Teachers' Capacity and Students' Perception about Technology: A Case in Modern Academia

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To link to this article: http://dx.doi.org/10.31841/KJSSH-7.1-2024-71

Published online: 30 June 2024

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Abstract

This study examined the visible impacts of technology on the learning process in the modern era, keeping in view the students' priorities, perceptions and teachers' capacity and determinations. This study mainly examines the participants' viewpoints about technological execution in education based on their approaches to specific concepts. Primary data were collected through semi-structured interviews with different students and teachers. Data were codified, and the main theme was calculated through content analysis with the help of predefined indicators. It was noticed that different factors (social, economic, individual, etc.) affect the importance and urgency of the said phenomenon. Being an important invention, the execution of technology in education prospects new chapters, which will be user-friendly, economical, and beyond the limits of "time and space."

Further, teachers and students should be properly trained about the available technology to build a smooth and efficient learning environment. In the modern era, educational systems must be updated regarding content, delivery, and techniques to compete in the global market. In this way, a unique direction will be provided for the new generation (both teachers and learners) to minimize technology's negative aspects and improve modern education's positive aspects.

Keywords: Education, Learning Process, Technology, Teaching Techniques.

1. Introduction

Modern life is updating quickly, and innovation is more of a concern for many people. The worldwide changing environment (working and living styles) has a visible impact on everything and, thus, on the education process. The traditional techniques in the teaching process are considered obsolete and need to be overhauled with modern blends of technological flavours. Lewitzky pointed out the importance of technology in advancing the library environment in educational systems.[1] Students can benefit in various ways from the execution of technology in education. It can help develop their professional skills, making them more rational, preparing them to cope with potential problems, and finally, helping them find a possible solution(s). More specifically, creating a virtual learning environment provides a platform for students to partake in different

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[1] Rachael A. Lewitzky, "Educating, Learning, and Growing: A Review of the Teaching Role in Academic Librarianship," *College & Undergraduate Libraries* 27, no. 1 (January 2, 2020): 32–40, https://doi.org/10.1080/10691316.2020.1714526.`

tasks, which seems more beneficial for students.[2] Therefore, it is not only beneficial for students but also for teachers and other professionals. In addition to learning, most of the daily work (routine work) has been digitalised recently. Technological advancement plays an intermediary role between human capacity and social needs. As a result, just like other commodities, society uses technical knowledge to satisfy basic needs. Collaboration with other stakeholders (especially society and enterprise) helps find innovative solutions to social issues and develop good image, reputation, and competitive edge.[3] Li, Ye, and Wong found that the phenomenon of innovation was not encountered from the same angle in all academies working in Asian countries.[4] Therefore, it is supposed that the pattern of accepting and implementing innovative techniques and modern technologies is not identical in all educational institutions, especially in developing countries. Holden et al. examined that many students opposed the arguments about technological efficiency in the learning process by claiming that it is unnecessary to conclude that higher education is always inclined to have a high dependency on technological usage.[5] Salmon identified many situations where the learning process was misguided by incorporating modern technology.[6] In addition, several stakeholders possess totally unlike or inconsistent perceptions/opinions about technological advancement.[7] Knowing how specific event(s) stimulate different ideas that can help resolve given issues is crucial.[8]

Recently, technology has become the leading personal and professional factor in modern life. It has been observed that introducing technology can bring improvement and development in academia (both for teachers and students). Although technology seems incredibly beneficial for business operations (socially and economically), it faces many hurdles in adoption and implementation within the given systems and thus needs to understand the complete process. Gregeren et al. claim that learning is beneficial for

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[2] Waleed Mugahed Al-Rahmi et al., "Use of E-Learning by University Students in Malaysian Higher Educational Institutions: A Case In Universiti Teknologi Malaysia," *IEEE Access* 6 (2018): 14268–76, https://doi.org/10.1109/access.2018.2802325..

[3] Prodromos Chatzoglou and Dimitrios Chatzoudes, "The Role of Innovation in Building Competitive Advantages: An Empirical Investigation," *European Journal of Innovation Management* 21, no. 1 (January 8, 2018): 44–69, https://doi.org/10.1108/ejim-02-2017-0015; Omar Rabeea Mahdi, Islam A. Nassar and Mahmoud Khalid Almsafir, "Knowledge Management Processes and Sustainable Competitive Advantage: An Empirical Examination in Private Universities," *Journal of Business Research* 94, no. 1 (January 2019): 320–34, https://doi.org/10.1016/j.jbusres.2018.02.013

[4] Kang Chang Li, Carmen Jiawen Ye, and Billy Tak-Ming Wong, "Learning Analytics in Higher Education Institutions in Asia," paper presented at the International Conference on Technology in Education, Hong Kong, January 9-11, 2018, 161-170.

[5] Heather Holden, Ant Ozok and Roy Rada, "Technology Use and Acceptance in the Classroom," *Interactive Technology and Smart Education* 5, no. 2 (May 16, 2008): 113–34, https://doi.org/10.1108/17415650810880772.

[6] Gilly Salmon, "Learning Innovation: A Framework for Transformation," *European Journal of Open, Distance and E-Learning* 17, no. 2 (December 1, 2014): 220–36, https://doi.org/10.2478/eurodl-2014-0031.

[7] Roelande H. Hofman, Edine Jansen and Alma Spijkerboer, "Innovations: Perceptions of Teachers and School Leaders on Bottlenecks and Outcomes," *Education as Change* 15, no. 1 (July 2011): 149–60, https://doi.org/10.1080/16823206.2011.573799; Chang Zhu, "How Innovative Are Schools in Teaching and Learning? A Case Study in Beijing and Hong Kong," *The Asia-Pacific Education Researcher* 22, no. 2 (August 29, 2012): 137–45, https://doi.org/10.1007/s40299-012-0006-4.

[8] Tony Davis, *Global Innovation and Growth Survey* (London: PriceWaterhouseCoopers, 2000). Scott G. Isaksen, William S. Aerts, and Elizabeth J. Isaksen, *Creating More Innovative Workplaces: Linking Problem-Solving Style and Organizational Climate*, A CRU Technical Report (Creativity Research Unit, 2009).

innovation and creativity.[9] It can help make academic decisions, track student progress, detect the student's potential weaknesses, and update the course contents.[10]   In this regard, it is crucial to introduce technical education from childhood (primary schools). This will help them understand basic technical education and practical applications from the beginning. Teachers should also motivate the students to use technology for educational purposes, especially to analyse and observe the complicated issues related to their studies or daily life.

In the modern technological era, traditional teaching environments and techniques are incompatible with the new generation of student's perception. They demand an instant, quick and more active environment, which is only possible with the execution of modern technologies. Recently, Scherer and Teo examined the technological importance of education by conducting a meta-analysis.[11] They highlighted scattered opinions and disseminated findings of various researchers regarding technology-oriented education with the help of the Technology Acceptance Model (TAM)-the variance of the outcome variable varies from 3% to 90%. Therefore, knowing the differences between these extreme environments and formulating plans based on teachers' and students' viewpoints is essential. In this ideal situation, society is supposed to have the knowledge and power to scrutinise the academic teaching process for better change by providing an active learning environment for students where they are willing to learn rather than forcing them to learn.[12] In the past, while introducing new technology in the education system, students were used as tools not only to learn and use the available technology but also to be tested for teaching missionaries equivalent to adults.[13]

However, the situation is changed now. The new generation has adopted the modern socio-technological system and is more convenient to live within the boundaries of the technological world. Therefore, it is not an absolute concept which varies from time to time, place to place, and person to person. In this regard, Zhu examined students' and teachers' perceptions about the level of teaching/learning innovation in various Asian schools situated in Beijing and Hong Kong. [14] It was observed that there is a visible execution of technological equipment and innovative techniques within a given context. However, the participants (both teachers and students) still perceive that the school and other teaching techniques are not innovative. This claim supports the supposition that the concept of innovation and the degree of technical advancement are subjected to and vary accordingly. In this regard, it is crucial to probe the basic grounds of such diverse choices within the given context, especially considering the importance of innovation and

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[9] Gregersen Hal, Clayton M. Christensen and Dyer Jeff, "The Innovator's DNA," *Harvard Business Review* 87, no. 12 (December 2009): 60-67.

[10] Karen D. Mattingly, Margaret C. Rice and Zane L. Berge, "Learning Analytics as a Tool for Closing the Assessment Loop in Higher Education," *Knowledge Management & E-Learning: An International Journal* 4, no. 3 (September 15, 2012): 236–47, https://doi.org/10.34105/j.kmel.2012.04.020.

[11] Ronny Scherer and Timothy Teo, "Unpacking Teachers' Intentions to Integrate Technology: A Meta-Analysis," *Educational Research Review* 27 (June 2019): 90–109, https://doi.org/10.1016/j.edurev.2019.03.001.

[12] Gerhard Fischer, Johan Lundin and J. Ola Lindberg, "Rethinking and Reinventing Learning, Education and Collaboration in the Digital Age—From Creating Technologies to Transforming Cultures," *The International Journal of Information and Learning Technology* 37, no. 5 (September 22, 2020): 241–52, https://doi.org/10.1108/ijilt-04-2020-0051.

[13] Allison Druin, "The Role of Children in the Design of New Technology," *Behaviour & Information Technology* 21, no. 1 (January 2002): 1–25, https://doi.org/10.1080/01449290110108659.

[14] Chang Zhu, "How Innovative are Schools in Teaching and Learning? A Case Study in Beijing and Hong Kong," 137–45.

technology implementation in academia. In this way, they can make a distinguished position among their competitors and cash the opportunity to be unique and innovative. Similarly, the social dynamics and other domestic forces might affect the learner's attitude and focus on the study. The longitudinal study will help determine the periodical achievement in the given field. This research was carried out to examine the nature of the learners and the features of the learning medium used in modern academia.

2. Changing Dynamics

Historically, creativity in problem-solving has not only been helpful for technological development but also essential for excelling in social life and other corporate matters. Recently, all stakeholders have been highly encouraged to implement innovative technical practices in education. Some authors have already examined technology as a medium of learning.[15] They state that the execution of technology is beneficial for effective learning. Nowadays, learning is not limited to learning from predefined bookish content and using a traditional environment (blackboard, chalks, notebooks, chairs, desks, and teachers). In this way, students can also learn many things without going to physical classes and meet the teachers face to face. Technology-enhanced learning (TEL) is the broader term that combines all forms and techniques and is full of fun essentials for efficient and effective learning.[16] In other words, the authors claim that using mobile phones, playing games, watching visuals, and other activities involved in technology are helpful for students. The ultimate goal of these efforts is to develop more effective and efficient ways of learning. The results of these innovations will finally decide whether to continue or quit the process in education.

Generally, it has been observed that the interests of the educational institutes and teachers are more inclined towards innovative and technological techniques in the teaching process. Fischer et al. emphasised that the new generation should be able to accept changes, shape patterns, and make suitable choices that fulfil ethical standards.[17] Reiser states that the modern learning process is technology-oriented, involving mobile phones, the internet, the computer, and other social media platforms.[18] Therefore, the education system should support the social role and escalate the change arrangements in the learning process, providing an environment where students are free to learn rather than force them to learn.[19] This inclination and trends are due to the need of the time (new generation) and other competitors (both local and global). This is the current generation's need due to their likes, dislikes, and priorities. Prensky termed the people as "digital natives" who were born between 1980 and 1994.[20]

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[15] Mayra C. Daniel et al., "Student Perception of Online Learning in ESL Bilingual Teacher Preparation," *Universal Journal of Educational Research* 4, no. 3 (2016), 561–569; Daniah Alabbassi, "Exploring Teachers' Perspectives Towards Using Gamification Techniques in Online Learning," *The Turkish Online Journal of Educational Technology* 17, no. 2 (2018), 34–45

[16] Peter Goodyear and Symeon Retalis, *Technology-Enhanced Learning*. Rotterdam: Sense Publishers, 2010.

[17] Gerhard Fischer, "Rethinking and Reinventing Learning, Education and Collaboration in the Digital Age", 241–52.

[18] Robert A. Reiser, "A History of Instructional Design and Technology: Part I: A History of Instructional Media," *Educational Technology Research and Development* 49, no. 1 (March 2001): 53–64, https://doi.org/10.1007/bf02504506.

[19] Gerhard "Rethinking and Reinventing Learning, Education and Collaboration in the Digital Age," *The* 241–52.

[20] Marc Prensky, "Digital Natives, Digital Immigrants," *On the Horizon* 9, no. 5 (September 2001): 1–6, https://doi.org/10.1108/10748120110424816.

It has also been observed that some students are naturally shy and conservative and do not usually speak (ask or answer) in front of the class. The reason is that such students are not active participants during physical classes (in the presence of classmates). Neo and Neo experienced using multimedia and projector as a teaching medium.[21] It was examined that students enjoyed and participated collectively in an active environment, and it was urged that they respond more logically while working together in a team. However, they are highly active when there is some "autonomous" activity online (not physical). The most visible technological superiority is the takeover of e-learning (virtual learning), which has enabled students to access beyond borders, time and space.[22] Most recently, many enterprises' working styles and operations have been changed due to the pandemic (COVID-19), and thus the academia. It might be a test case that should be considered a turning point in reshaping the lifestyle, individually and collectively. In this regard, as observed, many educational institutions started online classes based on technological advancement and devices. The pandemic (COVID-19) taught a lesson to the world that modern life is nothing without the use of modern technology. Some basic questions need to be enquired about: 1) What comes to your mind when explaining the terms "teaching" and "learning"? 2) How can curiosity help people struggle for more knowledge and explore new things? 3). How do you define the favourable environment for modern teaching and learning? 4). What are the most feasible learning techniques and compatible methodologies? 5). What is the primary purpose of introducing technology in the learning process? 6). How do we define technological importance in the modern era? 7). Why is modern learning different from traditional learning, considering the technological advancement? 8). What are the distinguished features of a technological-oriented teaching/learning environment? 9). What was the individual's approach before and after using specific technology in learning? 10). What are the main qualities required for an individual to adopt modern technological procedures? Overall transformation is needed from different angles-learners, teachers, society, and academia. As per Fischer et al.'s suggestions, new generations need to be treated differently while teaching and learning.[23] They should be considered as well-learned entities rather than unreceptive clients painstaking their viewpoints in the overall process. Fischer et al. state that the new generation should be capable of understanding the modern scenario and mastering the skills of changing, structuring, and selecting the best potential options that are perfect on social and ethical parameters.[24] Learners must discuss technology's positive and negative aspects, personally and professionally (learning). Various social content about manners, ethics, and social responsibility should be taught, and students should be sensitised to encounter any potential social issues, especially during their practical and professional lives. This way, they can make a difference and lay a solid, logical foundation for a prosperous society.

In the modern technological era, academia is more interested in internationalising their appearance in the global market. This "desire" has become more accessible and

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[21] Ashvini Joshi, "Innovative Teaching: Using Multimedia in a Problem-Based Learning Environment," *Current World Environment* 1, no. 1 (June 25, 2006): 183–86, https://doi.org/10.12944/cwe.6.1.28.

[22] Ahmad Baylari and Gh.A. Montazer, "Design a Personalized E-Learning System Based on Item Response Theory and Artificial Neural Network Approach," *Expert Systems with Applications* 36, no. 4 (May 2009): 8013–21, https://doi.org/10.1016/j.eswa.2008.10.080.

[23] Gerhard "Rethinking and Reinventing Learning, Education and Collaboration In The Digital Age", 241–52.

[24] Ibid.

economical due to the global introduction of technological facilities in the education system. They can utilise different modes and mediums to propagate their mission and deliver teaching content to their learners in real time to any part of the world. Academia is under tremendous pressure to modify their programs, which must combine traditional and modern techniques. Unfortunately, this challenge seems complicated for educational institutes in developing countries due to obsolete technological and educational systems, a lack of motivation among students, and a lack of interest in teachers.

Consequently, a comprehensive awareness session should highlight technology's importance. In addition, due to the generation gap, some teachers will think it is unsuitable to rely on technology for teaching. Hypothetically, students are evaluated based on their aptitude and memory rather than technical skills. In this regard, prior to technological execution, policymakers and educationists are supposed to evaluate the teachers' capabilities and sensitise them towards such programs. This study highlights the importance of modern techniques (procedures and equipment) that are aligned with the teachers' beliefs and students' perceptions.

3. Fundamentals of the Study

Generally, students are always searching for relevant information that is helpful for their course contents and improving the skills required for employment after graduation. Therefore, if such information is available easily and economically, they will be encouraged, and their efforts to search for more information will be enhanced. They are satisfied only when their learning techniques are compatible with the teaching methods. Apart from literacy, technological advancement can also be beneficial in developing the personal lives of ordinary people, especially students. Technology, like ICT, can be used for speedy communication and socialisation, strengthening the bond between all the stakeholders within academia. As a result, the student's academic progress can be achieved indirectly due to quick and real-time communication and strong bonds among learners and teachers. In this way, a triangle is established among the teachers, students, and teaching/learning staff (contents, devices, medium, etc.). Several studies have emphasised teachers' role in technological-oriented education by highlighting the importance of academia, the learning process, teaching requirements, and learning capacities. Sailer et al. suggested a learning model (Cb-model) which portrays a comprehensive structure of various indicators that impact technological education and categorises the bond between academia and teaching methods.[25] Other studies have pointed out the differences among institutional forces, local priorities, and cultural differences. Along with other socioeconomic factors, these indicators might also influence technology advancement.

Developing countries can also benefit from technological advancement in corporate and social activities. Like other human characteristics and regional privileges, access to technology is not similar for everyone globally. The people are divided into different social classes, and as a result, all the students are not in the same position to benefit equally from technology (e.g., Iivari et al., 2020; Larkins, 2020).[26] The widespread and

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[25] Michael Sailer, Florian Schultz-Pernice and Frank Fischer, "Contextual Facilitators for Learning Activities Involving Technology in Higher Education: The Cb-Model," *Computers in Human Behavior* 121 (March 2021): 106794, https://doi.org/10.1016/j.chb.2021.106794.

[26] Netta Iivari, Sumita Sharma and Leena Ventä-Olkkonen, "Digital Transformation of Everyday Life – How COVID-19 Pandemic Transformed the Basic Education of the Young Generation and Why Information Management Research Should Care?," *International Journal of Information Management* 55, no. 1 (June 27, 2020): 102183, https://doi.org/10.1016/j.ijinfomgt.2020.102183; Cath Larkins, "Building on

unceasing technological execution can lead to many complicated socio-technological challenges, especially while handling and teaching the new generation. However, it does not seem easy to bifurcate the lines between traditional teaching and technological advancement in modern times. To overcome these difficulties, the new generation should be granted equal rights to access and utilise modern technologies and thus benefit (e.g., Iivari et al., 2020; Larkins, 2020).[27]

Various social factors act as institutional forces that influence and pressure academia to execute the technology in the learning process.[28] These forces define the grounds which direct the individual tendency, perception, and behaviour about the technological application based on the domestic intensity of the active stakeholders. Knowing different information about the students is a significant input in the learning process. Academia can set different indicators and thresholds to judge the current situation and thus rectify their standards for future development. Peer groups and social circles influence students to adopt or use technology. Zhou and Wei examined the extent of advantages achieved by using technology in learning (teachers and students).[29] Pereira et al. observed that inspiration from someone influences the learning process.[30] Likely, the student's concentration, attention and progress can be attained if their other elementary psychological requirements are met within a given context. As a result, students can learn beyond the "time" and "space" phenomenon.

Zhu et al. pointed out that advancement in technical aptitude is one of the most compulsory elements in modern teaching.[31] Initially, the students' tendencies to use or avoid any technology primarily depend on the environment where he was born, raised, studied and worked. Similarly, their capacities and abilities are subjected to the length of time they are used to it. It is an individual priority that motivates a person to get involved or avoid any process, especially when initiating new things. In addition, other factors (demographic, social, economic) also influence the personal priority(ies). People of different ages and social and economic classes have different viewpoints on any issue.[32] Acevedo and Krueger state that related feelings significantly affect personal decision-

Rainbows: Supporting Children's Participation in Shaping Responses to COVID-19," *UCLan - University of Central Lancashire*, April 23, 2020, https://clok.uclan.ac.uk/33087/

[27] Netta Iivari, "Digital Transformation of Everyday Life – How COVID-19 Pandemic Transformed the Basic Education of the Young Generation and Why Information Management Research Should Care?"; Cath Larkins, "Building on Rainbows: Supporting Children's Participation in Shaping Responses to COVID-19".

[28] Viswanath Venkatesh et al., "User Acceptance of Information Technology: Toward a Unified View," *MIS Quarterly* 27, no. 3 (September 2003): 425–78.

[29] Yalun Zhou and Michael Wei, "Strategies in Technology-Enhanced Language Learning," *Studies in Second Language Learning and Teaching* 8, no. 2 (June 29, 2018): 471–95, https://doi.org/10.14746/ssllt.2018.8.2.13.

[30] Sara Pereira, Joana Fillol and Pedro Moura, "Young People Learning From Digital Media Outside Of School: The Informal Meets The Formal," *Comunicar* 27, no. 58 (January 1, 2019): 41–50, https://doi.org/10.3916/c58-2019-04.

[31] Chang Zhu et al., "What Core Competencies Are Related To Teachers' Innovative Teaching?," *Asia-Pacific Journal of Teacher Education* 41, no. 1 (February 2013): 9–27, https://doi.org/10.1080/1359866x.2012.753984.

[32] Melissa L. Finucane et al., "Task Complexity and Older Adults' Decision-Making Competence.," *Psychology and Aging* 20, no. 1 (2005): 71–84, https://doi.org/10.1037/0882-7974.20.1.71.

making.[33] Usually, it is tough to reach a mutual consensus due to the wide range of stakeholders, and every stakeholder has different stakes, worries and benefits.

People from specific social backgrounds define social directions by the degree of utilisation or inclination of technical facilities within given circumstances. In this way, the impact of technology was extended from individual change to global change, penetrating through specific society. For example, internet access is available to a few people (individuals), a specific group (wealthy people or any social or economic class) or to all people of the world (globally). Liberal societies are more concerned about scientific education and technological advancement. They focus more on scientific learning and accept changes and innovation.[34] People with scientific backgrounds and knowledge welcome new things and modern techniques. Based on comparing the expected and actual outcomes, one can conclude concrete viewpoints about any technology once it is used for a specific matter.[35] The perception can be used to understand their exact upshots based on pre-post scenarios. It is also essential that technological advancement should not be enforced; instead, it should be propagated in a way acceptable to the learners. Other studies have also examined that the active involvement and engagement of both students and teachers guarantee effective learning, which ultimately encourages the students to be more independent, enthusiastic, and active during the learning process.[36] Lee explored the extent of effective learning by the degree of innovation in teaching and the execution of information technology in the process.[37] Salmon suggests two-dimensional premeditated outlines to enhance innovation in education and learning by implementing modern structure and technology and concentrating on up-to-date goals, scenarios, and markets.[38] The combination of socio-scientific techniques is not an easy job. It requires special skills and approaches to pick up or foresee social problems and associate them with the available scientific phenomenon to find all possible solutions. Educational institutes have the flavours of all social factors (e.g., social norms, values, legal settings, formal and informal dynamics, etc.). In this regard, it is considered an essential social body representing all stakeholders' comprehensive patterns. These outlines are supposed to help achieve the desired goals in the modern context by involving the institutional actors. Faculty members and the school administration need to take the initiative to introduce the equipment and process to create an innovative environment in educational institutions. They should adequately calculate the advantages and disadvantages, considering the concerns of students and other ground realities. In addition, time and budget management are also very crucial before introducing these new kinds of stuff. In other words, there should be a unique, affordable,

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[33] Acevedo Melissa and Joachim I. Krueger, "Two Egocentric Sources of the Decision to Vote: The Voter's Illusion and the Belief in Personal Relevance." *Political Psychology* 25, no. 1 (2004): 115–34. http://www.jstor.org/stable/3792526.

[34] Robin Millar, *What is Scientific Method and Can It Be Taught?: In Skills and Processes in Science Education; A Critical Analysis*, ed. Wellington JJ (London: Routledge, 1989), 47-62.

[35] Anol Bhattacherjee, "Understanding Information Systems Continuance: An Expectation-Confirmation Model," *MIS Quarterly* 25, no. 3 (2001): 351–70, https://doi.org/10.2307/3250921.

[36] Richard M. Ryan and Edward L. Deci, "Self-Determination Theory and the Facilitation of Intrinsic Motivation, Social Development, and Well-Being," *American Psychologist* 55, no. 1 (January 2000): 68–78.

[37] Yu-Je Lee, (2011), "A Case Study on the Effect of Teaching Innovation on Learning Effectiveness: Using a Moderator of Integrating Information Technology into Teaching," *Journal of Human Resources and Adult Learning* 7, no. 1 (2000), 34–49.

[38] Gilly, "Learning Innovation: A Framework for Transformation," 220–36.

customised, and localised system (per the institution's budget, students' requirements, and teachers' capacity).

4. Research Methodology and Source of Data

The primary data was collected with the help of various indicators used in other studies in the past. A semi-structured interview session was proposed to provide a chance to express their perceptions and thus understand their viewpoints about the phenomenon. The predefined dynamics and all extracted indicators were kept in order and made a logical connection with all the study variables. Shah and Corley state that the qualitative method is more suitable for examining and interpreting different variables' impact on a multifaceted phenomenon within a social framework.[39] Relevant experts then verified all these variables to confirm the current study's validity, importance, and appropriateness. Afterwards, a pilot survey was conducted (4 participants) to fine-tune the given information if necessary. The final survey draft was refined and sent to the participants for data collection.

The participants were from different departments (major subjects)-mainly management sciences, engineering, science, health studies, and education. The aims and objectives were provided to the participants, and their consent was requested. They were told this is voluntary and has nothing to do with grades or course exemption. Participants were interviewed individually and in groups, depending on their ease and comfort. However, the proposed time was 45 minutes for each session. However, the interview was not conducted at the same length. The shortest time was 30 minutes and about 2 hours, with an average of 55 minutes each session. The participants varied in groups, with a minimum of 3 and a maximum of 6. All these interviews were conducted on school premises, mainly in the library and teachers' offices. All the sessions were recorded after asking for participants' consent. The number of students who participated in the survey was 207. Statistics about their major, age groups and gender were asked and classified accordingly. In the second phase, the age difference, gender, educational and professional backgrounds were grouped and crossmatched. The indicators mentioned above were observed to affect the trends and tendencies of the subject matter. The participants' average age is 26 (Maximum = 63 and minimum 19). Most participants are female (58%) and studying education majors.

Participants were asked to respond as per their approach and express themselves openly. The interview contents of each participant were coded and evaluated with the help of content analysis. Then, the coded contents were categorised as per the defined indicators and main theme of the study, suggested by Wilkinson and Birmingham.[40] They state, "Where regular key themes have been identified, there may be some quantitative analysis provided, in terms of the number of times a key theme occurred." Afterwards, the number of events, frequencies, importance, and weightage were calculated. The main common points and other participants' opinions were noted and discussed during the interview to confirm the reliability. After collecting and codifying the overall data, the focused groups were interviewed through open debates, and the predefined indicators were again quantified based on available information.

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[39] Sonali K. Shah and Kevin G. Corley, "Building Better Theory by Bridging the Quantitative - Qualitative Divide," *Journal of Management Studies* 43, no. 8 (December 2006): 1821–35, https://doi.org/10.1111/j.1467-6486.2006.00662.x.

[40] David Wilkinson and Peter Birmingham, *Using Research Instruments: A Guide for Researchers* (London: Routledgefalmer, 2003).

This study was observed under the "self-determination theory (SDT)," which is based on self-motivation to handle auxiliary trends while attaining goals and building effective behaviour. Individual willpower can act as a booster to maximise the secondary elements in specifying the direction and goal determination. Several researchers have linked this theory to understanding the urgencies of various psychological needs in different studies, not only in academic accomplishment but also in analysing other individual behaviours and actions.[41] In addition, the social constructivism theory also acts as a building block to formulate dynamics, perceptive and self-directed procedures for teachers,[42] emphasising steady progress in teaching techniques[43] and, ultimately, actively involving all the learners during the learning process. Modern technological tools facilitate the teachers' establishment of an innovative environment where students and teachers can communicate freely and in real-time, thus fully supporting the social constructivism theory. In this regard, all these new technological practices are the fundamentals of modern learning systems that only support equipment. This is only possible when they can form a structure equipped with modern techniques, innovative course contents and updated instructions or syllabus.[44]

5. Analysis and Discussion

The learning process was severely affected worldwide during the recent pandemic (COVID-19), especially in less developed countries. They lack modern technologies in schools and at home (Internet, mobile phones and computers). As a result, it was difficult for those students who did not have access to the technologies mentioned above to continue the learning process. On the other hand, everything happened suddenly, and academia was pressured to arrange the required equipment and train their staff to continue the learning process during the pandemic.[45] As a result, only those institutions that continued their operations had modern technology and trained staff who could work virtually (from home). Generally, educational institutions in developing countries (e.g., Kuwait) hesitate to modernise their overall systems as they rely more on traditional academic practices.[46] As in modern life, technology is spreading in every field worldwide. In other words, humans are controlled and addicted to technology daily and professionally.

Consequently, the introduction of technology has changed social life and impacted the logical levels of the people using it (especially the new generation). Therefore, scholars from different backgrounds have shown their concerns and foreseen many things about

[41] Peter C. Britton et al., "Basic Psychological Needs, Suicidal Ideation, and Risk for Suicidal Behavior in Young Adults," *Suicide and Life-Threatening Behavior* 44, no. 4 (February 3, 2014): 362–71, https://doi.org/10.1111/sltb.12074.

[42] Dorit Alt, "Constructivist Learning and Openness to Diversity and Challenge in Higher Education Environments," *Learning Environments Research* 20, no. 1 (November 30, 2016): 99–119, https://doi.org/10.1007/s10984-016-9223-8.

[43] Keith S. Taber, "The Role of New Educational Technology in Teaching and Learning: A Constructivist Perspective on Digital Learning," *Handbook on Digital Learning for K-12 Schools*, October 8, 2016, 397–412, https://doi.org/10.1007/978-3-319-33808-8_24.

[44] Karen Smith, "Cultivating Innovative Learning and Teaching Cultures: A Question of Garden Design," *Teaching in Higher Education* 16, no. 4 (August 2011): 427–38, https://doi.org/10.1080/13562517.2011.560374; Chang Zhu, "How Innovative are Schools in Teaching and Learning? A Case Study in Beijing and Hong Kong," 137–45.

[45] Randa Diab-Bahman, "VLEs in a Post-COVID World," *Advances in Educational Technologies and Instructional Design Book Series*, January 1, 2021, 265–83, https://doi.org/10.4018/978-1-7998-7607-6.ch016.

[46] Ibid.

the technological impact on society (socio-techno relationship). Technological-oriented education is a need of the time and an integral part of human life in the modern era. However, there should be a proper debate to understand the limits and scopes of technology. In other words, technology should be controlled by humans and kept under control, rather than human beings being controlled by technology. The positive aspects of technology should be encouraged and executed for the prosperity of humanity and vice versa. Technological progress and the changes in other sociocultural dynamics have compelled academia to respond more innovatively to satisfy the needs of all stakeholders and play a unique role in handling the demands of the new generation (students).[47]

Perez-Lopez and Contero found that due to technological gaps between the previous and current generations, the students are not interested and motivated to learn with traditional teaching techniques.[48] In simple words, they are more convenient with technologies than with manual learning methods. As a result, it will help to develop an active learning environment that will enhance the learners' interest and motivation and ultimately lead to learning progress.[49] Kitchin and Dodge also support the same argument by stating that technological execution enhances the learning attitude and, thus, academic progress.[50] However, like human nature, students are not the same; therefore, their choices regarding traditional and modern teaching techniques are not identical. They possess different skills, perceptions, priorities, and individual abilities. For example, if students are unaware of technology and essential equipment (mobile phones), how will they act/react during online/virtual classes? The focus group participants were identical and had the same social and economic background. However, it was observed that the technological capacity of all students is not the same, which proves the relationship with their major subjects, too. Due to the course contents and the demand of specific professions, some major subjects are more technologically oriented, and some are less, thus their perception, attitude, and abilities. In this regard, some students may prefer traditional ways of teaching due to social, economic, and other individual factors. Students with access to technology outside the school premises possess positive attitudes about technological usage in teaching.[51] Similarly, the learners' technological inclination and interests enhance their chances of using the available technological resources for learning objectives.[52] Vekiri found that despite students' positive inclination towards using technology in the learning process, their vulnerable

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[47] Tashfeen Ahmad, "Preparing for the Future of Higher Education," *On the Horizon* 23, no. 4 (November 9, 2015): 323–30, https://doi.org/10.1108/oth-06-2015-0029.

[48] David Pérez-López and Manuel Contero, "Delivering Educational Multimedia Contents Through an Augmented Reality Application: A Case Study on its Impact on Knowledge Acquisition and Retention," *The Turkish Online Journal of Educational Technology* 12, no. 4 (2013): 19–28, http://www.tojet.net/articles/v12i4/1243.pdf.

[49] Ian W. Gibson, "At the Intersection of Technology and Pedagogy: Considering Styles of Learning and Teaching," *Journal of Information Technology for Teacher Education* 10, no. 1-2 (July 2001): 37–61, https://doi.org/10.1080/14759390100200102.

[50] Rob Kitchin and Martin Dodge, *Code/Space: Software and Everyday Life* (Cambridge, MA: MIT Press, 2014).

[51] Yifat Ben-David Kolikant, "Using ICT for School Purposes: Is There a Student-School Disconnect?," *Computers & Education* 59, no. 3 (November 2012): 907–14, https://doi.org/10.1016/j.compedu.2012.04.012.

[52] Trevor Male and Kevin Burden, "Access Denied? Twenty-First-Century Technology in Schools," *Technology, Pedagogy and Education* 23, no. 4 (December 16, 2013): 423–37, https://doi.org/10.1080/1475939x.2013.864697.

social and economic factors negatively affect these trends due to the unavailability or affordability of technology.[53]

Although it is compulsory for the school administration to provide and allow the teachers to use various technical equipment in teaching, the school cannot guide the teachers and modify their beliefs about the execution of technology.[54] In other words, the provision of technical infrastructure in schools can only partially guarantee that it will be used in the teaching process by teachers.[55] Sailer et al. discovered the connection between different cognitive, emotional, and socio-contextual indicators regarding technological inclination in the education system.[56] They highlighted that teachers are at the weak end of complicated systems controlled by various forces. On the contrary, the instructors should be able to understand the students' activities (skill development and capacity building) and ensure that these align with the requirement to relate the theoretical knowledge with the practical implications.[57] Technological advancement can be helpful to support learning methods and empower students to access anytime and any place.

Similarly, students can virtually visit several knowledge origins and thus analyse various viewpoints about a specific phenomenon. However, technological innovation might be exploring a new era for some students. However, some will think that introducing these technologies is just the modern shape of old textbooks and other teaching techniques. In short, the students' opinions are much more important, whether they are interested in eliminating the physical classrooms or equipping these classrooms with new technologies.

No one can deny the impact and importance of the environment in the learning process.[58] Two-way communication can only be possible with an active teaching and learning environment. Creating such an environment is not difficult if the style and teaching methods are updated and the culture of technology is developed in academia. As a result, the students will attend the classes as active learners (encompassing the knowledge) rather than passive members (only for knowing and memorising). Therefore, it will be more attractive to understand the impact of technology in education and, thus, its relationship with the learning aptitude in a given context. Technology-oriented education implements technical equipment to support the learning process for smooth communication between learners and teachers. It is proposed that technological awareness is also beneficial in initiating much-refined theoretical concepts in learners'

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[53] Ioanna Vekiri, "Socioeconomic Differences in Elementary Students' ICT Beliefs and Out-Of-School Experiences," *Computers & Education* 54, no. 4 (May 2010): 941–50, https://doi.org/10.1016/j.compedu.2009.09.029.

[54] Khalid Abdullah Bingimlas, "Barriers to the Successful Integration of ICT in Teaching and Learning Environments: A Review of the Literature," *Eurasia Journal of Mathematics, Science and Technology Education* 5, no. 3 (January 22, 2009): 235–45, https://doi.org/10.12973/ejmste/75275.

[55] Kerstin Drossel and Birgit Eickelmann, "Teachers' Participation in Professional Development Concerning the Implementation of New Technologies in Class: A Latent Class Analysis of Teachers and the Relationship with the Use of Computers, ICT Self-Efficacy and Emphasis on Teaching ICT Skills," *Large-Scale Assessments in Education* 5, no. 1 (November 27, 2017), https://doi.org/10.1186/s40536-017-0053-7.

[56] Michael Sailer, "Contextual Facilitators for Learning Activities Involving Technology in Higher Education: The C♭-Model".

[57] Eva Kyndt, Simon Beausaert and Ilya Zitter, *Developing Connectivity Between Education and Work* (Routledge, 2021).

[58] Chin-Chung Tsai and Pi-Chu Kuo, "Cram School Students' Conceptions of Learning and Learning Science in Taiwan," *International Journal of Science Education* 30, no. 3 (February 26, 2008): 353–75, https://doi.org/10.1080/09500690701191425.

minds.[59] However, it is also essential to know the degree of "authority" and "power" if the technological equipment replaced the traditional teaching techniques. The teacher will dictate the classroom, and the flow of information will be either undirected or multi-directed. Secondly, the students will be given autonomy to access and utilise these technologies. Thirdly, the teaching and learning process will be modernised with teachers' and students' active participation and involvement through various apparatuses and techniques. Fourthly, the school administration developed a strictly controlled environment and handed it over to teachers after training.

Falvo experimented with students' interests using the animated video and observed that the student's learning levels improved.[60] In this way, it will develop curiosity among the students, leading them to explore more things through self-study using other technological resources. Similarly, it will help them to overcome all the shortcomings, myths and threats attached to technological devices. Modern technology helps form innovative techniques that connect students and teachers to knowledge generation.[61] Other studies have confirmed that continuous and strong student-teacher communication enhances learners' objectives.[62] It will also develop their behaviour (addict) to take a keen interest in using practically while studying or other things in daily life. The features of perfection (useful), easy to use (user friendly), cheap (economical), and convenient (any place) can motivate students to rely more on these devices and other technologies. However, implementing technology is informative in learning and customised to learners' capacity. However, there are still two opposite viewpoints: pro-digital education and anti-digital education transformation.

The reason is that it is not easy to convert the overall traditional processes into technological ones simultaneously. Equilibrium should be maintained between academic practices and technological usage in learning.[63] It seems a complicated issue for techno-illiterate instructors to manage these resources and deliver the teaching content in a given time. In this regard, teachers and learners should be fully trained about using modern technologies in teaching. As a result, academia and especially teachers should have the capacity to know the individual likes and dislikes and thus deliver the content accordingly. Generally, to handle the organisational format, academia is pressurised by strong objectives and outcomes.[64] This way, they can sustain the student's concentration and keep them focused on learning. In addition to the innovative learning environment, the willingness and inclination of the school administration enhance the chances of technological trends in the learning process.[65] Teachers translate the notions and

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[59] Chin-Chung Tsai, "Conceptions of Learning Versus Conceptions of Web-Based Learning: The Differences Revealed by College Students," *Computers & Education* 53, no. 4 (December 2009): 1092–1103, https://doi.org/10.1016/j.compedu.2009.05.019.

[60] David Falvo, "Animations and Simulations for Teaching and Learning Molecular Chemistry," *International Journal of Technology in Teaching and Learning* 4, no. 1 (2008): 68–77, https://sicet.org/main/wp-content/uploads/2016/11/ijttl-08-01-4_1_5_Falvo.pdf.

[61] Rob Kitchin, "Code/Space: Software and Everyday Life".

[62] Hsinfu Huang, Chin-wei Chen and Yuan-wei Hsieh, "Factors Affecting Usability of Interactive 3D Holographic Projection System for Experiential Learning," *Lecture Notes in Computer Science*, January 1, 2018, 104–16, https://doi.org/10.1007/978-3-319-91743-6_7.

[63] Linda Castañeda and Ben Williamson, "Assembling New Toolboxes of Methods and Theories for Innovative Critical Research on Educational Technology," *Journal of New Approaches in Educational Research* 9, no. 2 (January 15, 2021): 1, https://doi.org/10.7821/naer.2021.1.703.

[64] Shivangi Dhawan, "Online learning: A Panacea in the Time of COVID-19 Crisis," *Journal of Educational Technology Systems* 49, no. 1 (June 20, 2020): 5–22, https://doi.org/10.1177/0047239520934018.

[65] Eloho Ifinedo, Mirka Saarela and Timo Hämäläinen, "Analysing the Nigerian Teacher's Readiness for Technology Integration," *International Journal of Education and Development Using Information and*

objectives of learning content designed and implemented by the academia. In this way, teachers play intermediaries between academia and students, strengthening their bond. Some teachers are not competent enough to deliver the subject-related teaching content to the students.[66] Then, imagine the challenging situation if they were "forced" to teach the course with new techniques, which require extra effort and knowledge.[67] Whatever the logistic support the school provides, the final decision and implication of technology and modern teaching techniques depend on the teachers' inclination and perception to execute or avoid the use of technology.

6. Conclusion

It has been observed that almost every country has tried its best to sustain the learning process and deliver lectures through various mediums with the help of all available modern technologies. Toquero emphasised the benefits of introducing modern technologies in academia by stating that upgrading teaching techniques and policies and advancing all other programs and arrangements is vital.[68] This study examined the strengths and weaknesses of technological penetration in academia based on the opinions of students/teachers, academic capacity, and vision of modern and traditional learning. The key areas which were pointed out in this study are mentioned here:

- To observe the fundamental trends of the updated technology in the modern learning process.
- To understand the extent of technological execution parallel to the learners' interests.
- To evaluate the gap between current and previous generations regarding technological advancement and its use.
- To calculate the degree of perceived attitude for implementing the technology in course contents.
- To highlight the abilities required to balance the modern contents and technological techniques.
- To judge the capacity of the instructors teaching in a modern environment generation learners.
- To evaluate the degree of change observed in instructors before and after technological training.
- To determine the extent of academia's willingness to execute modern techniques and learning environments.

Both teachers and students experienced different things in this "new" technique of the virtual learning process. Various social, economic, and environmental factors constantly pressure corporations and academia. Even though these changes occur globally, their effect is quick and intangible. However, these are not logical excuses for academia. The reason is that they will always be answerable for uplifting literacy and their social and

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Communication Technology (IJEDICT) 15, no. 3 (2019): 34–52, https://files.eric.ed.gov/fulltext/EJ1227419.pdf.

[66] Kevin Stinson et al., "Mathematics and Science Integration: Models and Characterizations," *School Science and Mathematics* 109, no. 3 (March 2009): 153–61, https://doi.org/10.1111/j.1949-8594.2009.tb17951.x.

[67] Laura Icela González-Pérez and María Soledad Ramírez-Montoya, "Components Of Education 4.0 in 21st Century Skills Frameworks: Systematic Review," *Sustainability* 14, no. 3 (January 27, 2022): 1493, https://doi.org/10.3390/su14031493.

[68] Cathy Mae Toquero, "Challenges and Opportunities for Higher Education Amid The COVID-19 Pandemic: The Philippine Context," *Pedagogical Research* 5, no. 4 (April 16, 2020): em0063, https://doi.org/10.29333/pr/7947.

technological contributions. In this regard, they should behave responsibly to sustain educational quality and upgrade the techniques as needed in times of crisis (like the recent pandemic). In this regard, the teachers should assign various study materials to the students who need internet surfing and thus reproduce the information in different and unique ways. However, the grey areas should be appropriately examined, and all the potential trials should be encountered to handle the potentially unpredictable challenge.

This study suggests helpful tips to educationists and policymakers about the students' priorities, current urgencies and the transformed global environment, particularly in academia and the workplace. Regarding academia, the relationship between technology and academia and policymakers' viewpoints should be probed. This examination should be around a few main points. For example, the modern technological education system should be paralleled with future academic objectives and corporate trends. The capacity, planning and efforts required for the modification/modernisation of the current system. The students should be sensitised and educated to use modern technology in learning. Similarly, the academic staff and especially the teaching faculty should be trained regarding every new technology and application before providing it in classrooms.

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