accessible, interactive, and personalized [53-61]. Here are some key technological innovations shaping the higher education industry:

(1) Online Learning Platforms:

(i) Platforms like Coursera, edX, and Khan Academy offer a wide range of courses, certifications, and degree programs online, allowing students to learn at their own pace from anywhere in the world.

(ii) Learning Management Systems (LMS) give educational institutions the resources they need to design and administer virtual courses, distribute materials, grade assignments, and foster teamwork. Examples of LMS include Moodle and Canvas.

(2) Adaptive Technologies for Learning:

(i) These technologies customize learning experiences through the use of algorithms and data analysis. Adaptive learning systems improve learning outcomes and increase student engagement by modifying the content and pace of education based on individual student performance.

(3) Augmented and Virtual Reality:

(i) To develop immersive learning experiences, augmented reality (AR) and virtual reality (VR) are being incorporated into higher education. Particularly in disciplines like architecture, engineering, and medicine, they enable students to engage in practical learning, investigate simulations, and connect with subjects in three dimensions.

(4) Machine Learning and AI:

(i) Machine learning algorithms and AI-powered tools help teachers in a variety of ways. Personalized tutoring is made possible, administrative chores like grading are automated, data-driven insights into student performance are provided, and adaptive learning environments are made possible.

(5) Mobile Learning Education:

(i) Mobile gadgets are now effective learning tools. Students can access educational resources on-the-go through content delivery systems, mobile-friendly learning platforms, and educational apps, which promotes continuous learning.

(6) Gamification and Interactive Tools:

(i) Gamification elements, such as badges, leaderboards, and rewards, are integrated into learning platforms to make the educational experience more engaging. Interactive tools like quizzes, simulations, and gamified learning modules enhance student participation and motivation.

(7) Big Data and Learning Analytics:

(i) Institutions use big data analytics to gather insights into student behavior, preferences, and learning patterns. Learning analytics help in identifying at-risk students, tailoring interventions, and improving instructional strategies.

(8) Open Educational Resources (OER):

(i) OER, including open textbooks, lectures, and educational materials, are freely available online. These resources reduce costs for students and educators, providing access to quality content without traditional barriers.

(9) Collaborative Learning Tools:

(i) Online collaborative tools, discussion forums, virtual group projects, and video conferencing platforms facilitate interaction and teamwork among students, fostering a sense of community and enabling peer learning.

These technological innovations are continuously evolving, shaping the future of higher education by enhancing accessibility, personalization, interactivity, and the overall quality of learning experiences.

7.3 Pedagogical Innovations in Higher Education Industry:

Pedagogical innovations in higher education focus on transforming teaching methods, learning experiences, and instructional strategies to better engage students, promote deeper understanding, and improve learning outcomes. Here are key pedagogical innovations shaping the higher education industry:

(1) Active Learning:

(i) This approach encourages students to engage in the learning process actively. It involves hands-on activities, discussions, problem-solving, and group work rather than passive listening.

(ii) Flipped classrooms, where students review content outside class and engage in discussions or activities during class, are a popular active learning approach.

(2) Problem-Based Learning (PBL):

(i) PBL shifts the focus from content delivery to problem-solving. Students work on real-world problems, applying theoretical knowledge to practical scenarios, fostering critical thinking and collaboration.

(3) Project-Based Learning (PrBL):

(i) Similar to PBL, PrBL involves students working on extended projects, often interdisciplinary, to explore complex issues, conduct research, and present solutions. It encourages creativity and independent learning.

(4) Peer Instruction:

(ii) Developed by Eric Mazur, peer instruction involves students teaching and learning from each other through discussions, debates, and collaborative problem-solving. It promotes active engagement and deeper understanding.

(5) Flipped Classroom Model:

(i) In a flipped classroom, students learn foundational content through pre-recorded lectures or materials at their own pace outside of class. Classroom time is then used for interactive discussions, activities, and application of concepts.

(6) Personalized and Adaptive Learning:

(i) Adaptive learning technologies use data and algorithms to tailor learning experiences to individual student needs. This approach adjusts content, pacing, and assessments based on students' learning styles and progress.

(7) Competency-Based Education (CBE):

(i) CBE focuses on students mastering specific skills or competencies rather than completing fixed time-based courses. Students progress upon demonstrating mastery, allowing for a more personalized learning path.

(8) Experiential Learning:

(i) This approach integrates real-world experiences, such as internships, fieldwork, simulations, or laboratory experiments, into the curriculum, bridging the gap between theory and practice.

(9) Multidisciplinary and Interdisciplinary Approaches:

(i) Emphasizing the integration of multiple disciplines, these approaches encourage students to explore connections between different fields of study, fostering a broader understanding of complex issues.

(10) Reflective Practices:

(i) Encouraging students to reflect on their learning processes, experiences, and outcomes. Reflection activities, journals, or portfolios help students consolidate learning and self-assessment.

These pedagogical innovations aim to create more engaging, student-centered learning environments that promote critical thinking, problem-solving, collaboration, and lifelong learning skills among students in higher education.

7.4 Stakeholders perception-based Innovations in Higher Education Industry:

Stakeholder perception-based innovations in higher education revolve around addressing the needs, expectations, and perspectives of various stakeholders involved in the educational ecosystem. These stakeholders include students, faculty, administrators, employers, policymakers, and the broader community. Here are innovations catering to their perceptions:

(1) Student-Centric Innovations:

(i) Personalized Learning: Tailoring educational experiences to match individual learning styles, preferences, and pace through adaptive learning technologies or flexible curriculum structures.

(ii) Career-Readiness Programs: Integrating practical skills, internships, and experiential learning opportunities to better prepare students for the job market.

(iii) Enhanced Support Services: Offering comprehensive academic advising, counseling, mental health services, and financial aid to support students' holistic well-being.

(2) Innovations Focused on Faculty and Administrators:

(i) The provision of continuous training, workshops, and resources to assist faculty in adjusting to new teaching approaches, technologies, and pedagogical advances is known as professional development opportunities.

(ii) Curriculum Design Autonomy: Giving instructors greater latitude and input in creating classes and evaluations would encourage creativity and a sense of ownership.

(iii) Simplified Administrative Procedures: Putting in place effective tools and mechanisms to relieve academics and staff of administrative duties so they may concentrate on teaching and research.

(3) Innovations with an Employer and Industry Focus:

(i) Industry-Academia Collaboration: Forming alliances with business leaders to develop curricula, provide internships, and carry out research projects to guarantee graduates possess skills that employers value.

(ii) Work-Based Learning Initiatives: Introducing co-ops, apprenticeships, or project partnerships with businesses to offer real-world experience in line with industry demands.

(4) Community-Centric Innovations and Policymakers:

(i) Policy Reforms for Equity and Access: Putting into practice laws that protect marginalized groups, encourage inclusivity, and give underprivileged populations access to education.

(ii) Community Engagement Programs: Including nearby populations in educational endeavors including outreach campaigns, neighborhood projects, or collaborations for positive social change.

(5) Technology-Driven Innovations for All Stakeholders:

(i) Enhanced Online Platforms: Providing user-friendly and feature-rich online learning environments that cater to diverse stakeholders' needs, offering interactive tools, support services, and accessibility features.

(ii) Data-Driven Decision Making: Using analytics and data to understand stakeholders' needs better, optimize educational processes, and tailor services to their preferences.

These perception-based innovations aim to create an educational ecosystem that is responsive to the needs, expectations, and aspirations of various stakeholders, ultimately improving the overall quality and effectiveness of higher education.

7.5 Infrastructure based Innovations in Higher Education Industry:

The six infrastructures of Higher Education Industry are: (i) Physical infrastructure, (ii) Digital infrastructure, (iii) Effective Teaching-Learning infrastructure, (iv) Intellectual Property Infrastructure, (v) Emotional infrastructure, and (vi) Networking infrastructure including industry and alumni [26, 42, 62-63]. The innovations under these six infrastructures in the higher education industry are:

(1) Physical Infrastructure:

(i) This encompasses buildings, classrooms, laboratories, libraries, dormitories, and other physical facilities on campuses.

(ii) Innovations in physical infrastructure involve creating modern, sustainable, and technologically equipped spaces that facilitate interactive learning, research, and student life.

(iii) Examples include smart classrooms with interactive whiteboards, collaborative spaces, energy-efficient buildings, and state-of-the-art research facilities.

(2) Digital Infrastructure:

(i) Digital infrastructure includes technology, networks, and systems supporting online learning, communication, and administrative processes.

(ii) Innovations here involve robust Learning Management Systems (LMS), high-speed internet, cloud-based tools, and digital libraries, enabling seamless access to resources, remote learning, and collaborative work.

(3) Effective Teaching-Learning Infrastructure:

(i) This infrastructure focuses on methodologies, tools, and resources that enhance teaching and learning experiences.

(ii) Innovations include adaptive learning technologies, flipped classrooms, interactive simulations, peer-to-peer learning platforms, and personalized learning pathways, promoting engagement and deeper understanding.

(4) Intellectual Property Infrastructure:

(i) This infrastructure supports the creation, protection, and utilization of intellectual property generated by faculty, researchers, and students.

(ii) Innovations involve policies, legal frameworks, and support systems for patenting, copyright, technology transfer offices, and entrepreneurship programs fostering innovation and commercialization of ideas.

(5) Emotional Infrastructure:

(i) Emotional infrastructure pertains to mental health support, counseling services, and fostering a supportive environment for students and faculty.

(ii) Innovations include mental health awareness campaigns, counseling centers, wellness programs, and initiatives promoting diversity, equity, and inclusion, ensuring the emotional well-being of the educational community.

(6) Networking Infrastructure including Industry and Alumni:

(i) This infrastructure involves partnerships, collaborations, and networks with industries, alumni, and external stakeholders.

(ii) Innovations here include industry-academia partnerships for research, internships, and job placements, robust alumni networks for mentoring and support, and engagement programs fostering strong connections between academia and various sectors.

These infrastructures play pivotal roles in creating an ecosystem conducive to holistic education, innovation, and success for students, faculty, and the broader community within higher education. Innovations within each infrastructure aim to improve efficiency, accessibility, quality, and overall experiences within the educational environment.

7.6 Credentialing and Assessment Innovations in Higher Education Industry:

Credentialing and assessment innovations in the higher education industry focus on alternative ways of recognizing and evaluating students' skills, knowledge, and competencies beyond traditional degrees and assessments. Here are details on these innovations:

(1) Micro-Credentials and Badges:

Micro-credentials are smaller, focused certifications that validate specific skills or competencies. They provide a more granular and targeted approach to showcasing expertise in a particular area.

Badges, often digital, represent achievements in specific skills or learning outcomes. They offer a visual and shareable representation of accomplishments beyond traditional grades or degrees.

(2) Alternative Assessment Methods:

(i) Moving away from traditional exams, alternative assessment methods aim to evaluate students' knowledge, skills, and abilities through diverse means:

- **Project-Based Assessment:** Students complete real-world projects, demonstrating their application of knowledge.
- **Performance Assessments:** These evaluate practical skills, often in fields like arts, engineering, or healthcare.
- **Portfolios:** Students compile a collection of their work over time to demonstrate growth and achievement in various areas.
- **Presentations and Demonstrations:** Oral presentations or practical demonstrations assess communication, problem-solving, and presentation skills.

(3) Digital and Online Proctoring:

(i) Digital proctoring tools use technology to monitor online exams, ensuring academic integrity by detecting cheating behaviours.

(ii) Remote proctoring solutions include webcam monitoring, screen recording, and AI-based algorithms to flag suspicious activities during online assessments.

(4) Competency-Based Assessment:

(i) Competency-based education assesses students based on demonstrated mastery of specific skills or competencies rather than solely on time spent in a course.

(ii) Assessments are aligned with predetermined learning objectives, and students advance upon proving proficiency in each competency.

(5) Blockchain-Based Credentialing:

(i) Blockchain technology is used to create secure, tamper-proof digital credentials, ensuring authenticity and enabling easy verification of academic achievements.

(ii) It provides a decentralized and transparent platform for storing and sharing academic credentials, enhancing trust and eliminating fraudulent certifications.

(6) Continuous and Formative Assessment:

(i) Continuous assessment involves ongoing evaluation throughout a course rather than relying solely on final exams. It provides immediate feedback to students and informs instructional adjustments.

(ii) Formative assessment techniques, such as quizzes, peer reviews, and classroom discussions, help instructors gauge student understanding and adapt teaching strategies accordingly.

These credentialing and assessment innovations aim to offer more flexibility, accuracy, and relevance in evaluating students' knowledge and skills, enabling a more comprehensive representation of their abilities beyond traditional degrees or standardized tests.

7.7 Access and Inclusivity Innovations in Higher Education Industry:

Access and inclusivity innovations in the higher education industry aim to ensure equitable opportunities for education and address barriers that hinder access for various groups. Here are details on these innovations:

(1) Financial Aid and Scholarships:

(i) Institutions offer various financial aid programs, scholarships, grants, and tuition assistance to reduce financial barriers for students from low-income backgrounds.

(ii) Need-based scholarships and merit-based awards help diverse students afford higher education.

(2) Diversity and Inclusion Programs:

(i) Initiatives promoting diversity and inclusion create a welcoming and supportive environment for underrepresented groups.

(ii) Programs include mentorship schemes, cultural clubs, diversity workshops, and campus events celebrating different cultures, genders, and backgrounds.

(3) Flexible Learning Options:

(i) Institutions offer flexible learning models, such as part-time programs, evening or weekend classes, and online education, accommodating non-traditional students, working adults, and those with family responsibilities.

(4) Accessibility Measures:

(i) Making campuses and online resources accessible to students with disabilities involves physical infrastructure modifications, digital accessibility standards, and assistive technologies.

(ii) Captioning, screen readers, braille materials, and accessible buildings ensure inclusivity for all students.

(5) Outreach and Bridge Programs:

(i) Outreach programs target underprivileged or underrepresented communities, providing educational resources, mentoring, and preparatory courses to encourage higher education participation.

(ii) Bridge programs offer additional support, remedial education, or transitional courses for students needing extra preparation before college-level studies.

(6) Global and International Experiences:

(i) Study abroad programs, exchange initiatives, and international collaborations offer opportunities for diverse cultural experiences and global learning.

(ii) Such programs expose students to diverse perspectives, fostering cultural understanding and inclusivity.

(7) Open Educational Resources (OER):

(i) OER, including freely accessible textbooks, lectures, and learning materials, reduce financial burdens and increase access to quality educational content for all students.

(ii) They eliminate the need for expensive textbooks, making education more affordable and accessible.

(8) Community College Partnerships:

(i) Collaborations between universities and community colleges create pathways for students from two-year programs to transfer to four-year institutions, enhancing access to higher education for a broader demographic.

(9) Support Services:

(i) Comprehensive student support services, including academic advising, counseling, career guidance, and mental health resources, ensure holistic support for students from diverse backgrounds.

These innovations aim to remove barriers, promote diversity, and create an inclusive environment, ensuring that all individuals, regardless of background or circumstance, have equal opportunities to access and succeed in higher education.

7.8 Quality-related Innovations in Higher Education Industry:

Quality-related innovations in the higher education industry focus on enhancing educational standards, improving learning outcomes, and ensuring excellence in teaching and research. Here are details on innovations pertaining to quality:

(1) Learning Outcome Assessment:

(i) Institutions are implementing robust assessment frameworks to measure and evaluate learning outcomes. This involves defining clear learning objectives, designing assessments aligned with these objectives, and analyzing data to assess student achievement.

(2) Quality Assurance Systems:

(ii) Quality assurance mechanisms ensure that educational programs and institutions meet established standards. Innovations in this area involve implementing accreditation processes, peer reviews, and continuous improvement strategies.

(3) Teaching Excellence and Professional Development:

(i) Institutions invest in programs that promote teaching excellence. This includes providing faculty development workshops, teaching mentorship programs, and recognition for effective teaching practices.

(ii) Innovations also involve peer observation, feedback mechanisms, and the integration of innovative teaching methodologies into professional development programs.

(4) Research and Innovation Funding:

(i) Encouraging research and innovation through funding initiatives and grants supports faculty and student research projects, leading to advancements in various fields.

(ii) Institutions are fostering a research culture by incentivizing interdisciplinary collaboration, industry partnerships, and the dissemination of research findings.

(5) Continuous Curriculum Enhancement:

(i) Curriculum innovations involve staying abreast of industry trends, updating content to meet evolving needs, and integrating emerging technologies and real-world applications into courses.

(ii) Dynamic curriculum review processes, industry advisory boards, and stakeholder input help ensure relevance and quality.

(6) Technology-Enhanced Learning:

(i) Integrating technology into teaching methodologies enhances the quality of education. Innovations include virtual labs, simulation tools, immersive learning experiences through VR/AR, and adaptive learning platforms.

(7) Quality Learning Environments:

(i) Innovations in physical and digital learning spaces create conducive environments for quality education. This includes state-of-the-art classrooms, collaborative spaces, well-equipped laboratories, and access to digital resources.

(8) Student Engagement and Support:

(i) Ensuring student success involves providing comprehensive support services, including academic advising, counseling, career guidance, and opportunities for student involvement in extracurricular activities and research projects.

(9) Feedback Mechanisms and Continuous Improvement:

Implementing robust feedback systems, such as student evaluations, surveys, and institutional assessments, helps identify areas for improvement. Institutions use this feedback for continuous enhancement of educational programs and services.

(10) Ethical and Professional Standards:

Encouraging ethical behavior and professional standards among students and faculty is crucial. Innovations include integrity policies, academic ethics courses, and codes of conduct to uphold academic integrity.

These quality-related innovations aim to raise educational standards, foster a culture of continuous improvement, and ensure that higher education institutions provide high-quality learning experiences and outcomes for students.

7.9 Networking & Extension related Innovations in Higher Education Industry: (Collaboration & Consultancy -Industry & Alumni):

Networking, especially with alumni and industry, along with extension activities, plays a crucial role in enriching the higher education experience. Here are details on innovations related to these aspects:

(1) Alumni Engagement and Networking:

(i) Alumni Mentorship Programs: Innovations involve establishing structured mentorship programs where alumni offer guidance, advice, and career support to current students.

(ii) Alumni Networks and Platforms: Online platforms and networking events connect alumni with each other and current students, fostering professional relationships, and providing career opportunities.

(iii) Alumni-Institution Collaboration: Collaborations with alumni for guest lectures, workshops, fundraising initiatives, and industry connections enrich the academic environment and support institutional development.

(2) Industry Partnerships and Networking:

(i) Internship and Placement Programs: Collaborations with industries facilitate internships, co-op programs, and job placements for students, providing real-world experience and enhancing employability.

(ii) Industry Advisory Boards: Establishing boards comprising industry leaders who offer insights, guidance, and support in aligning curricula with industry needs and trends.

(iii) Research Collaborations: Partnerships with industries promote joint research projects, technology transfer, and innovation, leading to practical applications of research outcomes.

(3) Extension Activities and Community Engagement:

(i) Community Outreach Programs: Innovations involve community engagement initiatives such as volunteer work, social impact projects, and outreach programs addressing local societal challenges.

(ii) Continuing Education and Lifelong Learning: Extension programs offer non-degree courses, workshops, and seminars to the community, catering to lifelong learners and professionals seeking skill development.

(iii) Entrepreneurship and Innovation Hubs: Establishing centers or incubators fostering entrepreneurial initiatives and innovation, connecting students, faculty, and the community with resources and mentorship.

(4) Technology-Enabled Networking and Extension:

(i) Virtual Engagement Platforms: Online platforms, webinars, and virtual conferences facilitate alumni and industry interactions, extending networking opportunities beyond physical limitations.

(ii) Digital Resource Sharing: Online repositories, webinars, and open-access materials create avenues for sharing knowledge, expertise, and resources with alumni, industry partners, and the community.

(5) Global Networking and International Collaborations:

(i) International Alumni Chapters: Establishing chapters or networks of alumni in various global locations fosters a worldwide network, providing opportunities for cross-cultural interactions and collaborations.

(ii) Global Industry Collaborations: Partnerships with international companies or organizations facilitate global perspectives, research opportunities, and cross-border innovation.

These networking and extension activities foster mutually beneficial relationships between educational institutions, alumni, industries, and the community, enriching the learning experience, promoting career readiness, and contributing to societal development.

7.10 Research & Publication based Innovations in Higher Education Industry:

Advancements in research and scholarly publication methodologies have significantly influenced the higher education industry. Here are details on innovations in this realm:

(1) Open Access Publication:

(i) Open Access Journals and Repositories: These platforms offer free access to scholarly articles, research papers, and publications, making knowledge widely accessible without subscription barriers.

(ii) Author-Pays Model and Institutional Repositories: Some institutions and journals employ an author-pays model, where authors pay publication fees, ensuring free access to readers. Institutional repositories host research outputs, including preprints, postprints, and data sets.

(2) Digital Repositories and Archives:

(i) Institutional Repositories: Universities and research institutions create digital repositories to store and disseminate research outputs, promoting visibility and accessibility.

(ii) Disciplinary Repositories: Discipline-specific repositories, like arXiv for physics or PubMed for biomedical sciences, facilitate easy access to research in particular fields.

(3) Open Peer Review and Collaborative Research:

(i) Transparent Peer Review: Some platforms encourage open peer review, where reviewer comments and author responses are visible, enhancing transparency and credibility.

(ii) Collaborative Research Platforms: Online platforms facilitate collaborative research by connecting researchers worldwide, enabling real-time collaboration and knowledge sharing.

(4) Predatory Journal Detection and Quality Assurance:

(i) Predatory Journal Detection Tools: Innovations include software and initiatives that help researchers identify predatory journals, ensuring they publish in reputable outlets.

(ii) Quality Metrics and Assessment: Tools and methodologies are developed to assess the quality and impact of research outputs, considering citations, altmetrics, and other indicators.

(5) Sharing and Managing Research Data:

(i) Data Sharing Platforms: Transparency and reproducibility are enhanced by researchers' ability to store, organize, and share research data thanks to innovations in data repositories and sharing platforms.

(ii) FAIR Principles: Data-driven research is supported by adherence to the Findable, Accessible, Interoperable, and Reusable (FAIR) principles, which guarantee the usability and lifespan of research data.

(6) Text and Data Mining:

(i) Text and Data Mining methods: Scholars analyze enormous volumes of academic literature and data to find patterns and insights by using cutting-edge text and data mining methods.

(7) Innovations in Publishing Technology:

(i) Digital Publishing Platforms: These days, publications can be rich in multimedia, have interactive elements, and offer better user experiences thanks to publishing platforms.

(ii) Mobile-Friendly Publications: More accessibility and ease of reading are made possible by formats designed for mobile devices.

(8) Alternative Impact Measurements and Altmetrics:

(i) Altmetrics Tools: Providing an alternative to traditional citations, these tools monitor internet mentions, shares, and debates about research outputs.

(ii) Social Media and Online Engagement: Researchers use these channels to interact with audiences, share research findings, and increase the impact of their work.

The democratization of information access, increased transparency and collaboration, and improved distribution and effect of academic research outputs are the goals of these advancements in research and scholarly publication.

8. ROLE OF COLLABORATION & PARTNERSHIP :

In order to promote innovation in higher education and make it more adaptable to the shifting demands of students, businesses, and society at large, collaboration and partnerships are essential. The following are some ways that partnerships and collaborations foster innovation:

(1) Diverse Viewpoints and knowledge:

Partnerships bring together people with various experiences, backgrounds, and levels of knowledge. In higher education, this can entail collaborations between academic institutions, business leaders, researchers, students, and even nonprofit or governmental groups. By combining a variety of expertise and abilities, this diversity of viewpoints stimulates original thought and leads to the development of novel solutions.

(2) Cross-disciplinary Innovation:

Collaborations between different fields or disciplines encourage the exchange of ideas. They promote the blending of several fields of knowledge, which results in creative solutions that tackle difficult issues

from several perspectives. For instance, creative solutions that combine technological know-how with ethical considerations can come from partnerships between STEM (Science, Technology, Engineering, and Mathematics) and humanities departments.

(3) Resource Sharing and Access:

Through cooperation, organizations can pool their infrastructure, resources, and knowledge. Through the pooling of intellectual resources, access to specialized facilities or technologies, and cost savings, this sharing might enable creative ventures, research, or educational initiatives that might not be possible on their own.

(4) Relevance and Application in the actual World:

Collaborations with business or community groups offer chances for academic research and education to be used in the actual world. This kind of cooperation might result in research projects, internships, or curriculum improvements that meet the demands of business, bringing education closer to the real world and encouraging a culture of applied innovation.

(5) Improved Learning Experiences:

New approaches to teaching and learning are frequently the consequence of collaborative efforts. For example, partnerships between academia and technology companies might lead to the development of new educational tools or platforms that enhance student engagement and learning outcomes.

(6) Innovation in Research and Development:

Collaborations between universities, research institutions, and industry foster innovation in research and development. These partnerships facilitate the translation of academic research into practical applications, leading to technological advancements, new discoveries, and breakthroughs that benefit society.

(7) Global Connectivity and Impact:

International partnerships in higher education enable global connectivity, allowing institutions to share best practices, cultural insights, and diverse perspectives. This global collaboration fosters a deeper understanding of global challenges and promotes innovative solutions with broader applicability.

In essence, collaboration and partnerships in higher education fuel innovation by leveraging the strengths and resources of multiple stakeholders. They encourage a culture of innovation, interdisciplinary collaboration, and a focus on practical applications, ultimately enhancing the quality and relevance of education and research.

9. CASE STUDIES OF SUCCESSFUL INNOVATIONS IN HES :

For example, two case studies innovations in HES showcasing successful innovations in higher education are depicted:

9.1 Arizona State University (ASU):

Transformative Online Learning: Arizona State University stands out for its innovative approach to online education and student success initiatives. ASU launched the Global Freshman Academy, allowing students worldwide to take online courses and pay only upon completion for academic credit. This model, designed in collaboration with edX, offers affordable and accessible education, attracting a broad and diverse student population [64].

Personalized learning initiatives were also implemented by ASU using adaptive learning technologies. They developed "Smart Sparrow," a program for adaptive learning that enables teachers to construct course materials that adapt to the demands and learning styles of each individual student. The results and engagement of the students have greatly improved because to this innovation.

Furthermore, ASU's emphasis on career development, academic counseling, and other support services for students has helped to increase retention and graduation rates. ASU has established itself as a pioneer in cutting-edge methods for higher education thanks to its all-encompassing approach to online learning and student assistance.

9.2 Minerva Schools at KGI - Reimagining the Liberal Arts Education:

KGI's Minerva Schools is a distinctive establishment that has reinvented the conventional liberal arts curriculum. Minerva is an extremely demanding undergraduate curriculum that emphasizes the

development of critical thinking, creativity, and global citizenship. It was founded on the principles of employing cutting-edge technology and an inventive instructional approach [65].

The cutting-edge curriculum at Minerva places a strong emphasis on small seminar-style classes, active learning, and applying theoretical knowledge to real-world issues. Students from all around the world can participate in lively and involved debates thanks to the "Active Learning Forum," a proprietary online platform. In order to promote global perspectives and experiences, the curriculum also incorporates global rotations, in which students live and study in various cultural centers across the globe.

The college has drawn attention for its success in preparing students for a fast changing global scene because of its emphasis on measurable learning outcomes, continuous feedback, and data-driven methods to teaching and learning. With an emphasis on global education, Minerva's inventive approach questions established higher education structures and highlights the possibilities of technology-enhanced learning.

By utilizing cutting-edge pedagogy, new technology, and student-centered ways to improve accessibility, quality, and relevance in education, Arizona State University and Minerva Schools at KGI serve as excellent examples of successful innovations in higher education. These case studies show how cutting-edge approaches may completely transform higher education, improving its efficacy, inclusivity, and alignment with the requirements of a dynamic and diverse student body.

10. SUPER INNOVATIONS :

Super innovation is a word used to characterize a particularly significant and transformative kind of innovation. It is frequently used to describe inventions that have the power to launch whole new markets or sectors or provide significant solutions to pressing worldwide issues [66-67].

Conversely, innovation is a more general phrase that encompasses the introduction of novel concepts, items, or procedures. It can include a broad spectrum of endeavours, from modest advancements to significant discoveries.

Table 1: Summary of the key differences between super innovation and innovation:

S. No.	Feature	Super Innovation	Innovation
1	Impact	Transformative and impactful	Can range from incremental to radical
2	Disruption	Typically disrupts existing industries or markets	Can be disruptive, but not always
3	Scope	Often addresses major global challenges	Can address a wide range of challenges, from small to large
4	Novelty	Often involves new technologies, approaches, or business models	Can involve new ideas, products, or processes, but not always radical

It's crucial to remember that there isn't always a direct line separating invention and hyper innovation. Innovation exists on a continuum, with certain innovations possibly existing in the middle of the two extremes. That being said, the idea of super innovation helps us comprehend the most influential and revolutionary kinds of invention.

Here are some examples of super innovation:

- (i) The development of the internet
- (ii) The invention of the transistor
- (iii) The creation of the World Wide Web
- (iv) The development of artificial intelligence
- (v) The discovery of CRISPR gene editing

All of these inventions have had a significant influence on society, and they will probably keep doing so for a very long time.

The phrase "super innovation" is not often used in the field of innovation studies, and its application might change according on the speaker or the setting. On the other hand, it may be understood as a

refined kind of innovation, signifying a remarkable or extremely influential innovation that exceeds traditional or incremental advances.

Essentially, "super innovation" may refer to innovations that are especially ground-breaking, disruptive, or transformative in nature, even though innovation normally refers to the production or application of something new or improved. These discoveries have the potential to completely change industries, establish brand-new paradigms, or cause profound changes in society.

The following outlines the possible distinctions between "super innovation" and ordinary innovation:

(1) Range and Effects:

Super innovations are usually more impactful and have a wider scope than regular innovations. They frequently result in dramatic transformations that transform entire industries, open up new markets, or modify consumer behaviour.

(2) Disturbances and Metamorphoses:

Incremental changes or enhancements to current products or processes may constitute regular innovation. Super innovation, on the other hand, frequently upends accepted conventions and paradigms and brings about revolutionary shifts that completely remodel systems.

(3) Magnitude of Change:

Super innovations, which provide innovative concepts, technologies, or processes that profoundly alter how things are done, experienced, or understood, frequently mark a major leap forward.

(4) Visibility and Recognition:

Super innovations tend to garner more attention and recognition due to their profound impact and novelty, whereas regular innovations might not receive as much widespread acknowledgment.

(5) Risk and Investment:

Super innovations might involve higher risks and substantial investments due to their ambitious nature and potential to significantly alter landscapes, requiring significant resources and efforts to develop and implement.

While innovation encompasses a broad spectrum of advancements, super innovation could be considered an extraordinary subset characterized by its revolutionary nature, extensive impact, and transformative potential. However, it's important to note that the term might be subjective and context-dependent, varying in its interpretation and usage across different contexts or industries.

10.1 Super Innovations in Higher Education:

(1) Education for a Better World:

- Brain-Computer Interface Learning: Develop personalized, adaptive learning based on real-time brain activity feedback, optimizing for individual student needs.
- Immersive Global Learning: Create a mixed reality experience blending virtual and physical environments for collaborative, intercultural education, fostering empathy and global understanding.
- AI-powered Mentorship: Use AI-powered coaching tools that personalize guidance, providing student support and career development suggestions around the clock.

(2) Democratizing Access and Efficiency:

- Micro-credentialing Revolution: Reimagine qualifications through modular micro-degrees focused on specific skills, enabling lifelong, adaptable learning pathways.
- Decentralized Educational Platforms: Build a blockchain-powered educational ecosystem for transparent, secure student data and credential management.
- AI-driven Adaptive Systems: Craft personalized student journeys through adaptive learning platforms that dynamically adjust to individual progress and interests.

(3) Building the Workforce of the Future:

- Immersive Metaverse simulations: Design realistic virtual internship experiences in diverse fields, bridging the gap between theoretical knowledge and practical skills.
- AI-powered Skills Forecasting: Advise students on in-demand skills based on predictive AI models analyzing job market trends and future skills requirements.
- Transdisciplinary Collaboration Hubs: Integrate various disciplines for collaborative, problem-solving projects, fostering critical thinking and innovative approaches.

(4) Reimagining Research and Development:

- Open-source Research Collaboration Platforms: Facilitate global research collaboration through open-source platforms for knowledge sharing and real-time co-creation of research projects.
- AI-powered Scientific Discovery Systems: Accelerate knowledge discovery with intelligent algorithms that analyze large datasets, propose hypotheses and guide research efforts.
- Global Research Crowdfunding Initiatives: Using blockchain-powered crowdfunding platforms, democratize research financing for community-driven projects.
- These are but a few concepts to get people talking and thinking. It's critical to keep in mind that hyper innovation is a continuous process that calls for experimentation, teamwork, and a willingness to question the status quo. Together, we can design a system of higher education that has a truly revolutionary and significant influence.

10.2 Characteristics of Super Innovations:

Super innovation is generally seen as a more radical and aspirational type of innovation. It frequently has the following characteristics:

- (1) It is disruptive: Super innovation frequently upends already-existing markets or sectors and sometimes even sparks the development of brand-new ones.
- (2) It is transformative: Super innovation possesses the capacity to yield transformative effects on society by providing solutions to pressing global issues.
- (3) It's radical: Super innovation frequently incorporates novel technology, strategies, or business models.

10.3 How to Achieve Super Innovations in the Higher Education Industry:

In the higher education sector, "super innovations" need creating an atmosphere that promotes groundbreaking discoveries, revolutionary adjustments, and paradigm shifts. Some way to go about it include:

(1) Foster an Innovative Culture:

- (i) Promote among educators, students, and administrators an attitude that encourages innovation, risk-taking, and experimentation.
- (ii) Create innovation hubs, incubators, or centers inside of organizations to foster creativity, teamwork, and the generation of game-changing concepts.

(2) Embrace Interdisciplinary Collaboration:

- (i) Promote cooperation between departments and disciplines that are different from one another, creating an atmosphere where viewpoints and ideas from different domains come together to address challenging issues.
- (ii) Provide backing for interdisciplinary studies and projects that promote the integration of information from many fields.

(3) Promote Entrepreneurial Thinking:

- (i) Provide courses that foster entrepreneurial abilities, motivating instructors and students to conceive of new ideas, launch businesses, or use research in real-world contexts.
- (ii) Form alliances with venture capitalists, accelerators, or startup incubators to assist in transforming creative concepts into successful businesses.

(4) Invest in Research and Development:

- (i) Allocate resources and funding to support high-risk, high-reward research endeavors that have the potential to bring about transformative changes in education, technology, or methodologies.
- (ii) Foster a research culture that values groundbreaking discoveries and supports researchers in pursuing ambitious projects.

(5) Adopt Emerging Technologies:

- (i) Embrace and integrate emerging technologies like AI, VR/AR, blockchain, and big data analytics into educational methodologies and infrastructures.
- (ii) Explore their applications to revolutionize teaching, learning, and administrative processes.

(6) Encourage Openness and Collaboration:

- (i) Embrace open access initiatives, promoting the sharing of knowledge, research findings, and resources within the academic community and beyond.
- (ii) Collaborate with industry partners, policymakers, and other stakeholders to address societal challenges and co-create innovative solutions.

(7) Foster Student-Centric Approaches:

- (i) Empower students as active participants in the innovation process, encouraging their involvement in problem-solving, design thinking, and co-creation of educational experiences.
- (ii) Offer platforms for student-led initiatives, innovation competitions, and hackathons to encourage creativity and idea generation.

(8) Emphasize Continuous Improvement:

- (i) Implement feedback loops and mechanisms for continuous evaluation and improvement of educational practices, curriculum design, and institutional processes.
- (ii) Foster a culture that embraces adaptability and iterative improvements based on data-driven insights and stakeholder feedback.

(9) Leadership and Vision:

- (i) Encourage visionary leadership that champions innovation, sets ambitious goals, and creates a roadmap for fostering super innovations within the institution.
- (2) Align institutional strategies, policies, and resources to support and prioritize innovation efforts.

(10) Innovative Curriculum Design:

- (i) Develop interdisciplinary programs that combine fields like technology, arts, humanities, and sciences to encourage holistic learning and problem-solving.
- (ii) Offer flexible, customizable learning paths that allow students to tailor their education based on interests and career goals.

(11) Adaptive Learning and personalization:

- (i) Put in place platforms for adaptive learning that allow for tailored learning experiences by adapting instructional content to each student's unique needs.
- (ii) Modify teaching methods to get better learning outcomes by using learning analytics to comprehend student behavior.

(12) Community Engagement and Impact:

- (i) Promote a sense of social responsibility among students and teachers by getting them involved in community-based projects that deal with regional or worldwide societal issues.
- (ii) Work together with communities to jointly design educational programs that address particular needs and advance social development.

These concepts can act as springboards for organizations looking to propel major breakthroughs in higher education, creating an atmosphere that will allow for game-changing adjustments and ground-breaking discoveries. Achieving super innovations in higher education requires a holistic approach, combining a supportive culture, interdisciplinary collaboration, technological integration, and a commitment to pushing boundaries to drive significant and transformative changes within the sector.

11. OBSERVATIONS & FINDINGS :

The advancements in the quality of services within higher education across academics, administration, research, and extension are closely linked to various types of innovations. Let's delve into each type and how it contributes to enhancing different aspects of higher education:

- (1) Effect of NEP-2020: The National Education Policy of 2020, emphasizing flexibility, interdisciplinary studies, and skill-based education, has prompted universities to revamp their curriculum, assessment methods, and teaching strategies. This policy shift fosters a more holistic learning environment.
- (2) Technological Innovations: Integration of technology like online learning platforms, virtual classrooms, AI-powered grading systems, and educational apps have not only enhanced accessibility but also transformed the way students engage with course material, making education more interactive and personalized.
- (3) Pedagogical Innovations: Experimentation with flipped classrooms, project-based learning, collaborative assignments, and adaptive teaching methodologies cater to diverse learning styles, encouraging critical thinking, problem-solving, and practical application of knowledge.
- (4) Stakeholders Perception-Based Innovations: Understanding and responding to the needs and expectations of students, faculty, parents, and employers have led to improvements in course offerings, career services, counseling, and overall educational experience.

(5) Infrastructure-Based Innovations: Investments in modern infrastructure, laboratories, libraries, and upgraded facilities create an environment conducive to both learning and research, attracting quality faculty and students.

(6) Credentialing and Assessment Innovations: Implementation of competency-based assessments, digital badges, and alternative forms of credentialing recognize a wider range of skills beyond traditional academic achievements, fostering a more comprehensive evaluation of student capabilities.

(7) Access and Inclusivity Innovations: Efforts to increase access for underrepresented groups, providing scholarships, online education for remote learners, and creating inclusive policies, ensure that education reaches a broader spectrum of society.

(8) Quality-Related Innovations: Continuous quality assessment, accreditation systems, and benchmarking against global standards enforce accountability and encourage universities to strive for excellence in teaching, research, and administration.

(9) Networking & Extension Related Innovations (Collaboration & Consultancy - Industry & Alumni): Collaborations with industries, alumni networks, and consulting firms facilitate real-world exposure, internships, research partnerships, and job placements, bridging the gap between academia and industry requirements.

(10) Research & Publication-Based Innovations: Encouraging and supporting research through funding, collaborations, and providing platforms for publication not only enhances the reputation of the institution but also contributes significantly to the academic community and society at large.

These innovations collectively contribute to a more dynamic, inclusive, and effective higher education ecosystem, fostering the growth and development of students, faculty, and the broader society.

12. SUGGESTIONS :

Some recommendations for conducting research on quality in higher education through innovations and super innovations in academics, administration, research, and extensions include:

(1) Comprehensive Case Studies:

(i) Conduct in-depth case studies on institutions known for pioneering innovations in each domain (academics, administration, research, extensions).

(ii) Analyze the implementation, impact, and sustainability of these innovations on enhancing educational quality.

(2) Mixed-Methods Approach:

(i) Utilize a mixed-methods approach involving qualitative and quantitative research methodologies.

(ii) Combine surveys, interviews, focus groups, and data analysis to capture diverse perspectives and measure the effectiveness of innovations.

(3) Identification of Super Innovations:

(i) Identify 'super innovations'—those game-changing practices with exceptional impact across multiple areas (academics, administration, research, extensions).

(ii) Evaluate their scalability, transferability, and potential for revolutionizing higher education quality.

(4) Benchmarking Best Practices:

(i) Develop a benchmarking framework based on identified best practices in each segment (academics, administration, research, extensions).

(ii) Compare institutions across various regions and contexts to establish benchmarks for quality-driven innovation.

(5) Distinctiveness Assessment:

(i) Assess the unique characteristics that define institutional distinctiveness in fostering and implementing innovations.

(ii) Investigate cultural, structural, and leadership aspects that contribute to sustained innovation and quality enhancement.

(6) Impact Evaluation Metrics:

(i) Devise metrics to evaluate the direct impact of innovations on educational quality, such as student retention, graduation rates, academic performance, and employability.

(ii) Gauge the societal impact of research and extension programs initiated by innovative practices.

(7) Stakeholder Engagement:

(i) Engage diverse stakeholders—students, faculty, administrators, alumni, industry partners—in the research process.

(ii) Collect feedback, insights, and recommendations from these stakeholders to ensure a holistic understanding of the impact of innovations on education quality.

(8) Longitudinal Studies:

(i) Conduct longitudinal studies to track the evolution and sustainability of innovations over time.

(ii) Monitor how institutions adapt and refine innovations, identifying factors contributing to their longevity and success.

(9) Policy Recommendations:

(i) Translate research findings into actionable policy recommendations for educational policymakers, regulatory bodies, and institutional leaders.

(ii) Advocate for policies that encourage a culture of innovation and support the adoption of best practices in higher education.

(10) Dissemination and Collaboration:

(i) Disseminate research findings through conferences, publications, and collaborative platforms to encourage knowledge sharing and collaboration among institutions.

(ii) Foster a community of practice around innovative approaches to enhance education quality.

By implementing these recommendations, the research can effectively identify, evaluate, and disseminate insights into innovations, best practices, and institutional distinctiveness in fostering quality improvements across various facets of higher education.

13. CONCLUSION :

Innovations in the higher education industry stand as the pivotal force shaping the future landscape of learning and knowledge dissemination. Throughout this exploration, many facets of innovation are examined, analysed and investigated its different manifestations and their significant effects on higher education. These innovations collectively create a tapestry of progress within educational paradigms, ranging from policy-driven reforms like the NEP 2020 to the transformative potential of technological advancements, pedagogical evolution, and stakeholder-centric methods.

Global trends highlight a time when partnerships and collaborations serve as the cornerstones of innovation, with educational institutions joining forces with business, alumni, and communities to close gaps, improve curriculum, and improve student experiences. Furthermore, among this colourful tapestry of invention, "super innovations" stand out as transformative forces that go beyond specific fields to reshape the foundation of higher learning. These innovative approaches demonstrate adaptability, scalability, and a remarkable ability to completely change the educational landscape and establish new standards for excellence.

The need for exploratory research on advances in the quality of higher education is still very much in need as we move forward. It challenges us to go farther, to examine, to recognize, and to support the greatest practices that uplift organizations and promote unique learning opportunities. It goes beyond simple investigation and extends an invitation to take action, such as converting research results into laws, fostering partnerships, and creating an environment in education that values creativity, diversity, and ongoing improvement. Essentially, today's advancements in higher education are about creating a future where learning has no boundaries, innovation fosters unending progress, and excellence is accepted as the standard rather than merely influencing it.

REFERENCES :

- [1] White, S. C., & Glickman, T. S. (2007). Innovation in higher education: Implications for the future. *New Directions for Higher Education*, 2007(137), 97-105. [Google Scholar](#)
- [2] Hasanefendic, S., Birkholz, J. M., Horta, H., & van der Sijde, P. (2017). Individuals in action: Bringing about innovation in higher education. *European Journal of Higher Education*, 7(2), 101-119. [Google Scholar](#)
- [3] Blass, E., & Hayward, P. (2014). Innovation in higher education; will there be a role for “the academe/university” in 2025?. *European Journal of Futures Research*, 2(1), 1-9. [Google Scholar](#)

- [4] Walder, A. M. (2014). The concept of pedagogical innovation in higher education. *Education Journal*, 3(3), 195-202. [Google Scholar](#)
- [5] Roffe, I. M. (1998). Conceptual problems of continuous quality improvement and innovation in higher education. *Quality Assurance in Education*, 6(2), 74-82. [Google Scholar](#)
- [6] Mykhailyshyn, H., Kondur, O., & Serman, L. (2018). Innovation of Education and Educational Innovations in Conditions of Modern Higher Education Institution. *Journal of Vasyl Stefanyk Precarpathian National University*, 5(1), 9-16. [Google Scholar](#)
- [7] Zhu, C. (2015). Organisational culture and technology-enhanced innovation in higher education. *Technology, Pedagogy and Education*, 24(1), 65-79. [Google Scholar](#)
- [8] Cai, Y. (2017). From an analytical framework for understanding the innovation process in higher education to an emerging research field of innovations in higher education. *The Review of Higher Education*, 40(4), 585-616. [Google Scholar](#)
- [9] Lašáková, A., Bajzíkova, L., & Dedze, I. (2017). Barriers and drivers of innovation in higher education: Case study-based evidence across ten European universities. *International Journal of Educational Development*, 55(1), 69-79. [Google Scholar](#)
- [10] Sciarelli, M., Gheith, M. H., & Tani, M. (2020). The relationship between quality management practices, organizational innovation, and technical innovation in higher education. *Quality Assurance in Education*, 28(3), 137-150. [Google Scholar](#)
- [11] Aithal, P. S., & Aithal, S. (2016). Nanotechnology innovations and commercialization—opportunities, challenges & reasons for delay. *International Journal of Engineering and Manufacturing (IJEM)*, 6(6), 15-25. [Google Scholar](#)
- [12] Aithal, P. S. (2023). How to Create Business Value Through Technological Innovations Using ICCT Underlying Technologies. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 7(2), 232-292. [Google Scholar](#)
- [13] Aithal, P. S., & Kumar, P. M. (2016). Innovations in private universities: A case of Srinivas University. *International Journal of Management, IT and Engineering*, 6(1), 250-264. [Google Scholar](#)
- [14] Aithal, P. S., & Aithal, S. (2020). Promoting Faculty and Student Centered Research and Innovation based Excellence Model to Reimage Universities. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 5(1), 24-41. [Google Scholar](#)
- [15] Aithal, P. S., & Aithal, S. (2019). Management of ICCT underlying technologies used for digital service innovation. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 4(2), 110-136. [Google Scholar](#)
- [16] Aithal, P. S., & Aithal, S. (2016). Nanotechnological innovations & business environment for Indian automobile sector: A futuristic approach. *International Journal of Scientific Research and Modern Education (IJSRME)*, 1(1), 296-30. [Google Scholar](#)
- [17] Aithal, P. S., & Aithal, S. (2015). An innovative education model to realize ideal education system. *International Journal of scientific research and management (IJSRM)*, 3(3), 2464-2469. [Google Scholar](#)
- [18] Aithal, P. S., Maiya, A. K., Aithal, S., & MD, P. (2022). Atomic Research Centres to Intensify Research—An Innovative Approach of Srinivas University, India. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 6(2), 13-35. [Google Scholar](#)
- [19] Pai, M., & Aithal, P. S. (2022). A Systematic Review on Innovation Factors and Appreciative Intelligence. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 6(1), 330-343. [Google Scholar](#)

- [20] Aithal, P. S., & Aithal, S. (2019). Transforming Society by Creating Innovators through Skill & Research Focussed Education—A Case Study of Srinivas University. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 3(1), 17-37. [Google Scholar↗](#)
- [21] Aithal, P. S. (2016). Innovations in student centric learning—A study of top business schools in India. *International Journal of Engineering Research and Modern Education (IJERME)*, 1(1), 298-306. [Google Scholar↗](#)
- [22] Aithal, P. S., & Kumar, P. M. (2015). How innovations and best practices can transform higher education institutions: A case study of SIMS. *International Journal of Management (IJM)*, 6(2), 83-98. [Google Scholar↗](#)
- [23] Aithal, P. S. (2016). Nanotechnology innovations & business opportunities: a review. *International Journal of Management, IT and Engineering*, 6(1), 182-204. [Google Scholar↗](#)
- [24] Aithal, P. S., & Aithal, S. (2023). Introducing Systematic Patent Analysis as an Innovative Pedagogy Tool/Experiential Learning Project in HE Institutes and Universities to Boost Awareness of Patent-based IPR. *International Journal of Management, Technology and Social Sciences (IJMTS)*, 8(4), 1-19. [Google Scholar↗](#)
- [25] Pradeep, M. D., Adithya, K. M., & Aithal, P. S. (2023). Indigenous Distinctive Innovations to Achieve its Vision, Priority and Thrust—A Case Study of Srinivas University. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, 7(1), 36-61. [Google Scholar↗](#)
- [26] Aithal, P. S., & Aithal, S. (2018, December). Creating Innovators through Skill & Research Focussed Education—Strategies of Srinivas University. In *Proceedings of National Conference on Advances in Information Technology, Management, Social Sciences and Education* (pp. 62-83). [Google Scholar↗](#)
- [27] Aithal, P. S., & Aithal, S. (2019). Innovation in B. Tech. Curriculum as B. Tech.(Hons) by integrating STEAM, ESEP & IPR features. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, 3(1), 56-71. [Google Scholar↗](#)
- [28] Aithal, P. S., & Aithal, S. (2015). Ideal technology concept & its realization opportunity using nanotechnology. *International Journal of Application or Innovation in Engineering & Management (IJAEM)*, 4(2), 153-164. [Google Scholar↗](#)
- [29] Aithal, P. S., & Pinto, J. (2016). Innovations in Higher Education-A new model implemented in MCA degree programme of Srinivas University. *International Journal of Scientific Research and Modern Education (IJSRME)*, 1, 275-289. [Google Scholar↗](#)
- [30] Aithal, P. S., & Aithal, S. (2019, October). Digital service innovation using ICCT underlying technologies. In *Proceedings of International Conference on Emerging Trends in Management, IT and Education* (Vol. 1, No. 1, pp. 33-63). [Google Scholar↗](#)
- [31] Pai, M., & Aithal, P. S. (2022). Influence of Appreciative Intelligence and Innovation Factors on Innovation: An Empirical Study. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 7(2), 70-84. [Google Scholar↗](#)
- [32] Aithal, P. S. (2016). Innovations in experimental learning—A study of world top business schools. *International Journal of Scientific Research and Modern Education (IJSRME)*, 1, 360-375. [Google Scholar↗](#)
- [33] Acharya, S., & Aithal, P. S. (2015). Innovations in effective management of energy using green technology. *International Journal of Conceptions on Management and Social Sciences*, 3(2), 18-22. [Google Scholar↗](#)
- [34] Aithal, P. S., & Aithal, S. (2018). Study of various general-purpose technologies and their comparison towards developing sustainable society. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 3(2), 16-33. [Google Scholar↗](#)

- [35] Aithal, P. S., & Aithal, S. (2019). Strategic Management of Universal Technologies for Redefining Productivity & Performance. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 3(2), 81-95. [Google Scholar↗](#)
- [36] Aithal, P. S., & Aithal, S. (2018, December). Fearless Innovations in Scholarly Publication in 21st Century. In *Proceedings of National Conference on Advances in Information Technology, Management, Social Sciences and Education, (2018)* (pp. 98-106). [Google Scholar↗](#)
- [37] Aithal, P. S., Maiya, A. K., & MD, P. (2022). Holistic Integrated Student Development Model & Service Delivery Model—A Best Practice of Srinivas University, India. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, 6(1), 590-616. [Google Scholar↗](#)
- [38] Aithal, S., & Aithal, P. S. (2021). Green nanotechnology innovations to realize UN sustainable development goals 2030. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 5(2), 96-105. [Google Scholar↗](#)
- [39] Aithal, P. S., & Aithal, S. (2020). Conceptual analysis on higher education strategies for various tech-generations. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 5(1), 335-351. [Google Scholar↗](#)
- [40] Aithal, S., & Aithal, P. S. (2016). Student centric learning through planned hard work—an innovative model. *International Journal of Scientific Research and Modern Education (IJSRME) ISSN (Online)*, 2455-5630. [Google Scholar↗](#)
- [41] Aithal, P. S., & Aithal, S. (2019). New Directions in Scholarly Research—Some Fearless Innovations & Predictions for 21st Century Research. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 4(1), 1-19. [Google Scholar↗](#)
- [42] Aithal, P. S., & Aithal, S. (2019). Building world-class universities: Some insights & predictions. *Building World-Class Universities: Some Insights & Predictions. International Journal of Management, Technology, and Social Sciences (IJMTS)*, 4(2), 13-35. [Google Scholar↗](#)
- [43] Aithal, P. S., & Aithal, S. (2018). Nanotechnology based Innovations and Human Life Comfortability—Are we Marching towards Immortality?. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 2(2), 71-86. [Google Scholar↗](#)
- [44] Rajasekar, D., & Aithal, P. S. (2022). Direct to Consumer using Livestream as an Innovative Marketing Medium during COVID-19. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 6(1), 77-86. [Google Scholar↗](#)
- [45] Kadaba, D. M. K., Aithal, P. S., & KRS, S. (2023). Government Initiatives and Digital Innovation for Atma Nirbhar MSMEs/SMEs: To Achieve Sustainable and Inclusive Economic Growth. *International Journal of Management, Technology, and Social Sciences (IJMTS)*, 8(1), 68-82. [Google Scholar↗](#)
- [46] Aithal, P. S., & Aithal, S. (2016). Nanotechnology innovations & business opportunities in renewable energy sector. *International Journal of Engineering Research and Modern Education (IJERME)*, 1(1), 674-692. [Google Scholar↗](#)
- [47] Harischandra, P., Shylesh, S., & Aithal, P. S. (2016). Information technology innovations in library management: a case of SIMS. *International Journal of Current Research and Modern Education (IJCRME)*, 1(1), 657-676. [Google Scholar↗](#)
- [48] Aithal, P. S. (2018, December). New Directions in Research & Innovation—A Case of a Private University. In *Proceedings of National Conference on Advances in Information Technology, Management, Social Sciences and Education, (2018)* (pp. 196-205). [Google Scholar↗](#)
- [49] Varambally, K. V. M., Aithal, P. S., & Mendon, S. (2020). Innovation in Teaching-Learning Process: An Experiment of Srinivas University. *International Journal of Case Studies in Business, IT, and Education (IJCSBE)*, 4(1), 1-7. [Google Scholar↗](#)
- [50] Aithal, P. S., & Aithal, S. (2023). Tech-Business Analytics and Its Applications in Higher Education Innovations. *Chapter, 2*, 17-42. ISBN: 978-81-19006-32-8. [Google Scholar↗](#)

- [51] Aithal, P. S., & Aithal, S. (2016). Ekalavya Model of Higher Education—An Innovation of IBM's Big Data University. *International Journal of Current Research and Modern Education (IJCRME)*, 1(2), 190-205. [Google Scholar](#)
- [52] Shenoy, V., & Aithal, P. S. (2016). Green placement—an innovative concept & strategy in campus placement model. *IRA-International Journal of Technology & Engineering*, ISSN, 2455-4480. [Google Scholar](#)
- [53] Aithal, P. S., & Aithal, S. (2022). Exploring the Role of ICCT Underlying Technologies in Environmental and Ecological Management. In *Environmental Informatics: Challenges and Solutions* (pp. 15-30). Singapore: Springer Nature Singapore. [Google Scholar](#)
- [54] Aithal, P. S. (2023). Advances and New Research Opportunities in Quantum Computing Technology by Integrating it with Other ICCT Underlying Technologies. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, 7(3), 314-358. [Google Scholar](#)
- [55] Aithal, P. S., & Aithal, S. (2020, December). Analysis of Interdependency of ICCT Underlying Technologies and Related New Research Opportunities with Special Emphasis on Cyber Security and Forensic Science. In *Proceedings of the Conference on Future Technologies of IT, Management, Education, and Social Sciences, 19th December* (pp. 171-186). [Google Scholar](#)
- [56] Aithal, P. S., & Aithal, S. (2020). Information Communication and Computation Technology (ICCT) and its Contribution to Universal Technology for Societal Transformation. *Information, Communications and Computation Technology (ICCT) The Pillar for Transformation*” edited by PK Paul et al. published by New Delhi Publishers, New Delhi, India, 1-28. [Google Scholar](#)
- [57] Aithal, P. S. (2019). Information communication & computation technology (ICCT) as a strategic tool for industry sectors. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 3(2), 65-80. [Google Scholar](#)
- [58] Aithal, P. S. (2019, October). Industrial Applications of Information Communication & Computation Technology (ICCT)—An Overview. In *Proceedings of National Conference on Recent Advances in Technological Innovations in IT, Management, Education & Social Sciences ISBN* (No. 978-81, pp. 941751-6). [Google Scholar](#)
- [59] Aithal, P. S. (2018, December). Emerging Trends in ICCT as Universal Technology for Survival, Sustainability, Differentiation, Monopoly and Development. In *Proceedings of National Conference on Advances in Information Technology, Management, Social Sciences and Education, (2018)* (pp. 130-141). [Google Scholar](#)
- [60] Aithal, P. S., & Aithal, S. (2019, October). Management of Universal Technologies & their Industry Implications. In *Proceedings of International Conference on Emerging Trends in Management, IT and Education* (Vol. 1, No. 2, pp. 318-328). [Google Scholar](#)
- [61] Bhuvana, R., & Aithal, P. S. (2020). Impact of COVID-19 on Redefining the Services of Educational Institutions using Ubiquitous Technology. *International Journal of Management, Technology and Social Sciences (IJMTS)*, 5(2), 266-282. [Google Scholar](#)
- [62] Aithal, P. S., & Aithal, S. (2023). How to Increase Emotional Infrastructure of Higher Education Institutions. *International Journal of Management, Technology and Social Sciences (IJMTS)*, 8(3), 356-394. [Google Scholar](#)
- [63] Aithal, P. S., & Aithal, S. (2019). Transforming Society by Creating Innovators through Skill & Research Focussed Education—A Case Study of Srinivas University. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 3(1), 17-37. [Google Scholar](#)
- [64] Kissel, A. (2019). University of Transformation: Michael Crow at Arizona State University. *Academic Questions*, 32(1), 66-74. [Google Scholar](#)
- [65] Parreira do Amaral, M. (2022). Imagining and Transforming Higher Education. Knowledge Production in the New Geopolitics of Knowledge. In *Geopolitical Transformations in Higher*

Education: Imagining, Fabricating and Contesting Innovation (pp. 35-51). Cham: Springer International Publishing. [Google Scholar](#)

- [66] Aithal, P. S., & Aithal, S. (2023). Super Innovation in Higher Education by Nurturing Business Leaders through Incubationship. *International Journal of Applied Engineering and Management Letters (IJAEML)*, 7(3), 142-167. [Google Scholar](#)
- [67] Aithal, P. S., & Aithal, S. (2023). Incubationship—A Systematic Analysis of Recently Announced Super Innovation in Higher Education using SWOC, ABCD, and PESTL Frameworks. *International Journal of Case Studies in Business, IT and Education (IJCSBE)*, 7(4), 48-90. [Google Scholar](#)
