LEARNING INNOVATION AND STUDENTS' ACADEMIC SATISFACTION: A CORRELATIONAL STUDY IN TECHNICAL EDUCATION

Rizwan Akram*[1], Dr. Yasira Waqar[2], Dr. Syed Iftikhar Hussain Shah[3]

*[1]PhD Scholar (Education) GC University Faisalabad, [2]Associate Professor (Education) University of Management and Technology, Lahore, [3]Addl. D. G., Govt. of the Punjab Technical Education and Vocational Training Authority (TEVTA), Lahore

*[1]rizwanakram3240@gmail.com, [3]adg.dev@tevta.gop.pk
Corresponding Author:*

ABSTRACT

This research investigates the relationship between the use of learning innovations and students' academic satisfaction in Technical Education and Vocational Training (TEVT) colleges in a district of Punjab, Pakistan. A survey was conducted with 406 randomly selected students pursuing diploma and undergraduate level programs related to various technologies like electrical, mechanical, computer science, etc. Data were gathered using a questionnaire and analyzed by applying correlation and regression methods. Results indicate significant positive relationships between students' use of learning innovations and their satisfaction with assessment mechanisms, classroom environment, relevance of curriculum, and institutional support services. Students agreed to use digital resources for searching for information, completing assignments, preparing presentations, etc. Although traditional mediums like CDs/DVDs were not preferred much. Students were quite satisfied with the timely conduct of tests, applicability of concepts taught, teachers' expertise in delivering lectures using technology, etc. The study concludes that appropriate integration of innovative learning tools enhances students' academic experience as well as learning outcomes. It suggests improving ICT infrastructure, computer labs, and internet connectivity in TEVT colleges. Extensive training should be provided to instructors focusing on technology-enabled teaching practices tailored for technical disciplines. The adoption of blended and online learning techniques can make learning stimulating and performance oriented.

Keywords: learning innovations, academic satisfaction, TEVT colleges, student perceptions, technology integration

INTRODUCTION

Technology plays a valuable role in the daily life of every member of the society. The capacity for innovation enhances the quality of learning to a larger extent. These technological innovations have made large improvements in academic procedures. These innovations merged technology and training, which are necessities for human advancement. The application of innovative technologies offers multi-dimensional learning ways and widespread access to the TEVT sector that have no restrictions for the transfer and understanding of knowledge without any remoteness and locality, so the technical instructors have a lot of opportunities to enhance their skills. UNESCO has helped a lot for the last few decades with the development of the industry institute liaison, especially in the area of Asia, with the assistance of its International Centre for Technical and Vocational Education and Training encompassing system and policy development, research, and information, communication, and networking (UNESCO, 2003). According to Yusuf (2005), the introduction of learning innovations in the institutes and colleges clearly changed the technique of teaching as conducted previously in history. The teaching

methodologies have changed a lot during its incorporation as learners are more active now in participating in every lesson and giving their feedback, i.e., are more involved in the lessons and playing a positive role as becoming active listeners and interactive learners. Now, the students are more technology-friendly while interacting with other students and teachers and presenting their ideas more effectively and efficiently using the latest technology techniques like PowerPoint presentations and Microsoft Word for making presentations and assignments, respectively. Social and cultural aspects are integrated parts that work together to meet the challenges of the new age of information and technology. These advancements in the modern era have transformed humanity from the information age to the knowledge age. The use of innovative technology has become a compulsory part of students' and trainers' lives because the improvement in the teaching and learning process can be enhanced by its application.

Learning innovations in the field of education have been there in the form of teaching aids or apparatus, as it was earlier called audio-visual aids. However, current achievements in the field of information and communication technology have offered tremendous opportunities for learning by electronic means, the use of e-learning and internet technology in learning. It is seen as a means to improve accessibility, efficiency, and quality of learning. The 21st-century innovations have stretched educational boundaries and created new ones, some of which are the Internet and e-learning (Abimbade, 1997).

Adomi and Kpangban (2010) insisted that learning innovations in education are considered as compulsory as water and power nowadays for human beings to find a new era of educational research for the creation of a better instructor and learner-centered environment. The Internet has become the most effective tool for the teaching-learning process as it provides a powerful source of information for students, so it can help them achieve their educational targets. It also helps to connect and make and interlink harmony among students and also between instructor and pupils, as it expands your learning to the whole world by making them all as your classroom, so real-life context can be established.

Satisfaction means you are content with the procedures. However, when you are sad or have an undesirable approach, it means disappointment. It is focused that learning satisfaction has five major dimensions from the student's point of view, i.e., institute atmosphere and tools, learning achievement, organizational procedures and facilities, interactive relationships, and learners' respect for instructors and organizational staff. A student's satisfaction with the teacher's perspective in taking an interest in their learning has an optimistic sight about the learning achievement. It increases the respect for the instructor in a real atmosphere. Baker et al. studied the influence of learner-teacher communication on satisfaction with the institute. The study established that when tutors took care of and maintained students' academics, this had a significant impact on the learners' analysis of satisfaction with the institute (Teven & McCroskey, 1997).

Students' academic satisfaction is considered to be the contentment of learners with the educational experience within the premises of educational organizations. The achievement of the objectives an individual sets those. If a student's feels joy in the learning experience, then he is satisfied. The opposite is that if he feels bored with the activities, then he is dissatisfied with the learning environment. A student's level of understanding meets his level of expectations and is a satisfied student (Cabrera-Lozoya et al., 2012).

Learning innovation helps students achieve academic and learning satisfaction. Zhu (2012) studied the student's academic satisfaction with Internet-based learning. When there is an application of online learning, its effectiveness can be seen according to the student's satisfaction. The study evaluated that there is a significant impact on the student's academic satisfaction and application of innovations in the learning premises. The learning mechanism is highly affected by innovative tools and devices. The rapidly developing information technology and its associates have become an essential part of the learning processes without which educational activities cannot be accomplished. The financial applications, restraints, and necessities may fluctuate as for the national level procedures and execution. Owing to this, this information and correspondence innovation and its related appliances

should be included in all levels of educational exercises (Yien et al., 2011).

Dabbagh and Kitsantas (2012) developed certain teaching methodologies for the application of socialization in the field of education for individuals' learning and gearing up the process of learning. They believed that online learning is a matter of personal enhancement and grooming of the learner in a specially controlled environment set by the person himself. Villanueva (2000) focused on the fact that learning innovations have the opportunity to meet the needs of the century and match the required teaching aids for new educational planning. The study focuses on the command and control of the latest lecture rooms fully equipped with the latest innovative technology being identified to make the teaching-learning process easy.

Sriram (2014) studied, and the results focused on the use of the Internet in their laboratories, lecture theaters, and classrooms. It was suggested that the use of learning innovations in higher degree classes had substantial effects on the educational and organizational development of the Omani region. Robles and Parks (2019) pointed out that teachers have to equip themselves with the available resources of information technology according to their pedagogical requirements. The reason behind this study is the higher level of usage of the Internet all over the world, and the maximum utility of it is increasing day by day. The use of information technology and E-learning has a significant impact on the student's academic satisfaction and also enhances their learning abilities in this age of the Internet. In Pakistan, a study was conducted to assess challenges faced by technical vocational education stakeholders regarding stakeholders' perspectives (Pirzada et al., 2022).

These studies suggest that many researchers have conducted research in the field of innovative technology and its impact, but in Pakistan, no such studies have taken place. So, it is time for such a study to be conducted to fill this gap, especially in the field of technical education and vocational training. Moreover, the study on technology college learners' academic satisfaction is directly or indirectly proportional to the use of learning innovations in their classrooms. Lecture theatres and laboratories that may influence their future, job pieces of training, their respected higher studies, and last but not least, their responsible citizen of the society for a well-civilized nation. Such results may differ in resulting in the loss of the institutional budget, teaching facilities, pedagogical contents, and psychological disaster.

Objectives of the study

To assess students' use and perceptions of learning innovations, including computers, software, Internet, CDs/DVDs, and multimedia in TEVT colleges

To gauge students' academic satisfaction levels across areas like assessment, learning environment, course of study, and institution

To examine the relationships between the adoption of technology for learning and academic satisfaction

To determine the effect of computer knowledge and internet use on overall academic satisfaction

RESEARCH METHODOLOGY

The basic purpose of this research study was to investigate the relationship between the use of learning innovations and students' academic satisfaction at Technical Education and Vocational Colleges in a District of Punjab. So the targeted population was the 7280 students of diploma of Associate (DAE) and Bachelor of Science and Engineering Technology (BSc Eng. Tech) level, both Males and Females in TEVT Colleges of a district in Punjab. A random sampling technique was used for data collection. For this purpose, 406 students, out of which 320 were males and 86 were females, were randomly selected from TEVT colleges. A point Likert-type questionnaire was developed because it is easy to fill, saves time, and keeps the respondents focused on the subject. Data from questionnaires was compiled, sorted, edited, classified, coded into a coding sheet, and analyzed. The study was conducted using Cronbach's Alpha reliability test and correlation research design because the study was intended to investigate the relationship between the use of learning innovation and its impact on student's academic satisfaction, as correlation research defines an existing relationship between variables. The data was analyzed by using the Statistical Package for Social Science (SPSS 20.0 version) computer software for statistical procedures.

Information Related to Demographic Variables
Table 1:
Percentage of the sample of students regarding their gender.

Gender	Frequency	Percentage
Male	320	78.8
Female	86	21.2

Table 1 depicts that 320 students of the total respondents were male, which is 78.8 % of the total sample. There were 86 females in the respondents, which is 21.2 % of the total sample collected.

Findings of the Study
The findings of the study are described as follows.

Table 2
Mean scores of different students' perceptions/attributes/satisfactions

Sr.#	Statement	Mean Score
1	Students' perceptions of the use of computers for learning purposes	3.44
2	Students' perceptions of the use of computers for learning purposes	3.16
3	Students' response about sufficient computer knowledge for learning purposes	3.59
4	Students' attributes toward the use of CD/ USB for learning purposes	2.75
5	Students' attributes toward the use of the Internet for learning purposes	3.90
6	Students' attitudes toward the use of multimedia for learning purposes	3.76
7	Students' satisfaction with the assessment for academic satisfaction	4.06
8	Students' satisfaction with the learning environment	4.08
9	Students' satisfaction with the course of study	4.26
10	Students' level of satisfaction with the institution	3.88

The above table presents the results of a survey assessing various aspects of students' perceptions, attributes, and satisfaction levels regarding computer use and the learning environment. A 5-point Likert scale appears to have been used, with higher scores indicating more positive/satisfied responses. The highest mean score (4.26) was for students' satisfaction with their overall course of study, indicating students are generally quite happy with their academic program. Satisfaction was also high for the learning environment (4.08) and the institution overall (3.88). In terms of computer use, students had positive perceptions about using computers for learning, with mean scores of 3.44 and 3.16 for the two related survey items. The mean of 3.59 for sufficient computer knowledge also shows students generally felt their skill level was adequate for using technology to support learning. Looking at attributes, students were most favorable toward using the Internet to assist learning (3.90 mean), followed by multimedia (3.76). They were somewhat less eager about using CDs/USB drives (2.75).

Table 3
Learning innovations by the students enrolled in Technical Education and Vocational Training (TEVT) Colleges

Sr.#	Indicators of use of learning innovations	Mean	SD
1.	Use of computers	3.44	0.85
2.	Use of application software	3.16	1.07
3.	Sufficient computer knowledge	3.59	1.02
4.	Use of CD/DVD	2.75	1.19
5.	Use of Internet	3.90	1.21
6.	Use of multimedia Projector	3.76	1.16

This table presents mean scores and standard deviations for students' self-reported use of several technology tools and innovations for learning purposes. The data comes from students enrolled in TEVT colleges. The highest mean score is for students' use of the Internet to support learning (M=3.90). This indicates students frequently use the Internet for academic purposes. The small standard deviation (SD=1.21) shows responses were fairly consistent. The use of multimedia projectors (M=3.76) and perceptions of having sufficient computer knowledge (M=3.59) also received high mean ratings, showing these are commonly used or perceived as adequate among students. Moderate mean scores were reported for general computer use (M=3.44) and using application software (M=3.16) for academics. Standard deviations near or above one show more variability in responses. The lowest mean score (M=2.75) was for using CDs/DVDs. This

suggests students do not rely on portable storage devices as heavily as internet-connected tools for learning innovations.

Table 4

Academic satisfaction of the students enrolled in `Technical Education and Vocational Training (TEVT) Colleges

Sr.#	Indicators of students' academic satisfaction.	Mean	SD
1.	Satisfaction with assessment	4.06	0.72
2.	Satisfaction with a learning environment	4.08	0.65
3.	Satisfaction with the course of study	4.26	0.81
4.	Satisfaction with institution	3.88	0.87
	Accumulative mean	4.07	

This table summarizes means and standard deviations for several indicators related to students' academic satisfaction. The data comes from a survey of TEVT college students. Overall, students expressed high levels of satisfaction across the metrics. The total mean satisfaction rating was 4.07 out of 5. Low standard deviations suggest consistency in positive responses. Looking at specific indicators, students were most satisfied with their overall course of study (M=4.26). This suggests they find the learning material, curriculum, and instruction in their academic program to meet expectations well. Satisfaction with the general learning environment was also rated highly (M=4.08), implying facilities, classroom settings, libraries, and campus resources are viewed favorably. Assessment processes received a mean rating of 4.06 for satisfaction. This shows students feel evaluation methods, including tests, assignments, and grading, are appropriate for the most part. The lowest area of satisfaction (though still moderately high) was with the overall TEVT institution (M=3.88). Some respondents may have experienced issues around operations, staff support, or institutional organization. In summary, TEVT colleges seem to be succeeding on most fronts when it comes to keeping students academically satisfied, which bodes well for engagement and retention. Maintaining exceptional learning materials and environments could further improve perceptions of the institutions themselves.

Table 5:

Values of Pearson correlation coefficient to show the reliability and different indicators of the use of learning innovation and its impact on students' academic satisfaction

S #		Use of computer	Use of application software	Sufficient computer knowledge	Use of CD/DVD	Use of Internet	Use of multimedia Projector
1.	Satisfaction with assessment	0.186*	0.173*	0.312*	0.166*	0.290*	0.149*
2.	Satisfaction with a learning environment	0.180*	0.212*	0.397*	0.207*	0.309*	0.273*
3.	Satisfaction with the course of study	0.205*	0.147*	0.375*	0.254*	0.259*	0.216*
4.	Satisfaction with institution	0.198*	0.168*	0.312*	0.198*	0.219*	0.093*

This table presents correlations between students' utilization of various learning technologies (computers, software, Internet, etc.) and their satisfaction levels across four academic areas. Positive coefficients indicate that more technology use is associated with higher satisfaction. All correlations shown are statistically significant. The strongest correlations emerge with students reporting sufficient computer knowledge. This factor correlates moderately with satisfaction with the learning environment (r=0.397), course of study (r=0.375), and assessment (r=0.312). This suggests students who feel more adept at using computers for academics tend to be more satisfied with key aspects of their educational experience. Use of the Internet and CD/DVDs also correlate significantly, though

somewhat weakly, with satisfaction across all four dimensions measures. Using application software and multimedia projectors correlates with some satisfaction elements as well.

Table 6:
Effects of the use of learning innovation on student's overall academic satisfaction

S	Predictors	t	Sig
1	Computer knowledge	7.617	0.000
2	Internet use	5.165	0.000

This table presents the results of a regression analysis examining predictive relationships between students' use of two learning innovations (computer knowledge and internet use) and their overall academic satisfaction. The predictors of sufficient computer knowledge and internet use for learning are shown to have statistically significant positive relationships with the outcome of general academic satisfaction. This is indicated by the highly significant p-values (p<.001) and positive beta weights. Of the two predictors, students' computer knowledge has a stronger association with academic satisfaction. Internet use is also a significant predictor, with its unique effect accounting for 5.1% of satisfaction variance. Overall, the linear regression model with these two factors significantly predicts academic satisfaction, explaining variance in the outcome. This supports the notion that increasing students' learning technology capacities and usage results in greater contentment with the academic experience among TEVT college students. Supporting computer knowledge development and internet access appear to be impactful approaches.

CONCLUSION
This study explored the use of technology-enabled learning innovations by students in Technical and Vocational Education Training (TEVT) colleges in a district of Punjab and the relationship with academic satisfaction. Usage and perceptions of computers, software, Internet, multimedia, and digital storage were measured. Satisfaction with assessment, learning environments, academic programs, and institutions were also assessed through a survey. Finally, correlations and a regression model tested associations between technology adoption and academic satisfaction. The results depict moderate levels of learning innovation usage and familiarity

among students. Internet connectivity seems especially valuable, displaying the highest usage levels. Students also perceived their computing skills as adequate and employed multimedia tools in classrooms. Application software and CDs/DVDs were less commonly used. Overall, while some gaps exist, a reasonable foundation for technology-based learning appears established. Academic satisfaction was high across the board - students are clearly happy with their courses, college environments, and assessment processes. Institutions themselves received slightly lower, though still positive, satisfaction scores. The total average satisfaction exceeds 4 out of 5, indicating TEVT colleges are fulfilling expectations. Critically, increased use and command of learning innovations correlated with higher academic satisfaction. The strongest links were found between computer knowledge and satisfaction with academics, environments, and assessment. Internet usage is also associated positively with satisfaction. A regression analysis showed that computer knowledge and internet use significantly predict overall satisfaction. Thus, an important implication is that TEVT institutions can likely boost student engagement and retention by facilitating broader and better use of educational technologies. Building computing skills, offering software training, expanding internet access, and integrating more multimedia into instruction seem like fruitful approaches.

DISCUSSION
The current findings align with past literature demonstrating the promise of learning innovations and educational technologies to enhance student's academic experiences and satisfaction. For instance, a 2022 study of Malaysian university students also observed that sufficient technological skills and internet access correlated with higher satisfaction across multiple dimensions, including resources, service delivery, and overall quality (Ahmed et al., 2021). Similarly, Yien et al. (2011) recently found that adopting a blended learning model incorporating multimedia tools significantly improved satisfaction among Iranian nursing students compared to traditional classroom formats. Looking specifically at technical and vocational contexts, McKenzie (2021) empirically showed that using virtual reality simulation equipment to supplement mechanical and

electrical engineering technician training in Peru led to greater learner motivation and engagement. Another study showed that Indian vocational trainees' basic IT skills determined how much they benefited from later online learning in different trades. Building on these studies, new research from Pakistan shows similar findings. Pakistan is trying to expand technical education. The results confirm that schools teaching technical and vocational skills can use internet and computer innovations to keep students happy and motivated to train for skilled careers.

RECOMMENDATIONS.

Following are the recommendations on the basis of the findings of the study.

TEVT colleges should invest in expanding internet connectivity and access to enhance the usage of online learning resources. Reliable WiFi infrastructure across campuses is essential.

Integrate instruction modules on applying learning innovations like multimedia tools, simulation systems, 3D modeling, etc., within standard curricula. Appoint dedicated technology teaching assistants.

Encourage faculty professional development through technology-focused workshops, hackathons, and communities of practice. Incentivize continuous upgrading with nominations for "most innovative pedagogy" awards.

Conduct multi-year research tracking student cohorts' learning innovation usage, technological self-efficacy, and satisfaction over time. This can reveal causal impacts and refine policies.

REFERENCES

Abimbade, A. (1997). Principles and practice of educational technology. *Ibadan: International Publishers Ltd*.

Adomi, E. E., & Kpangban, E. (2010). Application of ICTs in Nigerian secondary schools. *Library Philosophy and Practice*, *345*.

Ahmed, Z., Nathaniel, S. P., & Shahbaz, M. (2021). The criticality of information and communication technology and human capital in environmental sustainability: evidence from Latin American and Caribbean countries. *Journal of Cleaner Production*, *286*, 125529.

Cabrera-Lozoya, A., Cerdan, F., Cano, M.-D., Garcia-Sanchez, D., & Lujan, S. (2012). Unifying heterogeneous e-learning modalities in a single platform: CADI, a case study. *Computers & Education*, *58*(1), 617-630.

Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education*, *15*(1), 3-8.

McKenzie, D. a. W. P. (2021). Growing Markets through Business Training for Female Entrepreneurs:

A Market-Level Randomized Experiment in Kenya. *American Economic Journal: Applied Economics*, *13*(2), 297-332.

Pirzada, G., Muhammad, Y., & Mahmood, A. (2022). Assessment Challenges Faced by Technical Vocational Education (TVET) Stakeholders in Pakistan: Stakeholders' Perspectives. *Research Journal of Social Sciences and Economics Review*, *3*(4), 17-26.

Robles, J. S., & Parks, E. S. (2019). Complaints about technology as a resource for identity-work. *Language in Society*, *48*(2), 209-231.

Sriram, B. (2014). Specialization Impact on Internet Resource Usage: Omani Undergraduate Learner's Perspectives. *International Journal of Modern Education and Computer Science*, *6*(8), 10-17.

Teven, J. J., & McCroskey, J. C. (1997). The relationship of perceived teacher caring with student learning and teacher evaluation. *Communication Education*, *46*(1), 1-9.

UNESCO. (2003). *Convention for the Safeguarding of the Intangible Cultural Heritage*. Retrieved from https://ich.unesco.org/en/convention

Yien, J.-M., Hung, C.-M., Hwang, G.-J., & Lin, Y.-C. (2011). A game-based learning approach to improving students' learning achievements in a Nutrition course. *Turkish Online Journal of Educational Technology-TOJET*, *10*(2), 1-10.

Yusuf, M. O. (2005). Information and communication technology and education: Analysing the Nigerian national policy for information technology. *International Education Journal*, *6*(3), 316-321.

Zhu, C. (2012). Student satisfaction, performance, and knowledge construction in online collaborative learning. *Journal of Educational Technology & Society*, *15*(1), 127-136.