Research Article

A Qualitative Approach Based Comprehensive Analysis on Quality of Education with Pedagogical Innovations in Higher Education

Sanjay Kavishwar*

Dean, Commerce and Management, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur
* **Corresponding Author Email:** sanjaykavishwar@gmail.com- **ORCID:** 0000-0001-6485-2681

Abstract:

One of the mainstays of progressing in society is higher levels of education. Because of this, and many other recent academic and technical breakthroughs, radical approaches to higher education are now possible. A number of problems, however, arise within this model concerning the potential for a direct link between innovation and the quality that students perceive in higher education. Therefore, this research aims to analyze the connection, identifying the essential features of educational innovation that affect quality, and demonstrating various practices along these lines. In order to investigate how students and academicians feel about the active learning strategies already in place, this research takes a qualitative approach. Students and academicians were the target audience for a closed-ended analysis used to gather the data. The unforeseen impact of the global pandemic on higher education has prompted a thorough reevaluation of all aspects of the current system, including how to make better use of technology in the classroom. Although it is known that bringing lessons online can be accomplished swiftly, there are significant discrepancies in early claims regarding quality, acceptance, completion, and learning. Therefore, it is essential to review the current technological pedagogical innovations and practices. This research employs an exploratory approach to analyze contemporary technical, organizational, and educational trends and difficulties in an effort to better comprehend the full scope of the problem. The development of integrated academics, with an emphasis on both research and practice to update pedagogical activities, requires significant investment if the quality of instructions and learning in higher education are to be improved. This research aims to briefly analyze the methodological techniques to check if the novel pedagogical practices are being used in higher education institutions and their impact on quality of education with their adoption.

1. Introduction

The importance of instructional innovation in Higher Education (HE) is becoming more recognized around the world. Need for 21st century skills and knowledge, changing student demographics and increased student agency, technology advancements, and a renewed focus on teaching in higher education are all factors pushing educators to experiment with new approaches to instruction [1]. To boost student quality, participation, and retention, educators have turned to novel approaches to the classroom. Active approaches employed in the classroom can be a crucial ally in this regard because they seek to enhance educational training by rethinking the conventional approach to instruction [2]. Higher Education Institutions (HEIs) and their students

work together in a dynamic system called quality in services to meet the students' needs and wants and keep the two parties satisfied [3].

Higher education 4.0 is seeking mentors, facilitators, instructors, educators, and motivators who will implement creative transgressive pedagogy practises that participate with sustainability-oriented and adaptable education rather than trying to replicate insufficient and static methods of instruction and learning that struggle with enhancing Industry 4.0 skills [4]. Factors related to the Fourth Industrial Revolution (4IR), including the need for educational institutions to meet students' learning expectations, preliminary and multifaceted approaches to education, internationalization, globalization, technological advancement, and an increase in the

HE4.0, a method of instruction that is in line with the 4IR [5], are all factors.

The classroom method has been the backbone of formal education for generations, but it requires both the teacher and the student to be physically present in the same location. However, there is a clear movement away from conventional Teaching and Learning (T&L) methods and towards contemporary pedagogical models like e-learning, blended instruction, and others. Many HEIs are interested in experimenting with different approaches to education [6]. The development of devices and software that allow for remote, online, and face-to-face pedagogy is largely responsible for this shift in the pedagogical landscape. Therefore, forward-thinking T&L practices must embrace technology and embrace innovation in the classroom [7].

Universities all throughout the world are starting to place more of an emphasis on teacher quality. More students, more scrutiny, the affordances and influence of new technologies, shifting student expectations, and a greater emphasis on the value of teaching in tandem with research have all contributed to this shift in emphasis [8]. Quality education programmes are associated with higher enrolment, greater student involvement, and higher rates of student retention and graduation. One of the hallmarks of high-quality education is an emphasis on pedagogical innovation [9]. According to the OECD Report, for instance, innovative teaching is typically a reaction to particular situations or issues and can incorporate all parts of a study programme, including content, pedagogy, student assistance, assessment, and the learning environment. It is not clear from the existing literature, however, what constitutes innovation in the classroom [10]. The pedagogical models and the procedure is shown in figure 1.

Figure 1. Pedagogical Model Flow.

When applied to higher education, innovation appears to be a shaky concept. However, a lack of definitional clarity may impede the development of useful theory and measures of innovative teaching, so research in this area is warranted. This paper reflects on a strategic research analysis programme at the institutions looking at new methods of instruction in higher education, with the goal of developing a common and precise definition of pedagogical innovation. Understanding how to most effectively encourage and promote pedagogical innovations that boost student engagement and learning was a central focus of the effort. In this article, we analyzed innovative pedagogies in higher education and their quality levels. The need of implementing pedagogical initiates and their impact is shown in figure 2.
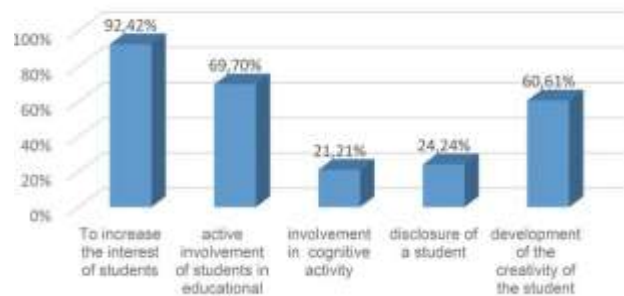

Figure 2. Need of Pedagogical Models.

In advanced countries, education plays a key role and typically advances alongside the rest of society. Innovation in higher education is thus a possibility, especially in light of the many technological and scholarly developments of recent years. A number of problems, however, arise within this framework concerning the potential for a direct link between innovation and the quality that students perceive in higher education [11]. Therefore, this article's central premise is to probe the aforementioned connection, identifying the essential features of educational innovation that affect quality and illustrating various practices [12].

Five possible or alternate definitions of the idea were suggested in the context of higher education, each of which appears to be based on one or more elements of quality.

1. Quality is an unusual occurrence, hence one definition is that it is high. If we consider the concepts of exclusivity and elitism, this may be the case. The same holds true for exemplifying qualities like excellence and performing above and beyond expectations. The framework also includes meeting or exceeding a predetermined set of standards on a regular basis.

2. Quality can be thought of as either flawlessness or uniformity. This takes place when the focus shifts from quality as an uncommon phenomenon to one in which standards must be satisfied precisely.

3. Quality as appropriateness for use or achievement of a goal.

4. Quality is viewed as a cost-benefit relationship that is connected to the definition of conformity and the accomplishment of an objective or purpose in conformity. According to this premise, the appreciation of the results in this regard is correlated with the quality of all investments made directly from the perspective of accountability.

5. The role of quality in the transforming process. This concept is related to how transformation and change are defined in pursuit of significant enhancement. However, this enhancement may pertain to the university's student body, faculty, academic year, or overall.

Higher education is said to be isomorphic if it leads to the same level of performance regardless of the individual. HEIs and the courses they offer benefit from a diverse range of perspectives, including those that take into account geographical, cultural, and economic disparities.

2. Literature Survey

According to Chen et al. [1], who investigates the ways in which the state regulates the modern higher education system, a wide range of disciplines, including state management science, sociological scholars, psychologists, and philosophers are looking to work together to make informed predictions about the future of higher education and the threats it faces. The Ukrainian society, which is going through a difficult developmental stage full of changes, emphasises issues with the field of technological innovation and identifies a variety of issues with the description of other fields, which are essential elements of the knowledge society.

According to Crook et al. [2], examples of developments in the field of contemporary college and university education include unique educational technologies, individual trials and errors, innovative curricula, modifications that determine changes to the number of learners, the order of obtaining learning, and the funding of education, as well as new approaches to learning. In another study, Glavas et al. [3] stressed the importance of synergistic linkages as an expression of educational innovation, linking it to the development of better learning tools as well as a change in the nature of the educational product. To effectively advance scientific, entrepreneurial, and other endeavours, technology encompasses all relevant information and expertise. Scholars highlight the significance of these topics and the necessity of studying them in depth and extensively, especially in light of the contemporary university system.

There is a wide range of motivations for colleges and universities to pursue and support educational experimentation. Mavri et al. [4] identified main causes for pedagogical reactions, all of which are intricate and interconnected. First, universities are rethinking what and how they educate in response to the shifting skills, knowledges, and understandings required of graduates in the 21st century. The need for degree courses with a strong focus on professional development and relevance in the workplace has increased. Graduate qualities, such as creative and critical interaction, conscientious scholarship, cognitive autonomy and integrity, and the capacity for both independent and teamwork, have become common descriptions of talents and competencies outside discipline knowledge. Many educational institutions and educators are reconsidering and giving up the lecture-based transmission methodologies of formal disciplinary-based learning that have been employed up to now to nurture these skills and competencies due to the uncertainties of the future [5]. Second, efforts to expand access to higher education around the world have altered student populations, resulting in a more ethnically and racially diverse student body.

Students who are the first in their families to attend college, those from marginalized backgrounds, and those who are returning to school later in life to pursue a different line of work all contribute to this variety [6]. Students from other countries are enrolling in greater numbers as a result of globalisation and rising incomes in countries like India, China, and Brazil, resulting in a more linguistically and culturally diverse student body that calls for a more nuanced approach to instruction. As evidenced by calls for equal treatment and student partnership in the institution and the learning process, the marketization of higher education casts students in the role of consumers. It has been suggested that including students in institutional and pedagogical decision-making can help them grow as individuals, increase their employability, and ensure they acquire the necessary skills to succeed after graduation [7].

Although there is a wealth of studies, many of them fail to agree on how to define pedagogical innovation in higher education. The purpose of the innovation is often not defined in studies or is defined in a way that is too broad. For example, games and simulations have been shown to increase student engagement and achievement, while encouraging creativity and promoting teamwork [8]. It is also common to equate innovation with the deployment of cutting-edge technological tools, which is misleading because technology can be implemented in tried-and-true pedagogical frameworks. However, other research provides narrower and more specific definitions of pedagogical innovation. For instance, based on a study of student instructors' perceptions on

innovations in higher education, Sadkovoy et al. [9] described innovative pedagogy as a method of renewal, choosing of the most relevant material, and their practical application. This definition's main ideas are that inventive instruction is linked to renewal and that something is renewed when it is consciously selected and put into practise.

These concepts are in line with Song et al.'s [10] definition of innovation, which defines it as a physical product or technique that is novel and intentional and that seeks to be beneficial. For instance, SulimA et al.'s [11] definition of innovation as changes in practise that are advantageous to the community as a whole because they generate value for its members incorporated the concept of benefit. Innovation in education, according to Vernyakhovskaya et al. [12], consists of new or evolving theories and practises of instruction, learning, and evaluation for the contemporary, technologically advanced world. After examining how innovation has been defined in higher education over the past few decades, pedagogical innovation is defined as an intentional endeavour that seeks to enhance university students' learning in a sustainable way.

Vernyakhovskaya et al. [13] who invoked the concept of constructive alignment in higher education, investigate the connection between learning outcomes, teaching-learning approaches, and the evaluation process. This methodology presupposes that lessons are planned and lessons are assessed in a way that is in line with the learning goals for that unit of study. As a result, training shifts its emphasis from imparting knowledge to facilitating growth. Curricular articulation is mentioned by Vigentini et al. [14] as a way to interconnect knowledge from different fields of knowledge in order to facilitate the acquisition, on the part of the student, of a global, integrating, and integrated knowledge. This is necessary so that the student can acquire a blend of technical and transversal abilities that will allow them to stand out in the job market. Traditional methods of instruction focusing on lecturing to pupils and having them regurgitate what they've learned have been rethought in light of the evidence that shows how ineffective they are. As a result, the roles of teacher and student have shifted: teachers no longer have all the answers, and students are no longer passive sponges for new information [15]. To promote student autonomy and active participation in the learning process, teachers in contemporary educational models take on the role of facilitator [16]. As a result, the learner is no longer a simply recipient of the sent knowledge but rather an active participant in the decisions that affect his or her education. According to Xie et al. [17], the conventional approach to education is characterized by the employment of teacher-centric, expository approaches. Pedagogical efforts in the modern classroom should focus on implementing strategies that increase student engagement. Therefore, learning should be based on the student's abilities, inspiring both independent and collaborative efforts and facilitating the growth of crucial intangibles like the capacity for teamwork. This student-centered, problem-solving approach to learning is at odds with more conventional pedagogical models because it encourages students to learn on their own initiative while also fostering their creativity and critical thinking skills. Students' prior knowledge can be taken into account in the classroom, according to Adedoyin et al. [18]. The teaching and learning process can be improved through the exchange of information between students and instructors.

3. Methodology

This examination looks at the function of creative activity as a scientific issue for the application of fresh technological advances in the classroom while taking into consideration the current higher education system. The main approach taken into account in this analysis is a combination of an analytical study of India, a developing country, and its experience in the development of cutting-edge modern technologies in institutions of higher learning in order to recognise the characteristics of the impact that they have had on the system of contemporary higher education [13]. Innovative technologies are now widely used in higher education institutions, and this has had a significant impact on how courses are taught and how students develop the professional skills they will need in the future. A thorough analysis of the characteristics of the development and implementation of innovative technological solutions in the system is required [14] in order to objectively identify the main trends within the creative growth of the contemporary system of higher education in terms of the essence, classifications, and main relevant fields of study.

Because of this, the methodology selected for this study is intended to provide the most thorough and objective description of the issues that have been raised to be taken into account in terms of a qualitative assessment of the degree to that cutting-edge innovations are being implemented in today's colleges and universities and their impact on the development of students' professional competencies [15]. In order to facilitate understanding and create the most accurate picture of the academic research, all materials gathered for inspection from sources by various researchers are offered in this study. Regarding adherence to the objectives, the methodology of this study may be judged ideal, and

the combination of materials and procedures selected as its foundation can be successfully applied to other studies in this field.

A spate of relevant conferences, essays, publications, and initiatives have been produced as a result of the revived interest in innovation in higher education that has been ignited by the advent of novel information and communication technologies (ICT). Thus, we can recognise the many facets and subjects that have been examined in this context, such as the use of ICT in the classroom, the provision of personal computers to students for note-taking and academic work, the establishment of computer labs where students can experiment with cutting-edge technologies, the replacement of traditional lectures with group projects, and the use of online learning environments for instruction [16]. To add to the continuing conversation, experts have proposed a number of reflections that are consistent with this supposition. As a result, there are two essential aspects to take into account: Innovation in higher education is defined as a collection of changes that have an impact on fundamental aspects and organising principles of university instruction. These changes can either be the result of societal evolution or of specific reflections on the fundamental purposes of higher education in society. We can say that the pedagogical project of a course or of a HEI, from its establishment to the modifications of the existing project, is the result of new social demands or new governmental policies if we take into consideration the first constitutive element of the concept, such as higher learning is understood as the set of modifications that affect key points and the foundation axes of the organisation of university teaching [17].

There are formally declared broader educational aims that include human and professional skills and competences. The same is true of modern society's expectations for its members in terms of morality, politics, and professionalism [18]. Similar changes in pedagogical initiatives and goals have led to a tendency towards curricular reorganisation and increased flexibility. The disciplines themselves have been rethought as curricular elements, to be chosen with consideration of the desired educational results, and as a source of information for the emerging practitioner. Using this framework, we are able to integrate curricular materials and activities in accordance with educational objectives, so overcoming the isolation and fragmentation of information [19-25]. However, approaches that support the attainment of the various educational objectives, motivate students to learn, and allow them to take part in the learning process have taken the place of the conventional methodology, which was primarily based on lectures. Similar to this, the growth of online activities has been made possible by the discovery of new computer, telematics, and Internet-based technologies, all the while improving the student's interaction with the teacher and fellow students. Gill et al. [26] asserted that the concept of assessment has been transformed by innovation and is now understood as formative assessment, a tool for providing feedback that motivates students to learn, contributes to their holistic development, follows them throughout the learning process, and manages to deepen and broaden the student's understanding with the aid of peers, teachers, and the student.

It is well known that for a significant amount of time, the university system has concentrated primarily on the training of professionals, on the basis of curricula that have been adapted, based to the characteristics of each environment, but without address the second element of innovation, changes that were brought about by the growth of society itself, or by specific reflections on intrinsic ideas of the mission of Higher Education in society. However, according to Khashab et al.'s[27] argument, this situation has drastically changed recently as European society as a whole has undergone a number of changes, primarily brought on by the new technological revolution in computing and telematics, which affects not only people's day-to-day lives but also fundamental aspects of university life. With the help of a questionnaire, information about five universities' educational standards and amenities is obtained, as well as the opinions of three engineering college students. The students were surveyed on a variety of topics, including the classroom amenities, their interest in learning about traditional and pedagogical initiatives, the amount of time they spent learning about cutting-edge teaching techniques, and their academic standing. To learn more about the instructional resources available at the college level, the same questionnaire is used to interview engineering college students. Based on the observations, it is determined that the pedagogical models had superior improvements in the academic performance of the students and also enhanced their interest in the teaching and learning models used in the classroom. The educational institutions need to be given the resources they require to make greater use of these advances for the growth of their pupils.

4. Impact & Discussions

The necessity to upgrade the educational system with cutting-edge pedagogical models that account for the realities of Industry 4.0 highlights the significance of incorporating learning ecosystem concepts into HE 4.0. To better understand and conceptualize the dynamic, diverse, and interactive

nature of the connection between educational organizations and digitally enabled activities, the concept of a learning ecosystem has emerged. For instance, a shift in policy can cause a shift in the pedagogical model, as the rise of blended learning and other technology-facilitated pedagogical approaches has broadened the learning landscape and the mode of T&L processes. The responses of students on using various teaching learning models are shown in figure 3.
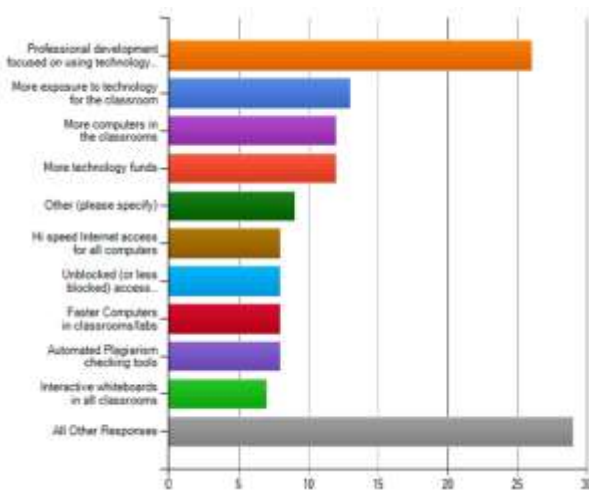

Figure 3. *Students Response in Usage of Teaching Innovations.*

The term innovation is sometimes used as a synonym for technological progress, as if the two concepts were indistinguishable. Nonetheless, there are a wide variety of forms that educational innovation can take. It is challenging to define instructional innovation in this setting. Scholastic innovation in teaching or tutoring is another name for pedagogical innovation. Introducing new methods into the classroom requires permanent, gradual improvement.

It's an innovative approach to education that goes against the grain of standard practice. Therefore, it signals a shift motivated by a short-term adjustment to instructional goals and the modern student profile. It develops from a pedagogical, intellectual, creative, psychological, and long-term reflection that links both the audience and the discipline or the technology in a multi-level and multi-impact process with the aim of improving quality in ways such as making the subject understood and fostering success. Only by the application of pedagogical thought, and more specifically via the will of the personality of a dedicated professor, can an invention in the classroom be considered educational, as opposed to technological. Different pedagogical innovations are discussed in this section that has a impact on the T&L process.

4.1 E-Learning

E-learning is an internationally acclaimed, cutting-edge T&L method. Video and audio systems, multimedia, chat room software, and conferencing software like Zoom and Microsoft Team can all be used to facilitate online education. Learning Management Systems (LMS) and software platforms like Blackboard Collaborate, Canvas, Moodle etc. are also common E-learning solutions that facilitate online communication between students and teachers. Therefore, LMSs may aid in supporting, reusing, and sharing digital learning objects created on the system, if an appropriate infrastructure is provided. Students are increasingly using their own electronic devices to study as part of the bringing device trend in E-learning made possible by the proliferation of digital learning resources. It refers to the methods of teaching and learning wherein teachers and students are separated by either time or space and therefore must rely on internet-connected electronic devices to communicate and collaborate on the T&L process. As institutions, teachers, and students continue to adapt to the new realities, the E-learning paradigm is becoming the standard, especially in the HE sector. This implies that students can tailor their education to fit their schedules and interests, opening up a world of possibilities in terms of job paths and personal aspirations. However, potential drawbacks of E-learning include the lack of human interaction, the time and money required to create and distribute E-learning tools, and the rise of technological issues that can hinder T&L. In addition, not all students will have ready access to the internet due to factors including cost, availability of facilities, or technical difficulties.

4.2 Project-Based Learning

Project-Based Learning (PBL) has become a standard T&L method all around the world. PBL is an interactive student-centered education approach characterized by student independence, constructive investigations, goal setting, teamwork, communication, and reflection on real-world activities. According to the literature on PBL, it is grounded in the following tenets: learning in context; learning with clear objectives that encourage student engagement; and learning through the collaborative construction of shared knowledge and understanding. PBL is based on the idea that students learn best when given multiple opportunities to solve real-world problems on their own through the processes of question generation, task allocation, research, data analysis, and report writing. Group work improves students' collaboration skills, test performance, and long-term content retention, and teachers can evaluate students based on their

contributions to the group's overall success. It is important to remember that Industry 4.0 necessitates an approach to problem solving that is grounded in reality, and HE 4.0 supports just that. For this reason, it's important to learn as much as possible. Some students are overbearing and would not allow for roughly equal active engagement of the project team members, which is a problem attributable to PBL based on empirical findings. But there are also those pupils who are sure of themselves and would like to push their own agendas. In such a circumstance, some students may wish to withdraw from the project. Some students' engagement could also be dampened by a lack of access to their own electronic devices.

4.3 Flipped Classrooms

Flipped Classrooms (FC) is a popular form of integrated T&L since it encourages student participation in class. Students in the FC model are responsible for acquiring all course materials independently. Meanwhile, in class, students concentrate on group discussions and assignments while the instructor leads them through a practical exercise. FC T&L is not like the conventional method of instruction in which the professor gives a lecture and the students do the lab work at home. The FC model is a type of blended learning that gives students more freedom to learn at their own speed. Students who see the lecture video before the in-class session have been shown to perform better both immediately and later on. The FC approach has some drawbacks, one of which is that it benefits most when students are self-motivated and take responsibility for their own education without being told to do so. Some students, especially those on the margins of society, may feel overwhelmed by the FC approach's emphasis on group work, despite the fact that it has been shown to boost students' self-assurance, bravery, and public speaking and presentation skills. The inability of students to express questions and receive a timely response can be an indicator of confusion and irritation, especially in the home readings. Students may make notes of their queries when reading lecture notes at home and during class sessions. Previous studies have showed that reading instructional materials before class sessions enables students to bring up issues about murky topics during the class session. The FC approach has been demonstrated to boost students' engagement, exam results, and overall long-term learning. FC also enables the teacher to address the unique needs of each student through active and flexible learning. When utilising this approach, students' interest, motivation, and contentment rise while their study anxiety falls.

4.4 Blended Learning

Blended learning (BL) is a growing trend in HEIs around the world because it integrates T&L strategies from both traditional classroom settings and online platforms. There is an increasing tendency in the use of active BL pedagogical approaches, which further enhance experimental and practical learning, with the accessibility of online learning options that enable anywhere-and-anytime learning utilizing a variety of E-learning platforms. BL is important because it allows for the complementary integration of online and distance learning with more conventional forms of teaching and learning. BL encourages students to fully engage in the learning process while also promoting academic responsibility, preparing students for a technology-centered labour market, lowering the costs of online learning, enhancing collaborative, exciting, and entertaining abilities, and more. The benefits and drawbacks of face-to-face and online T&L have led many HEIs to provide students with a variety of ways to participate in BL. Overall, traditional face-to-face instruction is the gold standard of training and development practices everywhere. Creative techno-pedagogical content knowledge has evolved as an essential part of modern T&L, complementing the continued use of traditional pedagogy. In recent years, many innovative pedagogical approaches have gained traction in HEIs around the world.

Academics working to improve the technological foundation of the educational process within the framework of the current higher education system have begun to focus on innovation activity as an issue to be solved. Traditional and cutting-edge approaches to higher education differ principally in how they employ technological means of achieving their stated aims. India's experience with integrating new technologies into higher education highlights the critical importance of graduating a specialist who can immediately contribute to the creation of cutting-edge technological solutions, successfully adjust to the demands of a given production environment, and serve as an efficient conduit for the dissemination of such solutions. To begin, the very nature of innovation as a research problem necessitates the creation and implementation of efficient mechanisms for gauging the significance of innovative technologies within the framework of contemporary higher education with regards to scientific novelty and the likelihood of influencing the establishment's scientific development through the introduction of novel ideas. This calls for an analysis of the essence, categories, and research tendencies of new technologies at today's institutions of higher learning. Figure 4 displays the various forms of cutting-edge technology employed in
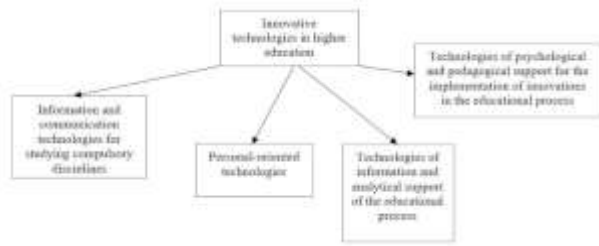
***Figure 4.** Innovative Technologies in HEIs.*

today's academic institutions. Given the current state of the higher education system, the primary goal of innovative educational technology is to improve students' ability to absorb and process knowledge. Research into the fundamentals of innovative technologies in higher education today reveals a complex information system that is constantly evolving, which has far-reaching consequences for the system of higher education and the training of future specialists able to solve problems effectively. Specialists educated at today's universities must not only be up-to-date on the newest standards in a wide range of socially relevant topics, but also prepared to contribute to their advancement. New technologies are used in today's universities, and they hold the promise of resolving long-standing problems with the quality of higher education and the preparation of tomorrow's professionals.

Nearly all activities of colleges and universities can be supported by ICT in the modern era, including the organization and management of processes, data and methodical support for automated training, access to common information resources, provision of contemporary information processing technologies, and remote interaction among course participants. ICTs can therefore be categorized as typical educational tools that need an information culture among teachers and pupils. Figure 5 shows how commonplace various ICTs are in university and college classes.
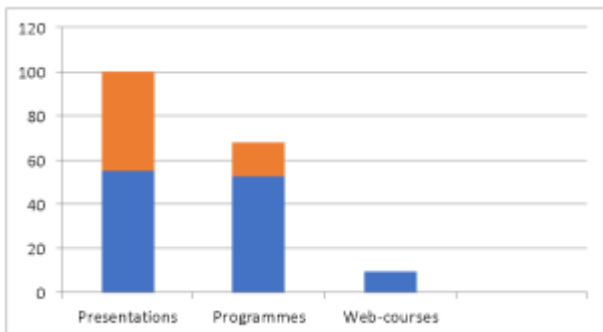

***Figure 5.** Frequency of ICT Models Used in HEIs.*

The majority of university professors use presentations on a regular basis, and another 45% use them only when absolutely necessary, as shown in figure 2. For specialized programmes, those figures are 53% and 15%, while for online courses

they are 10% and 5%, respectively. The most advanced and widely available technology for carrying out the educational process is the technology of generating a presentation, which may account for this trend. Using new pedagogical methods that take into account students' unique personalities while instructing required courses in higher education requires the creation of tailored experiential learning opportunities. When applied to higher education, the idea of innovation signifies a shift in the educational landscape. Technology for imparting mandatory subjects with a focus on developing students' personalities rests on the premise that pedagogical progress can be made through novel approaches. The qualitative analysis provides a statistics about the adoption of traditional teaching learning and usage of innovative techniques for teaching for better performance of university students. The statistics are provided in figure 6.
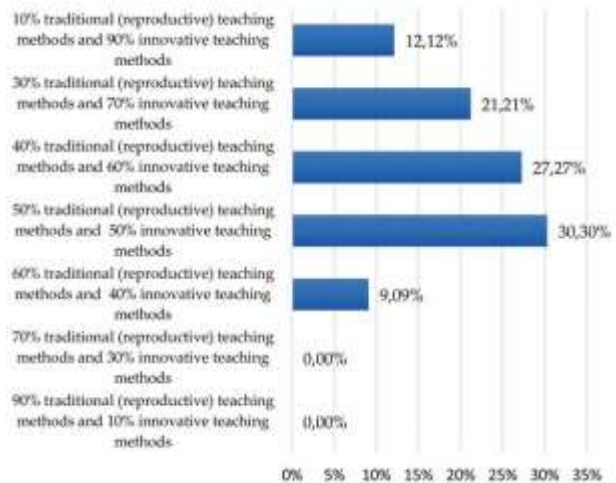

***Figure 6.** Qualitative Report on Classroom Teaching Models.*

The use of data and analysis to supplement classroom instruction type of cutting-edge technology efficiently addresses the challenges of equipping universities with the data and cutting-edge analytical tools instructors need to complete their work on time and to a high standard. When applied to higher education, the terms organization, management, and administration all revolve around information. Information transfer and analysis are at the heart of every type of educational process management. With a focus on encouraging students to think critically, imaginatively, and independently, pedagogical innovations can translate academic concepts and ideas into useful modifications to the classroom environment. The psychological and pedagogical support of cutting-edge technologies in the classroom supports the most recent executive and management structures, pedagogical programme materials, novel methodological goods, and pedagogical models. It is helpful to conceive of

innovative technologies as a collection of some of the most recent pedagogical developments in order to better comprehend how they could enhance the educational process and the way some subjects are taught.

5. Conclusion

One of the primary motivating forces behind the evolution of today's higher education system is the incorporation of cutting-edge technological innovations. It has been found that implementing cutting-edge technological solutions in India's higher education sector improves students' ability to learn and retain new information, as well as the quality of their overall academic growth. Implementing cutting-edge educational technology in India's higher education sector in light of the continent's collective experience has proven to be an effective means of addressing the twin challenges of enhancing the communicative function of the modern university's instructional process and guiding students towards the acquisition of marketable skills. The simultaneous introduction of innovative technologies in higher education calls for proper pre-training of faculty and students in order to develop their competencies necessary for the subjective growth of the features of modern technology in terms of comprehension and proper use in order to achieve practical results. This study analysis has enabled an in-depth investigation of the idea of pedagogical innovation in order to enrich the information on this subject, which continues to be quite difficult. Blended learning, project-based learning, cooperative and/or collaborative work, the use of new technology, and research-oriented methods are a few of the techniques mentioned by respondents as having an impact on education through raising knowledge levels. The findings also indicate that these approaches help students acquire global and articulated knowledge while encouraging the growth of creative thinking, critical thinking, and independent research. Even though participants appear to have varying degrees of readiness, the impact shows that the vast majority report feeling prepared or well equipped to utilize active learning approaches. Classroom design, large class sizes, and a shortage of materials are cited as reasons active learning strategies cannot be implemented. These obstacles could be overcome and active teaching strategies could be more easily used with the availability of larger classrooms that are set up to promote group work and interaction between students, as well as a bigger variety of resources. Given the significance of these practices for educational institutions, the author hopes that this research will increase readers' familiarity with active

learning methodologies within the context of higher education and encourage the creation and implementation of the innovative pedagogical approaches discussed. Moreover, the research deficit in this area of science suggests that there is still a great deal to learn.

Author Statements:

- **Ethical approval:** The conducted research is not related to either human or animal use.
- **Conflict of interest:** The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper
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References

[1] Benson, R., & Brack, C. (2010). Online learning and assessment in higher education. In *Chandos Publishing.
eBooks*. https://doi.org/10.1533/9781780631653

[2] Bortsov, Yu.S.; Starygina, A.M. (2015). *The strategy of innovative development of higher education in Russian Federation: opportunities and constraints*. Available in: https://cyberleninka.ru/article/n/strategiya-innovatsionnogo-razvitiya-vysshego-obrazovaniya-v-rossii-vozmozhnosti-i-ogranicheniya.

[3] Chen, B., Chang, Y., Ouyang, F., & Zhou, W. (2018). Fostering student engagement in online discussion through social learning analytics. *The Internet and Higher Education*. 37, 21–30. https://doi.org/10.1016/j.iheduc.2017.12.002.

[4] Crook, C.; Schofield, L. (2017).The video lecture. *The Internet and Higher Education*. 34, 56-64.

[5] Glavas, C., & Schuster, L. (2020). Design principles for electronic work integrated learning (eWIL). *The Internet and Higher Education*, *47*, 100760. https://doi.org/10.1016/j.iheduc.2020.100760.

[6] Mavri, A., Ioannou, A., & Loizides, F. (2021). Cross-organisational Communities of Practice: enhancing creativity and epistemic cognition in higher education. *The Internet and Higher Education*. 49,

100792. https://doi.org/10.1016/j.iheduc.2021.100792.

[7] Miller, I. (2000). Distance learning — a personal history. *The Internet and Higher Education.* 3(1–2), 7–21. https://doi.org/10.1016/s1096-7516(00)00030-0.

[8] Oosthoek, H. (2013). Higher education and new technologies. *Oxford: Pergamon Press.*

[9] Rambe, P., & Mlambo, S. (2014). Using digital storytelling to externalise personal knowledge of research processes: The case of a Knowledge Audio repository. *The Internet and Higher Education.* 22, 11–23. https://doi.org/10.1016/j.iheduc.2014.04.002.

[10] Rovai, A. P. (2009). The internet and higher education. In *Chandos Publishing eBooks.* https://doi.org/10.1533/9781780631622.

[11] Sadkovoy, V.P. (2014). Mechanisms of state reforming of higher professional education in Ukraine. *Actual Problems of the Humanities and Natural Sciences.* 7(2), 183-187.

[12] Song, Y., & Kong, S. C. (2016). RETRACTED: Affordances and constraints of BYOD (Bring Your Own Device) for learning and teaching in higher education: Teachers' perspectives. *The Internet and Higher Education.* 32, 39–46. https://doi.org/10.1016/j.iheduc.2016.08.004.

[13] SulimA, YE.N. Innovative processes in Ukrainian higher pedagogical education. *Domestic and Foreign Pedagogy.* 2(48), 82-91, 2018.

[14] Vernyakhovskaya, V.N. (2012) Promising forms of technology transfer in higher education. *Science and Innovation.* 6(112). 47-50.

[15] Verniakhovskaya, V. (2019). Higher education as a key component of the national innovation system. *Science and Innovations.* 5(195), 45–49. https://doi.org/10.29235/1818-9857-2019-5-45-49.

[16] Vigentini, L., Liu, D. Y., Arthars, N., & Dollinger, M. (2020). Evaluating the scaling of a LA tool through the lens of the SHEILA framework: A comparison of two cases from tinkerers to institutional adoption. *The Internet and Higher Education.* 45, 100728. https://doi.org/10.1016/j.iheduc.2020.100728.

[17] Wartman, S. A. (2015). *The Transformation of Academic Health Centers: Meeting the Challenges of Healthcare's Changing Landscape.* Elsevier Inc.

[18] Watted, A., & Barak, M. (2017). Motivating factors of MOOC completers: Comparing between university-affiliated students and general participants. *The Internet and Higher Education*, 37. 11–20. https://doi.org/10.1016/j.iheduc.2017.12.001.

[19] Xie, K., Di Tosto, G., Lu, L., & Cho, Y. S. (2018). Detecting leadership in peer-moderated online collaborative learning through text mining and social network analysis. *The Internet and Higher Education.* 38, 9–17. https://doi.org/10.1016/j.iheduc.2018.04.002.

[20] Adedoyin, O. B., & Soykan, E. (2020). Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive Learning Environments.* 31(2), 863–875. https://doi.org/10.1080/10494820.2020.1813180.

[21] Anthony, B., Kamaludin, A., Romli, A., Raffei, A. F. M., Phon, D. N. a. E., Abdullah, A., Ming, G. L., Shukor, N. A., Nordin, M. S., & Baba, S. (2019). Exploring the role of blended learning for teaching and learning effectiveness in institutions of higher learning: An empirical investigation. *Education and Information Technologies.* 24(6), 3433–3466. https://doi.org/10.1007/s10639-019-09941-z.

[22] Ashour, S. (2020). Quality higher education is the foundation of a knowledge society: where does the UAE stand? *Quality in Higher Education.* 26(2), 209–223. https://doi.org/10.1080/13538322.2020.1769263.

[23] Averill, R. M., & Major, J. (2020). What motivates higher education educators to innovate? Exploring competence, autonomy, and relatedness – and connections with wellbeing. *Educational Research.* 62(2), 146–161. https://doi.org/10.1080/00131881.2020.1755877.

[24] Carayannis, E. G., & Morawska-Jancelewicz, J. (2022). The Futures of Europe: Society 5.0 and Industry 5.0 as driving forces of future universities. *Journal of the Knowledge Economy*, 13(4). 3445–3471. https://doi.org/10.1007/s13132-021-00854-2.

[25] De Mello Silva, M. F., & De Vargas, E. R. (2021). Quality assurance systems: enemies or allies of innovation in higher education institutions? *Quality Assurance in Education.* 30(1), 1–18. https://doi.org/10.1108/qae-09-2020-011.

[26] Deshmukh, S. R. (2020). Social realities of higher education in the age of uncertainties. *SMART MOVES JOURNAL IJELLH.* 8(4), 279-289. https://doi.org/10.24113/ijellh.v8i4.10547.

[27] Evans, C., Howson, C. K., Forsythe, A., & Edwards, C. (2020). What constitutes high quality higher education pedagogical research? *Assessment & Evaluation in Higher Education.* 46(4), 525–546. https://doi.org/10.1080/02602938.2020.1790500.