A Pathway leads to Quality Tertiary Education via the change in Learning Technologies and Students' Academic Self-Concept with the intervention of Students' Creativity

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ABSTRACT: Since the dawn of civilization, humans have been learning and adapting to new environments and changing scenarios. The fast-paced changing trends in the advancement of educational technology are exercising a push on the Higher Education System to elevate and follow transformation. Moreover, the UN Sustainable Development Goal 4 expands the phenomenon of "Quality Education" by 2030 which suggests building and upgrading the traditional educational environment to a more tech-oriented learning environment.

The current study used a quantitative research approach and collected data from a sample of seven nighty eight students from private and public sector universities in the province of Sindh, Pakistan. The study proposed four hypotheses investigating direct and indirect relationships between variables, based on Lewin's Change Model and reinforced by the Social Exchange Theory. The research findings showed that the attitude toward Technological Change positively and significantly influences the Academic Self Concept through the intervention (mediation) of students' creativity. The interrelationship of the variables in the current study model, especially within the tertiary education of Sindh province, has not been extensively researched before. This emphasizes the uniqueness of the research questions developed based on the theoretical framework of the Kurt Lewin Model. Moreover, the study has been updated to incorporate citations and references from recent years. The study's findings indicate that leaders and managers of Higher Education Institutions (HEIs) play a crucial role in influencing students' academic self-concept based on their views of the technology resources in the learning environment, particularly in line with HEC Vision 2025 and UN Sustainability Development Goal 4 Quality Education. Moreover, students' academic achievement, contentment level, multidimensional learning, and confidence significantly influence the competitive market and contribute to the educational institution's reputation.

Keywords: Academic Self Concept, Attitude towards Technological Change, Students' Creativity, Higher Education Institutes (HEIs)

1. Introduction

The phenomenon of change holds an unconventional meaning of causing short-term disruption to get long-term benefits. Since the inception of life, the planet has been evolving rapidly. Worldly processes are constantly evolving. Change impacts individuals, organizations, and society as a powerful and continuous force that permeates and moves inside the mainstream working environment (Karasvirta & Teerikangas, 2022). The recent era prevails in development, growth, and advancement. Consequently, the advent of technology unveils a significant route for the alleviation of human conditions.

The education system of the country has been taken for granted which caused unreasonable outcomes in the shape of inadequate innovation, devalued productivity, insufficient development of critical thinking skills, and fewer opportunities for individual growth and development, especially for the young generation.

Students are the primary assets of Higher Education Institutes, and their success impacts their creativity, academic engagement, and self-concept. Conversely, poor academic achievement can reduce self-motivation, diminish self-esteem, and negatively affect behavior, leading to increased academic expenses. (Valli Jayanthi et al., 2014).

A study is required to improve the quality of Higher Education Institutions (HEIs) by providing technological tools to impact students' attitudes toward sustainable skills and behaviors. This, in turn, impacts students' academic self-concept and performance, contributing to the development of intellectual human capital and a knowledge-based economy (Haider et al., 2020).

1.1   Need/Motivation of the Study

The UNSDGs aim to revolutionize the globe by 2030. In 2015, the United Nations established goals to be reached by 2030 to transform the ecosphere into a recovering and better place for everybody. The UN has established 17 SDGs with its 4th goal focusing on "Quality Education". In addition, it predicts a significant rise by 2030 in the number of young people and adults completing their education at technologically advanced institutions to pursue employment, jobs, and entrepreneurship prospects (Franco et al., 2018).

Higher Education Institutes must understand that their long-term performance relies on the efficient administration of providing enhanced facilities to stakeholders, following the concept "from access to success."

Due to the skyrocketing hyperinflation and the employer's obsession with intellectual tech-based talent, there is a need for individuals who excel academically. With profound creative abilities, therefore HEIs of Sindh Province must produce a based and creative knowledgeable generation that will tend to lead the country while stabilizing economic conditions. A study focusing on attitudes towards technological transformation and academic self-concept in HEIs of the Province of Sindh, Pakistan.

1.2 Problem Statement

Amid reservations and speedy changes, the orientation of the Socio-economic development of the country along with the UN Sustainable Development Agenda are urging HEIs to focus on embracing technological change in the knowledge accumulation processes. The absence of learning technology is increasingly cited as a key factor contributing to less creative learning and low academic self-concept among students.

1.3 Research Objectives

1. Investigate the correlation between attitudes towards Technological Change and student creativity in HEIs in Sindh Province.

2. Investigate the correlation between students' creativity and academic self-concept in higher education institutions in Sindh Province.

3. Investigate how Student Creativity mediates the relationship between attitude toward Technological Change and Academic Self Concept in Higher Education Institutes in Sindh Province.

4. Examine the relationship between Technological Change and Academic self-concept in Higher Education Institutes in Sindh Province.

1.4 Theoretical Foundation

Kurt Lewin, a German American social psychologist, is considered a leading figure in the development of the Change Management Model in the 1940s. The idea gained attention due to its simplicity and its seamless incorporation into the everyday practice of utilizing ice. Lewin describes a 3-stage model of the change process through Unfreezing, Transition/Change, and Refreezing.

While integrating the theoretical framework, in the 1st stage, the availability of educational technological tools in the learning environment of HEIs generates a perception/attitude of change that technological upgradation is needed in HEIs.

In the 2nd stage, the current study displays the inclusion and the development of possible behavior/ attitude i-e students' creativity with the availability of educational technological tools.

Finally, the 3rdstage shows the solidification and anchoring of the new behavior, ensuring the academic self-concept of the students.
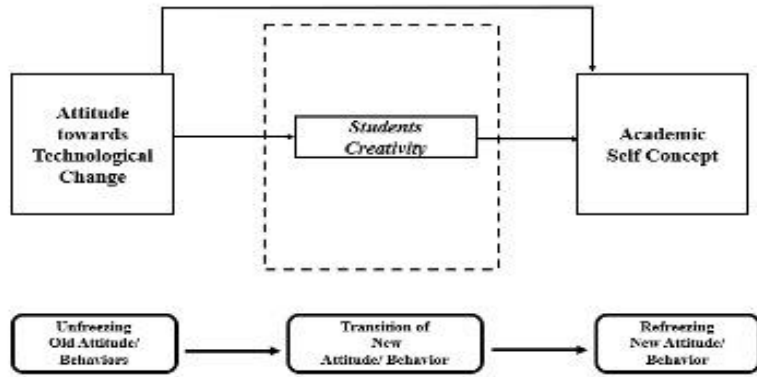

Figure 1: Conceptual Framework

The current study focuses on four constructs and illustrates their interrelationships. The visual representation of the current research model demonstrates a revolutionary development where the attitude towards Technological Change acts as exogenous (IV),

1.6 Social Exchange Theory (Underpinning Theory)

The research demonstrates the exchange of reciprocity between students and the management of Higher Educational Institutes. Education providers equip educational technological tools in the learning environment whereas students utilize these tools and their impression is returned, ensuring academic self-concept. Creativity plays a mediating role in this interdependent relationship.

This study delves into the concept of reciprocity in Social Exchange Theory (SET) between students and Higher Education Institutes. It focuses on how changes in educational technology provide students with tangible resources, fostering creativity and enhancing their academic self-concept. This, in turn, benefits the reputation and economic standing of the Institutes.

2 Hypothesis Development

H1: Attitude towards Technological Change (TC) and Students' Creativity (CR)

Influential contributions have been made by Ahmad et al., (2022) and explored in the 21st century the educational structure has transformed drastically. The study examined the relationship between major technological transformations in teaching-learning processes (MOOCs, IoT, Cloud Computing, Machine learning, Artificial Intelligence, Gamification Technology, and Metaverse) and their figurative impact on the students with their effective universal access, improved learning engagement, adaptive and creative learning, generation of curiosity, flexibility, and authenticity. The study utilized a secondary data collection method in which articles from (The Web of Science) were reviewed along with eminent research articles from IEEE Conferences and the reports from UNESCO and World Economic Forums have also been taken into consideration. The major recommendations from the current study to achieve Sustainable Development Goal 4 entail the following elaborations: MOOCs - educational tech tools (IoT), Cloud Computing, Machine learning, Artificial Intelligence, Gamification Technology, and Metaverse) enhance students' collaboration and their curious creativity by allowing students to generate novel ideas generation in collaborative learning.

Hendrik et al., (2022) conducted an experimental research study to explore how creating and applying robotic technology in various courses might improve students' figural creativity. 23 kids were deliberately selected to participate in the Figural Creativity test before and after the introduction of advanced robotic technology. The paired sample T-test results showed a notable disparity in the results.

Technology comes before creativity and creative talents can be acquired through the latest available technology (V. DIcheva and S. Lesidrenska, 2016).

H1: Students' creativity at Higher Education Institutes of Sindh Province is significantly and positively influenced by their Attitude towards Technological Change.

2.2 Student's Creativity (CR) and Academic Self-Concept (ASC)

Joussemet et al. (2010) explored a possible connection between creativity in students and their academic self-concept. 2,264 youths were randomly chosen from 68 distinct educational sectors in Spain for the research.

Teachers were invited to participate in the study and evaluate the students' originality. A canonical correlation study revealed a robust and positive association between creativity and students' academic success when assessed using instructors' ratings.

H2: The creativity of students positively and significantly impacts students' academic self-concept in Higher Education Institutes of Sindh Province.

2.3 Student's Creativity (CR) as a mediator between Attitude towards Technological Change (TC) and Academic Self-Concept (ASC)

Research studies have demonstrated that students' creativity plays a role as a mediator between motivation and academic self-concept, as well as between individual achievement and work performance. Prior studies have shown that student creativity has not been viewed as a mediator in the correlation between attitude towards technological change and students' academic self-concept.

H3: Student creativity (CR) mediates the relationship positively and significantly between attitude toward technological change (TC) and academic self-concept (ASC) in Higher Education Institutes of Sindh Province.

2.4 Technological Change (TC) and Academic Self-Concept (ASC)

Kuleto et al. (2022) found that students' academic self-concept requires lifelong learning and updated ways to be equal, inclusive, and sustainable. A study was done with 150 students from Portugal, Serbia, and Romania to explore their perspectives on how blockchain technology affects their academic self-concept and learning performance. The data was evaluated using the multivariate technique Structural Equation Model by partial least squares method (PLS-SEM). The hypothesis results revealed a beta value of 0.742, a T value of 8.813, and a significance value of 0.000. The study showed that innovative educational technology such as blockchain tools (MOOCs, Augmented Reality, Virtual Reality, gamification, and online learning opportunities) had a favorable and significant effect on students' academic self-concept and learning performance. Shen & Chang, (2023) predictably demonstrate how advanced technology has altered education and emphasized the need for high-achieving students. The research was carried out on 102 high school students enrolled in an Introductory Educational Technology course. Out of 102 research participants, 50 students were assigned to the experimental group, which received flipped classroom instruction with deeper learning. The remaining 52 students were in the control group, which followed standard learning methods. The study utilized a quantitative quasi-experimental research design with a control group mechanism. The study discovered that flipped classrooms have a substantial and beneficial impact on improving deeper learning at higher cognitive

levels in students, as evidenced by statistical values (T value = 2.26 with P value <0.05) in interpersonal (T value = 2.79 with P value <0.01) and intrapersonal (T value = 2.64 with P value <0.01) domains when compared to traditional classrooms.

H4: Attitude towards Technological Change has a positive and significant effect on students' self-concept in Higher Education Institutes of Sindh Province.

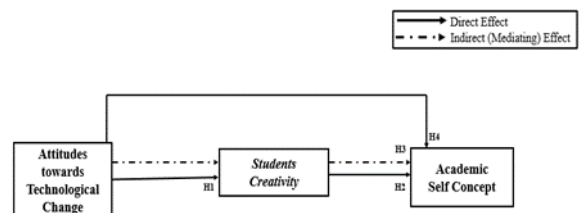| Hypothesis	Hypothesized Relationship
H1	Attitude towards Technological Change →Student's Creativity
H2	Student's Creativity → Academic Self-Concept
H3	Technological Change → Students Creativity → Academic Self Concept (ASC)
H4	Attitude towards Technological Change → Academic Self Concept

Figure 2: Summary of Direct and Indirect Hypothesized Relationship.

3 Methodologies

3.1 Population and Sampling: The survey included students from 6 Public and 6 Private Higher Education Institutions in Sindh Province. This study employed a convenience sampling method. The sample size of 68 was calculated using G*power 3.1.9.7 software. Moreover, a total of 798 students took part in the research.

3.2 Measures: Demographic variables such as gender, age, sector, higher education institutes, and degree programs were assessed using nominal and continuous scales.

The scale for the latent variable Attitude Towards Technological Change with 25 items is adapted from the study (Gurtoo & Tripathy, 2000), Students' creativity is adapted from the study by Lehmkuhl et al. (2021) using 12 questions, while academic self-concept is being adapted from the study by Granero-Gallegos et al. (2021) using 10 items.

3.3 Demographic Details: The demographic variables used in the present research are Gender, Age, and Sector. Among 798 responders, 56.1% were male and 43.6% were female students. 85% of respondents were aged 18-23, 12.5% were aged 24-29, 1.1% were aged 30-35, 0.9% were aged 36-40, and 0.4% were above 40 years old. Furthermore, 54.6% of respondents were from public sector higher education institutes and 45.1% of respondents were from private sector HEIs.

4. Data Analysis

Smart PLS software is employed which analyses the Structural Equation Model. The current study examines a mediation link between independent and dependent variables, and based on the suggestion of Hair et al. (2019), the PLS-SEM (Path Modeling) approach has been used.

4.1 Outer Model Analysis - Measurement Model: The measurement model evaluates the reliability and validity of the model.

Table 2 displays the outer loadings, Cronbach Alpha composite reliability, and average variance.

Construct	Items	Outer Loadings	Cronbach's Alpha	Composite Reliability	AVE
Attitude Towards Technological Change	TC1	0.653	0.948	0.952	0.523
	TC2	0.645			
	TC3	0.577			
	TC4	0.684			
	TC5	0.646			
	TC6	0.738			
	TC7	0.678			
	TC8	0.649			
	TC9	0.642			
	TC10	0.58			
	TC11	0.678			
	TC12	0.643			
	TC13	0.733			
	TC14	0.681			
	TC15	0.649			
	TC16	0.649			
	TC17	0.573			
	TC18	0.686			
	TC19	0.65			
	TC20	0.735			
	TC21	0.68			
	TC22	0.681			
	TC23	0.643			
	TC24	0.743			
	TC25	0.679			
Students Creativity	CR1	0.695	0.915	0.927	0.515
	CR2	0.693			
	CR3	0.767			
	CR4	0.693			
	CR5	0.691			
	CR6	0.762			
	CR7	0.697			
	CR8	0.69			
	CR9	0.764			
	CR10	0.693			
	CR11	0.692			
	CR12	0.765			
Academic Self-Concept	ASC1	0.716	0.843	0.877	0.508
	ASC 2	0.656			
	ASC 3	0.719			
	ASC 4	0.689			
	ASC 5	0.523			
	ASC 6	0.639			
	ASC 7	0.677			
	ASC 8	0.531			
	ASC 9	0.642			
	ASC 10	0.648			
	ASC1	0.716			

	Academic Self Concept	Students Creativity	Attitude towards Technological Change
Academic Self Concept			
Students Creativity	0.694		
Attitude towards Technological Change	0.713	0.502	

4.2 Structural Model Analysis (Inner Model)
The structural model evaluates hypotheses by examining the significance of path coefficients to determine acceptance or rejection.
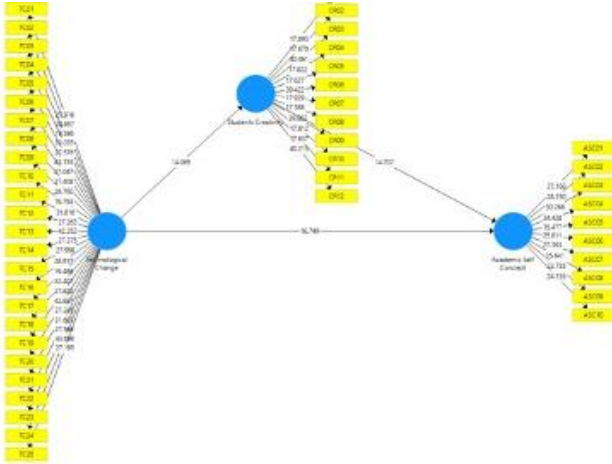
validity was assessed using the HTMT ratio, which should be below 0.85. All HTMT values in the table are below 0.85, indicating that respondents perceived all constructs differently.

The current investigation, as recommended by Hahn and Ang (2017), assessed the hypothesis's significance by utilizing various criteria such as p-values, confidence intervals, and effect sizes.

Table 4: Direct and Indirect Relationship - Significance and Relevance of Path Coefficients

To be precise, the β value for Hypothesis 1 to

Relationship	Beta (β)	Std Error	T	P	LCI 5%	UCI 95%	Status	F^2
H1 TC→CR	0.47	0.03	14.23	0.00	0.39	0.53	Accepted	0.294
H2 CR→ASC	0.40	0.02	14.91	0.00	0.34	0.44	Accepted	0.273
H3 TC→CR→ASC	0.19	0.01	10.41	0.00	0.15	0.22	Accepted	-
H4 TC→ASC	0.45	0.02	16.47	0.00	0.40	0.51	Accepted	0.358

Table 2 compiles the item's outer loading values (Bivariate Correlation), all of which are above 0.50. This demonstrates the establishment of indicator reliability. All constructs in Table 2 have a Cronbach Alpha exceeding the required threshold of 0.7. The model shows the achievement of internal consistency reliability. Convergent validity is assessed by examining the Average Variance Extracted (AVE), which should exceed 0.5 to confirm convergent validity. (Hair et al., 2006). The data in Table 2 indicates that the average variance extracted values in the current study model for all constructs are above 0.5, which confirms the convergent validity. Discriminant

4 results (0.477, 0.401, 0.191, and 0.458) respectively (Hair et al., 2014), significance level P values (0.000 for each hypothesis) with confidence intervals LCI - UCI (H1 0.393-0.536, H2 0.347-0.449, H3 0.154-0.225, H4 0.400-0510) (Preacher and Hayes, 2008), indicating the acceptance of H1, H2, H3, H4. Furthermore, the results also show the level of effect size with a medium effect size for H1 and H2 and a large effect size for H4.

4.3 R² Variance Explained

While evaluating R² for the present study model, Academic Self Concept shows 0.545 (Moderate degree of variance), whereas Students' Creativity with 0.226 (weak) variance explained.

Table 5: R² Variance Explained

Endogenous Latent Variable	R Square	Variance Explained (%)	Variance Explained
Academic Self Concept	0.545	54.5%	Moderate
Students Creativity	0.226	22.6%	Weak

4.4 Predictive Relevance - Q² (In Sample)

Q² values are being produced for the endogenous latent variables to evaluate the predictive significance of the study model using cross-validation. Q² is being computed using the Blindfolding approach with an Omission distance of 7. The present study assessed students' creativity shows Weak predictive relevance with Q² = 0.116 whereas Academic self-concept shows a moderate level of Predictive relevance with Q² = 224.

Table 6: Q² Predictive Relevance

Endogenous Latent Variable	Q Square Q² (=1-SSE/SSO)	Predictive Relevance
Academic Self Concept	0.116	Weak
Student's Creativity	0.224	Moderate

5. Discussion

In the current study, Hypothesis 1 has confirmed a strong and statistically significant correlation between students' Creativity and their Attitude toward Technological Change, with a beta coefficient of 0.477. The accepted hypothesis aligns with the literature and the investigation conducted by Ahmad et al. (2022). Educational technology is essential for nurturing students' creativity in the 21st Century. Higher Education Institutes (HEIs) must utilize technology to assist students in enhancing their inventive talents for success. Integrating the current study components of Attitude towards technological change and students' creativity with Kurt Lewin's three-stage model as the theoretical framework. The planned change model suggests that the implementation of technological resources in Public and Private Higher Education Institutions alters students' behaviors, including orthodox thinking, limited global exposure, passive class participation, reliance on copying, and ineffective brainstorming. This disruption encourages students to embrace new behaviors such as unconventional thinking, larger viewpoints, active participation in learning, a growth mindset, and a tendency to generate inventive ideas.

In this study, a robust and statistically significant link was discovered between students' creativity and academic self-concept, indicated by a beta value of 0.401 for Hypothesis 2. The accepted hypothesis aligns with the literature and the study by Joussemet et al. (2010). Students who cultivate creativity in their learning environment aim to merge new concepts with their existing knowledge and apply them beyond the classroom. This practice of integrating concepts can help students excel in exams by providing well-thought-out cognitive examples in response to questions. Students can earn high-Grade Point Averages (GPAs) by confidently and creatively striving for exceptional performance in exams. By developing creativity abilities, kids recognize the importance of learning and implementing concepts through methods beyond traditional classroom instruction.

The study discovered that students' creativity significantly mediates the relationship between their access to technology and academic self-concept, with a beta value of 0.191 in hypothesis 3.

The creativity of students plays a crucial role in mediating the impact of technological changes in the learning environment. It enhances students' learning attitudes, facilitates knowledge sharing, and collaboration, and fosters the development of research skills. Donche et al. (2013) and Razak (2010) suggest that utilizing technological tools and facilities might enhance creative talents, which in turn positively influences students' academic self-concept (Cheston et al., 2013). Chai and Fan (2018) proposed that technological advancements, such as the E portal, provide students with access to online materials like videos, lectures, and notes. This exposure enhances students' awareness and supports their innovative study practices and academic self-concept.

The study confirmed in hypothesis 4 a strong and statistically significant relationship between an individual's attitude towards technological progress and their academic self-concept, with a beta coefficient of 0.458. The accepted hypothesis aligns with the literature and the investigation by Kuleto et al. (2022). Technology serves as a conduit for delivering knowledge to pupils in an educational environment. Technology enhances students' problem-solving abilities, particularly in degree programs with intricate subjects. Technology allows students to collaborate or work individually to choose which tool can assist them in resolving academic challenges. Additionally, students can monitor their progress via the e-portal. Classrooms that are technologically integrated with interactive whiteboards, audio systems, video demonstrations, various applications, websites, blogs, vlogs, case study-based documentaries, gamification, and IoT can assist students in creating podcasts, academic videos, movies, and recorded background voices (Foley Art). These technologies also enable students to develop solutions for emerging issues, which can then be shared in class to spark enthusiasm among peers and on social media platforms Technology-integrated learning helps students acquire essential technical skills that might be advantageous to them in various ways.

The present study incorporates the "Social Exchange Theory" to explain how Higher Education Institutes create an environment that encourages students to engage in social exchange, fostering creativity. In return, Students enhance their inventive skills and innovate within their academic field on campus. HEI Students employ their creative abilities to create things, generate business ideas, and conduct experiments for professional development, which enhances societal progress and boosts the academic institute's reputation.

5.1 Research Implication

The research implication of the present study emphasizes the theoretical and practical applications, depending on the transformational nature of change in the public & private sector universities of the province of Sindh Pakistan.

5.1.1 Theoretical Implication

Possessing the foundation of the Kurt Lewin Model of the planned transformation. The study aimed to observe how students' creativity and academic self-concept changed based on the availability of learning technologies in their Alma Mater. Utilizing the model, the initial stage involves altering the perception of Technological Change in the learning environment of Public and Private sector universities to disrupt old learning behaviors. In the subsequent Change/Transition stage, students' new behavior is cultivated through fostering creativity. Finally, in the last stage, the outcome of the newly developed behavior is characterized by a high academic self-concept, leading to the solidification of the entire change process.

5.1.2 Practical Implication

The current study aligns with the HEC Vision 2025 and the 4th UN SDG "Quality Education," offering significant commercial, economic, and societal implications. With the advancement of technology facilities, the public and private universities in Sindh Province would achieve a prominent position in international rankings for managing higher education institutes.

Higher Education Institutes aim to have an impact on society by integrating academic learning and teaching with real-world commercial activities. Transformational leaders and administrators in Higher Education Institutions (HEIs) must effectively respond to future academic changes related to technological advancements and updated facilities by promptly implementing such anticipated transformational adjustments.

The study highlights the significant impact of students' attitudes towards technological change/facilities in their learning environment on their academic self-concept. This has significant ramifications for leaders and decision-makers of both Public and Private sector universities since students are pivotal to the institution's reputation and financial prosperity.

5.2 Limitations of the Study

The study used a quantitative method, which restricted the ability to properly understand the intricate behavioral elements of the research participants. The current study does not include behavioral measurements before technological intervention.

The study's results cannot be universally applied or generalized to other countries due to its concentration on a specific area in Pakistan, namely Sindh.

5.3 Future Direction

Future research can explore the influence of technological amenities on students' motivation.

Future studies can be conducted on Transformational change concerning Technology transmits focus on other corporate sectors, either service providers or fast-moving consumer goods. (FMCGs).

Future scholars should do qualitative research using the factors from the current research.

Prospective researchers can carry out a forthcoming study focusing on the variable of technological breakthroughs at the school level.

For future researchers, the present study can be utilized as a longitudinal study to detect and examine any prospective change that might occur over a while.

5.4 Conclusion

Adadvancements in educational technology for younger generations have led to shifts in knowledge accumulation. Learning methods are being redesigned to adapt to the changing landscape of education, catering to students at the beginning of their higher education journey and those transitioning into professional roles.

The current study investigates transformational change, specifically examining students' attitudes toward technological advancements to enhance their creativity and imagination, enabling them to capitalize on opportunities and address emerging global challenges.

The higher education sector in Sindh Province, Pakistan urgently requires improvements in technology and facilities. The technological revolution is seen as a significant change that impacts the improvement of students' self-concept and performance, as well as the overall success of the Institute.

References

Ahmad, I., Ali, A., Khan, I., & Khan, F. A. (2014). Critical Analysis of the Problems of Education in Pakistan: Possible Solutions. *International Journal of Evaluation and Research in Education, 3*(2), 79-84

Bodla, M. A., & Naeem, B. (2014). Creativity as a mediator for intrinsic motivation and sales performance. *Creativity Research Journal, 26*(4), 468-473.

Burke, M., Marlow, C., & Lento, T. (2010, April). Social network activity and social well-being. In Proceedings of the SIGCHI conference on human factors in computing systems (pp. 1909-1912).

Burnes, B. (2020). The origins of Lewin's three-step model of change. *The Journal of Applied Behavioral Science, 56*(1), 32-59.

Chai, J. X., & Fan, K. K. (2017). Constructing creativity: social media and creative expression in design education. Eurasia Journal of Mathematics, *Science and Technology Education, 14*(1), 33-43.

Cheston, C. C., Flickinger, T. E., & Chisolm, M. S. (2013). Social media use in medical education: a systematic review. *Academic Medicine, 88*(6), 893-901.

Ekvall, G., & Ryhammar, L. (1999). The creative climate: Its determinants and effects at a Swedish university. *Creativity research journal, 12*(4), 303-310.

F. Hair Jr, J., Sarstedt, M., Hopkins, L., & G. Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European business review, 26*(2), 106-121.

Granero-Gallegos, A., Baena-Extremera, A., Escaravajal, J. C., & Baños, R. (2021). Validation of the Academic Self-Concept Scale in the Spanish university context. *Education Sciences, 11*(10), 653.

Gurtoo, A., & Tripathy, A. (2000). Assessing workers' attitude towards technological change: Scale Construction. *Indian Journal of Industrial Relations, 35*(4), 519-531.

Hahn, E. D., & Ang, S. H. (2017). From the editors: new directions in the reporting of statistical results in the Journal of World Business. *Journal of World Business, 52*(2), 125-126.

Haider, K., Kerio, G. A., & Kazimi, A. B. (2020). Higher Education in Pakistan and Malaysia: A Comparative Analysis of their Education Policies in the Modern Era of Technology. *Global Educational Studies Review, 3*, 103-13.

Hair Jr, J. F., Sarstedt, M., Ringle, C. M., & Gudergan, S. P. (2017). Advanced issues in partial least squares structural equation modeling. SAGE publications.

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis (*Vol. 6).

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European business review, 31*(1), 2-24.

Hendrik, B., Ali, M. N., Nayan, N. M., Mat Isa, N. A., & Masril, M. (2022). A New Robotic Learning Activity Design to Increase the Figural Creativity: Originality, Elaboration, Flexibility, and Fluency. *International Journal on Advanced Science Engineering Information Technology, 12*(1), 114-120.

Henriksen, D., Creely, E., Henderson, M., & Mishra, P. (2021). Creativity and technology in teaching and learning: a

literature review of the uneasy space of implementation. *Educational Technology Research and Development*, 1-18.

Jahnke, A., Arp, H. P. H., Escher, B. I., Gewert, B., Gorokhova, E., Kühnel, D. & MacLeod, M. (2017). Reducing uncertainty and confronting ignorance about the possible impacts of weathering plastic in the marine environment. *Environmental Science & Technology Letters*, *4*(3), 85-90.

Jayanthi, S. V., Balakrishnan, S., Ching, A. L. S., Latiff, N. A. A., & Nasirudeen, A. M. A. (2014). Factors contributing to the academic performance of students in a tertiary institution in Singapore. *American Journal of Educational Research*, 2(9), 752-758.

Karasvirta, S., & Teerikangas, S. (2022). Change organizations in planned change-A closer look. *Journal of Change Management*, *22*(2), 163-201.

Kuleto, V., Bucea-Manea-Țoniş, R., Bucea-Manea-Țoniş, R., Ilić, M. P., Martins, O. M., Ranković, M., & Coelho, A. S. (2022). The potential of blockchain technology in higher education as perceived by students in Serbia, Romania, and Portugal. *Sustainability*, *14*(2), 749.

Lehmkuhl, G., von Wangenheim, C. G., Martins-Pacheco, L. H., Borgatto, A. F., & ALVES, N. D. C. (2021). SCORE-A model for the self-assessment of creativity skills in the context of computing education in K-12. *Informatics in Education*, *20*(2), 231.

Liang, C., & Lin, W. S. (2015). The interplay of creativity, imagination, personality traits, and academic performance. Imagination, *Cognition and Personality*, *34*(3), 270-290.

Moore, K. A., & Lippman, L. H. (Eds.). (2006). What do children need to flourish? Conceptualizing and measuring indicators of positive development (Vol. 3). *Springer Science & Business Media*.

Naviwala, N. (2016). Pakistan's Education Crisis: The Real Story. Woodrow Wilson International Center for Scholars.

Ojala, M. (2012). Hope and climate change: The importance of hope for environmental engagement among young people. *Environmental Education Research*, *18*(5), 625-642.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods, 40*(3), 879-891.

Ranjit, G. (2022). Explicating intrinsic motivation's impact on job performance: employee creativity as a mediator. *Journal of Strategy and Management*, *15*(4), 647-664.

Razak, R. A., & See, Y. C. (2010). Improving academic achievement and motivation through online peer learning. *Procedia-Social and Behavioral Sciences, 9*, 358-362.

Rong, Q., Lian, Q., & Tang, T. (2022). Research on the Influence of AI and VR Technology for Students' Concentration and Creativity. *Frontiers in Psychology*, *13*, 767689.

Saiti, A., Abbott, I., & Middlewood, D. (2018). University governance: insights from England and Greece. *International Journal of Educational Management*, *32*(3), 448-462.

Shen, D., & Chang, C. S. (2023). Implementation of the flipped classroom approach for promoting college students' deeper learning. *Educational technology research and development*, 1-25.

Stes, A., & Van Petegem, P. (2014). Profiling approaches teaching in higher education: a cluster-analytic study. *Studies in Higher Education, 39*(4), 644-658.

Taylor, J. (2017). Pakistan Higher Education Commission Vision 2025.

Valquaresma, A., & Coimbra, J. L. (2021). Creativity, learning and technology: Lights and insights for new worldmaking possibilities in education. *Creativity. Theories-Research-Applications*, *8*(1), 38-51.