Examining the Relationship between Personalized Learning and Student Achievement at University Level: Evidence from Mirpur University of Science and Technology (MUST), Pakistan

Haroona Qurban [1*] Nabila Kousar [2] Hira Ali Asghar [3]

[1] Assistant Professor/Chairperson, Department of Education, Mirpur University of Science and Technology, Azad Jammu & Kashmir, Pakistan. Email: Haroona.edu@must.edu.pk

[2] M.Phil. Scholar, Department of Education, Mirpur University of Science and Technology, Azad Jammu & Kashmir, Pakistan. Email: nabilakousar348@gmail.com

[3] M.Phil. Scholar, Department of Education, Mirpur University of Science and Technology, Azad Jammu & Kashmir, Pakistan. Email: Hsnali44212@gmail.com

ABSTRACT: This study looked at the connection between learning and student achievement at Mirpur University of Science and Technology (MUST), AJK, Pakistan. Personalized learning customizes teaching, materials, speed, and testing to each student's needs, interests, and strengths. We used a survey that looks at a moment in time. The total group included 6,613 registered students. We randomly picked 350 students. The questionnaire was made by us. Had two parts, each with 15 statements on a scale from one to five. Experts checked the questionnaire for correctness. We tested it for consistency with Cronbach's Alpha, getting α =.928. We used numbers and a correlation test to analyse the data. We found that students had average to high levels of personalized learning experiences. Most agreement was on using technology to help learning, with an average score of 4.12, and 76 percent used it always. Students said that personalized learning improves grades; 70 percent said it helps solve problems and think carefully; 67 percent said it helps solve problems and think carefully; and 72 percent said it helps academic growth. Regarding achievement, 74.6 percent of students had a CGPA above 3.0. Students went to class regularly with an average of 4.67, worked well in teams with an average of 4.61, and completed tasks on time with an average of 4.59. We found a positive link between personalized learning and student achievement with r =.680, p = 0.000, which led us to reject the null hypothesis. The study concluded that personalized learning is a way that meets many student needs, encourages participation, motivation, and success, and has a direct positive effect on student achievement at the university level.

KEYWORDS: Personalized Learning, Student Achievement, Higher Education, University Students, Pakistan

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Corresponding Author
Haroona Qurban
✉ Haroona.edu@must.edu.pk

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Introduction

There is another way of learning called "Personalized Learning" that changes how teaching happens in terms of what's taught how fast students learn and, how they are tested. Personalized learning approaches are those that fit the needs, likes and abilities of each student (Dockterman, 2018). Personalized learning takes the learning process

away from being the same for everyone. Makes it focused on the student. Being focused on the student, fostering a pace of learning and growth, constant progress checks, keeping students interested, making choices based on information, using different ways to teach, and focusing on mastering the subject are all aspects of personalized learning (Abrar et al., 2025). The fact that each student is different, the ability of students to learn on their own, and making training match what students want are the ideas of personalized learning. In college, personalized learning helps students become more engaged, remain in school, and achieve results in their studies (Chen & Wang, 2021). Approaches to learning include student-centered learning, individualized learning, adaptive learning, competency-based learning and technology-enhanced personalized learning. Student achievement refers to how students reach their learning goals, acquire knowledge, and develop skills as shown in their academic performance (Inthanon & Wised, 2024). Student achievement includes feelings, actions, social skills, and thinking about thinking. Personalized learning can help students perform better in school by making sure the lessons are at the right level and move at the right speed for each student. Even though more and more universities are using learning, there is not enough specific information about how personalized learning connects with student achievement (Idowu, 2024). Therefore, this study examined whether a significant relationship exists between learning and student achievement at the university level.

Literature Review

Recently, there has been an increased level of interest in learning as a result of technology, data use, and a focus on pedagogy that focuses on students. Personalized learning is not about having various textbooks or functioning independently of other learners (Gunawardena et al., 2024). Personalized learning is a method of pedagogy that involves lesson planning, instructional process, assessment, and learning environment. The role of the educator in personalized learning includes acting as a mentor and a coach who is knowledgeable about everything (Stanojoska et al., 2024). Student achievement includes feelings, actions, social skills, and thinking about thinking. Personalized learning can help students perform better in school by making sure the lessons are at the right level and move at the right speed for each student. Even though more and more universities are using personalized learning, there is not enough specific information about how personalized learning connects with student achievement (Nilson, 2023). The important characteristics of learning include student focus, ability to learn at diverse speeds and in various ways, ongoing assessment of the progress of the learner, involvement of learners in their learning, use of data to make future decisions use of various methods, creation of a conducive learning environment, and deep understanding (Lindner & Schwab, 2025; Tomlinson & Imbeau, 2023). These features show that personalized learning is distinct from the traditional method of learning. These geographies also simplify design and assessment of learning. Principles of education are those that recognize the uniqueness of each individual, allow students to take responsibility and control over their own learning, help students attach consequences to the subject matter, provide instant feedback, ensure equal opportunity for all, foster positive teacher-student relationships, incorporate data-based decision-making, remain flexible, focus on comprehension, and continually improve (France, 2022; Bali & Holilah, 2021; Khor, 2023).

Personalized learning is becoming more essential in education because schools now have students from different backgrounds. These backgrounds include people who work, people who study part-time, international students, and students who are the first in their family to go to university (Rose et al., 2023). Traditional classes often do not meet all these needs. Personalized learning helps schools deal with students, makes students more interested, helps them stay in school, and gets them ready for jobs that change (Sasikala & Ravichandran, 2024). Personalized learning also makes sure that every student has a chance to do well no matter where they come from. There are ways to do learning. These ways include student-centered learning, individualized learning, adaptive learning, competency-based

learning, and learning that uses technology. In student-centered learning, the student is the person in the learning process (Gafoor, 2024). The teacher helps them. In learning, the speed and the materials are changed for each student, and the teacher often leads the way. In learning, technology and data change the lessons as students learn. In competency-based learning, students show they know the material by spending a set time in class (Rane et al., 2023). In technology-enhanced learning, tools and data help make learning fit each student. These methods often mix together. The best personalized learning uses parts of approaches. The idea of personalization at the university means changing the lessons, changing the ways of teaching lessons, changing the ways of assessment of students, and changing the support that is provided to them so that all these correspond to each particular student (Taherdoost, 2022).

The idea of personalization means that students have an opportunity to study at their own pace and according to their schedule, work, and the way they like to study. The teacher has to know the needs and preferences of each student, including his/her style of thinking, emotions, behavior, and other requirements for life. Student achievement means how much students reach their goals, learn things, and gain skills. This is shown in grades, abilities, and what they learn (Alamri et al., 2020). It includes areas like thinking, feelings, actions, social skills, how they think about their thinking, physical skills, and morals (Taylor et al., 2021; Irons & Elkington, 2021). Students are tested in ways like traditional tests that show what they can do, tests that check progress, and final tests checking themselves and checking each other. Many things can affect how well students do, like who they are, where they come from, how good the school is, what their friends do, how much money they have, the culture around them if they can use technology, how they feel, how motivated they are, and what the teachers do (Thomson, 2020; Arthur, 2022; Royce, 2022; Kocak et al., 2021). The ideas behind this study come from two theories. The first is the theory of learning, where students build knowledge through experiences talking with others and thinking about things. This theory comes from people like Piaget, Vygotsky, and Dewey. The second is the idea that people need to feel they have control, feel good about what they do, and feel connected to others. When those needs are met, people are more motivated and more involved. Personalized learning helps with these needs by letting students choose, giving them tasks that match their level, and helping them build relationships (Vorobyeva et al., 2025).

Objectives, Research Questions, and Hypothesis

These objectives, research questions and hypothesis translate the theoretical framework outlined above into terms.

1. To investigate the level of personalized learning among students.
2. To analyze the students' achievements in MUST.
3. To examine the relationship between personalized learning and students' achievements at university level.

Three corresponding research questions followed, what is the level of personalized learning among students? (QR1), What is the level of students' achievements at MUST? (QR2), What is the relationship between personalized learning and students' achievements at MUST? (QR3). H0: There is no significant relationship between personalized learning and students' outcomes at the University level.

Methodology

This study used a quantitative research design, specifically a cross-sectional survey design, to examine the relationship between personalized learning and student achievement at Mirpur University of Science and Technology (MUST), AJ&K. According to Creswell (2014), quantitative research involves collecting numerical data to explain, predict, or control variables of interest, and is valued for its precision, objectivity, generalizability, and efficiency in data

administration. A survey research design was adopted because it allows the researcher to administer a questionnaire to a sample in order to describe and elaborate the attitudes, beliefs, actions, opinions, or traits of the population. The cross-sectional approach was chosen because it involves gathering data all at once, measuring current opinions or attitudes on a specific topic, and delivering information quickly, including the time needed for survey administration and data collection (Creswell, 2009). The researcher conducted the survey to obtain students' perspectives regarding the needs and barriers of the relationship between personalized learning and student outcomes.

Participants and Settings

The population of the study comprised all enrolled students of Mirpur University of Science and Technology (MUST) AJ&K, which is a collection of people who share similar traits (Creswell, 2012). The population was spread across five faculties: Social Sciences and Humanities, Engineering and Technology, Health and Medical Sciences, MUST Business School, and Natural and Applied Sciences. The DSA office of MUST served as the source of population data (2025). The setting of the study was Mirpur University of Science and Technology (MUST), AJ&K, and the participants were students from these five faculties. A representative sample was chosen using probability sampling, and the final sample consisted of approximately 377 students, with 350 respondents actually participating in the study.

Sampling

The study used probability sampling, which, according to Creswell (2009), involves selecting individuals who are representatives of the whole population. This is the most rigorous form of sampling in quantitative research because the researcher can claim that the sample represents the whole population and can generalize the findings to that population. According to Solvin (2018), choosing the right sample is a crucial step that ensures the applicability and reliability of the study's results. The sample size was calculated using Solvin's formula: $n = N / (1 + N) e^2$, where n is the required sample size, N is the estimated proportion of the population, and e is the margin of error. This yielded a sample of approximately 377 students. The sample was then proportionally allocated across the five faculties using stratified sampling to ensure fair representation of students from each discipline, following the Krejcie and Morgan (1970) method for selecting suitable sample sizes.

Procedure

The data collection process was done in an organized way. First, after finding the students and the school location, the researcher got approval from the research supervisor. As Creswell (2009) says, collecting data means picking the people, getting permission from the institution, making the tools, and then gathering the data. The researcher gave out a questionnaire that they made themselves. It had two parts: Section A with 15 questions about learning and Section B with 15 questions about student achievement. Each question used a five-point scale from Never to Always. There was also a section at the start to collect basic information about the students, like age and grade. To make sure everyone understood, the researcher explained what the questionnaire was about. Gave a version in the local language. They also told the students their answers would be kept private and safe. The purpose of the study was clearly. Students were told how the results would be used. Everyone was reminded they could say no or stop at any time without any problem. Before the collection, a small group of students tried out the questionnaire. This pilot test helped make sure the questions made sense and gave results. After collecting the data, the researcher checked the questionnaire's reliability. The Cronbach's alpha score was.928 which means the tool was very consistent and trustworthy. All the data were analyzed using SPSS software.

Ethical Considerations

Written consent was sought from different departments of MUST. A cover letter was obtained before participants filled out the questionnaire. The researcher ensured informed consent and confidentiality by adhering to ethical rules.

Measure

The study used a questionnaire that was made on its own to look into how personalized learning affects how well students do in school at Mirpur University of Science and Technology (MUST), AJ&K. The questionnaire had two parts. Part A had 15 statements about learning. Part B had 15 statements about how students do in school. That made 30 questions in all. There was also a part for details. This part asked about gender, age, what level of study the person is in, and which department they are in. All the questions used a scale that went from 1 to 5. The number 1 meant never. 5 Meant always. The questionnaire was checked by people who work in the Department of Education at MUST. These people included Dr. Razia Rivi and Dr. Humaira Abbasi. The questionnaire was changed based on their ideas. Also, based on what the supervisor said. A test was done first to make sure the questionnaire worked well and gave answers. The test showed a number of.928, for Cronbach's alpha. This number shows that the answers were very consistent. The data were looked at using SPSS.

Statistical Analysis Plan

Consistent with the hypotheses and design outlined above, the following analytic sequence was used to test the proposed moderation model.

- Data were checked to make sure everything was complete. Out of 34 pilot cases, 33 were valid, which is 97.1%. That's a good rate.
- Descriptive statistics were used to sum up the demographic info and how students answered the items. This included means, standard deviations, frequencies, and percentages.
- Cronbach's alpha was used to check how consistent the 30-item scale was. The result was α =.928, which shows the scale is very reliable.
- Pearson correlation coefficient was used to look at how personalized learning and student achievement were related. The significance level was set at $p < 0.01$, two-tailed.
- The null hypothesis was tested using r, p, and N values.
- Results were presented in tables and pie charts.

Results

The Results follow the order defined in the Statistical Analysis Plan (SAP). This section begins with the sample description, followed by the reliability of the outcome measure, then the descriptive analysis of personalized learning and student achievement, and finally the correlation analysis of the main study hypothesis.

Descriptive Statistics

The sample for the analysis included 350 university students from Mirpur University of Science and Technology (MUST), AJK, Pakistan. The students came from both postgraduate levels. Gender: 149 students (42.6%) were male, and 201 students (57.4%) were female. When it comes to the faculties, 38.0% were from Social Sciences and Humanities, 16.6% were from Engineering and Technology, 14.6% were from Applied Sciences, 17.4% were from MUST Business School, and 13.4 % were from Health and Medical Sciences. About 2.3% had a CGPA between

2.0 and 2.5, 27.7% had a CGPA between 2.6 and 3.0, 57.4% had a CGPA between 3.1 and 3.5, and 12.6 % had a CGPA between 3.6 and 4.0. Descriptive statistics are presented in Table 1.

Table 1

Descriptive Statistics for Student Demographic Variables

Variable	M (SD) or n (%)
Gender: Male	149 (42.6%)
Gender: Female	201 (57.4%)
Faculty: Social Sciences and Humanities	133 (38.0%)
Faculty: Engineering and Technology	58 (16.6%)
Faculty: Natural and Applied Sciences	51 (14.6%)
Faculty: MUST Business School	61 (17.4%)
Faculty: Health and Medical Sciences	47 (13.4%)
CGPA: 2.0–2.5	8 (2.3%)
CGPA: 2.6–3.0	97 (27.7%)
CGPA: 3.1–3.5	201 (57.4%)

Reliability

The personalized learning and student achievement questionnaire showed good internal consistency (α = .928). This indicates that the items in the instrument consistently measured the intended constructs. The reliability findings are shown in Table 2.

Table 2

Internal Consistency of the Questionnaire

Scale	Items	Cronbach's α
Personalized Learning and Student Achievement	30	.928

Descriptive Analysis of Personalized Learning

I see that students at MUST reported levels of personalized learning experiences. The highest agreement was around using technology to support learning (M = 4.12), with 76 % of students agreeing that they use technology often or always. I also see that students reported they use platforms and tools for exam preparation (78 %, M = 4.08). Students said that personalized learning helps students finish tasks well (66 %, M = 3.89). Students also said that personalized learning helps their school grow (72%, M = 3.99). Using platforms and tools helps students improve their grades (68 %, M = 3.95). Getting help and support from teachers helps students grow (67 %, M = 3.90). Students said that they set their learning goals to reach their aims (67 %, M = 3.85) and that they gained speaking skills through personalized learning activities (68 %, M = 3.85). Personalized learning helps students do better on class projects and tasks (65 %, M = 3.83). Active participation in activities improves students' class work (65 %, M = 3.82). Students use feedback from teachers to improve their work (65 %, M = 3.79). Students also use what they learn in life (61 %, M = 3.77). Students understand course material well because of learning (63 %, M = 3.77). Students said that they manage time well for tasks by using learning plans (60 %, M = 3.71). Students feel confident sharing their ideas in class because of learning (58 %, M = 3.67). Students feel free to pick learning methods that help them learn well (57 %, M = 3.66). Students indicated that they freely ask questions about topics during and after class (56 %, M = 3.64). Students work independently on project-based tasks (56 %, M = 3.61). Teachers guide students according to

their learning needs to complete tasks (56 %, M = 3.59). Students participate in tasks related to their courses (53 %, M = 3.53). Students reported that they ask for help from teachers based on their assessment of what they need (49 %, M = 3.46). Students share their opinions and ideas in seminars (43 %, M = 3.20). Descriptive statistics for learning are presented in Table 3.

Table 3

Descriptive Statistics for Personalized Learning Items

Statement	N	M	SD
I use technology to support my learning	350	4.12	.875
I use different online platforms and tools for exam preparation	350	4.08	.930
Personalized learning improves my academic performance	350	3.98	1.050
Using online platforms and tools helps me improve my grades	350	3.95	1.032
Personalized learning improved my overall academic growth	350	3.99	.911
Personalized learning helps me solve problems and think critically in my coursework	350	3.91	1.007
Receiving guidance and support from my teachers helps me grow	350	3.90	1.043
Personalized learning helps me complete tasks successfully	350	3.89	1.023
I complete tasks and assignments on time due to personalized learning	350	3.87	1.026
I set my learning objectives to achieve my goals	350	3.85	1.059
I have improved my communication skills through personalized learning activities	350	3.85	1.030
Personalized learning helps me perform better in class projects and tasks	350	3.83	1.015
Active participation in activities improves my class performance	350	3.82	1.102
I effectively use feedback given by my teachers to improve my work	350	3.79	1.039
I apply what I learn to real life situations	350	3.77	1.043
I understand content courses well due to personalized learning	350	3.77	1.017
I manage time effectively for academic tasks by using personalized learning strategies	350	3.71	1.040
I feel confident sharing my ideas in class because of personalized learning	350	3.67	1.070
I am free to select learning methods that help me learn effectively	350	3.66	1.166
I freely ask questions about difficult topics during and after class	350	3.64	1.049
I work independently on project-based tasks	350	3.61	1.053
Teachers guide me according to my individual learning needs to complete tasks	350	3.59	1.139
I participate in practical tasks related to my courses	350	3.53	1.101
I ask for help from teachers based on my assessment of what I need	350	3.46	1.139

Descriptive Analysis of Student Achievement

Students at MUST demonstrated good academic performance. About CGPA distribution, 74.6% of students had a CGPA higher than 3.0. Students showed positive academic behaviors: they attended class consistently (M = 4.67), worked effectively in teams (M = 4.61), and accomplished tasks on time (M = 4.59). Descriptive statistics for student achievement are presented in Table 4.

Table 4

Descriptive Statistics for Student Achievement

Variable	N	M
CGPA higher than 3.0	350	74.6%
Students attended class consistently	350	4.67
Students worked effectively in teams	350	4.61
Students accomplished tasks on time	350	4.59

Correlation Analysis

The Pearson correlation coefficient value was r = .680, showing a positive link between personalized learning (PL) and student achievement (SA). This positive relation means that higher levels of personalized learning are linked to higher levels of student achievement. The significance level (Sig. 2-Tailed) was p = 0.000, which's well below the alpha threshold of 0.01 ($p < 0.01$). So the correlation is a positive relationship at the 0.01 level, allowing us to reject the null hypothesis. Because of this significance, it can be concluded that the link between learning and student achievement is real and not because of chance. A larger sample size of 349 respondents makes these findings stronger and more precise. Correlations are presented in Table 5.

Table 5

Correlation Between Personalized Learning and Student Achievement

Variable	N	Pearson Correlation	Sig. (2-tailed)
Personalized Learning	350	1	—
Student Achievement	349	.680**	.000

Note: Correlation is significant at the 0.01 level (2-tailed). **p < .01.

Hypothesis Testing

The null hypothesis stated that there is no significant relationship between personalized learning and students' outcomes at the university level. The Pearson correlation coefficient value was r = .680, showing a positive link between personalized learning and student achievement. The significance level (Sig. 2-tailed) was p = 0.000, which is fine below the alpha threshold of 0.01 ($p < 0.01$). Thus, the correlation is a significant positive relationship at the 0.01 level, allowing rejection of the null hypothesis. Because of this significance, it can be concluded that the link between personalized learning and student achievement is actual and not due to chance. A larger sample size of 349 respondents makes these findings stronger and more accurate. These results show a significant positive correlation between personalized learning and student achievement.

Discussions

The findings give evidence that personalized learning is positively and significantly linked to student achievement at MUST. The correlation coefficient of r =.680 ($p < 0.01$) shows that students involved in learning activities get higher marks. Therefore, this proves the notion that every student should receive personalized education depending on his or her needs, interests, and pace. Students indicated that they received some to a great extent of learning. They highly agreed that technology (M = 4.12) and e-learning for preparation for exams (M = 4.08) were effective. Most students felt that personalized learning helped in terms of performance (70%), problem-solving and critical thinking (67%), and task completion (66%). The majority of students also achieved some results, with 74.6% having a CGPA greater than 3.0. All the above-mentioned results support the hypothesis that personalized learning leads to increased

motivation, engagement, and successful academic performance through personal goal setting and progress tracking. However, we cannot say anything about possible correlation since there are a number of other factors such as motivation, previous performance, and quality of teaching. Nevertheless, results give some justification for using personalized learning at university.

Limitations and Future Directions

There are some limits to this study that should be noted. First, the research was done at one university, MUST AJ&K. That's a problem because it makes it hard to say if the results would be the same at other universities or in different settings. Second, the study used a cross-sectional design, which means it collected data only once. Because of that, it can't show cause and effect between the variables being studied. Third, the data came from self-reported questionnaires. People might answer in a way they think is more acceptable, not how they really feel. That's called social desirability bias. It can affect the results. Lastly, the sample only included students from five faculties. So we can't be sure the findings apply to postgraduate students or to fields of study. Future studies could do better by following people over time with a design. That would help see how things change.

Conclusion

This study offers proof that personalized learning and student achievement are closely tied at MUST AJ&K. Students who participate in personalized learning activities such as using technology, picking topics that interest them, studying at their own pace, and getting one-to-one guidance tend to score higher in their courses. The Pearson correlation of $r = .680$ ($p < 0.01$) confirms a statistically significant link, so the null hypothesis can be dismissed. Personalized learning boosts student engagement, motivation, and academic success by customizing instruction to each learner's needs. We recommend that faculty weave personalized learning strategies into their courses, that university administration fund growth and technology, that policymakers back evidence-based programs, and that future researchers use long-term and comparative studies. This research adds to the growing body of work on learning and gives useful ideas for raising student achievement in higher education.

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