ACADEMIA International Journal for Social Sciences
Volume 4, Issue 4, 2025 ISSN-L (Online): 3006-6638

The Role of Artificial Intelligence Technologies in Enhancing Non-Cognitive Skills Among Graduate Learners: A Case Study of Graduate Students at The University of Turbat, Balochistan

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Received: 16-08-2025 **Revised:** 26-09-2025 **Accepted:** 25-10-2025 **Published:** 23-11-2025

ABSTRACT

This study signifies how Artificial Intelligence (AI) technologies relate to non-cognitive skills , critical thinking, decision-making, and self-motivation , among graduate learners at the University of Turbat, Balochistan. A concurrent mixed-methods design was used: quantitative and qualitative data were gathered at the same time so the two strands could be checked against each other. The quantitative side drew on 150 graduate students who completed a structured, twenty-item Likert-scale questionnaire, analyzed in SPSS using descriptive statistics; the qualitative side came from semi-structured interviews with 15 teachers, analyzed thematically. Students generally saw AI tools such as ChatGPT, DeepSeek, and Grammarly as moderately to strongly supportive of academic self-efficacy, decision-making, and problem-solving, with agreement across the twenty items ranging from 35.0% to 57.9%. Six themes emerged from the interviews: AI as a catalyst for motivation, its role in building persistence and resilience, confidence building, AI-assisted decision-making, emotional regulation, and teachers' outlook on AI's future role in non-cognitive development. The weakest results were for persistence in difficult tasks and for independent academic confidence, which suggests that AI on its own may not be enough to build self-directed learning unless it is paired with deliberate teaching practice. The study draws on Bandura's Social Learning Theory and Picard's Affective Computing Theory to explain how AI-mediated observation, reinforcement, and emotionally responsive feedback feed into non-cognitive growth. It closes with recommendations for more structured, critically engaged AI use in higher education, with particular attention to under-resourced regions such as Balochistan.

Keywords: *Artificial Intelligence, Non-cognitive skills, Critical thinking, Decision-making, Self-motivation, Higher education, Balochistan*

INTRODUCTION

Higher education has absorbed artificial intelligence faster than almost any other sector of public life. Within a few years, tools that once sat in computer-science labs are now used routinely by students to draft assignments, check grammar, plan revision schedules, and even talk through a difficult problem set at midnight (Chen et al., 2020; Zawacki-Richter et al., 2019). Most of the research attention so far has followed the obvious question: does AI help students learn facts and pass exams? A quieter, arguably more consequential question has received far less scrutiny , what does constant exposure to AI do to the habits of mind and character that sit outside a test score? Critical thinking, the confidence to make a decision and stand by it, the discipline to keep working when a task gets tedious: these are the non-cognitive skills that employers and educators alike now treat as decisive for long-term success (Ma, Diao, & Wang, 2026).

Non-cognitive skills are best understood as habits of conduct and disposition rather than fixed traits. Heckman and Kautz (2012) describe them as the qualities that let a person work through a difficult social or academic situation and keep moving toward a goal that will not pay off for months or years. They are not inherited so much as practiced, and practice depends heavily on the environment a learner is placed in; the feedback they receive, the models they observe, and the room they are given to try, fail, and try again. Because AI systems now sit inside that environment, offering feedback around the clock and modelling a kind of endlessly patient tutor, it is reasonable to ask whether they are quietly reshaping these habits, for better or worse (Luckin et al., 2016).

Yet the evidence base on this question remains thin, and thinner still outside a handful of well-resourced systems. Pakistani higher education in general, and Balochistan in particular, has seen almost no empirical work asking how students and teachers actually experience AI-mediated learning day to day (Bernstein et al., 2025). Given how quickly tools such as ChatGPT, DeepSeek, and Grammarly have been adopted by graduate learners in this setting, the gap is no longer academic ,it is a live question for curriculum planners right now. This study responds to that gap directly. It asks, first, how AI applications are perceived to shape critical thinking, decision-making, and self-motivation among graduate learners at the University of Turbat; second, which methods of AI use appear most effective for social-emotional learning; and third, what obstacles stand in the way of using these tools well.

LITERATURE REVIEW

AI in Education

AI as a field is older than most people assume, with its intellectual roots often traced to the 1956 Dartmouth Workshop and to earlier work spanning psychology, mathematics, and philosophy (Russell & Norvig, 2021). What has changed in the last decade is not the underlying theory but the scale of deployment: intelligent tutoring systems, learning-analytics dashboards, and conversational agents are now everyday classroom fixtures rather than experimental prototypes (Chen et al., 2020; Zawacki-Richter et al., 2019). ChatGPT and DeepSeek in particular have been described as genuinely transformative for language learning and personalized feedback (Alqahtani, 2023; Dwivedi et al., 2023), and Grammarly has picked up a reputation among writing researchers as a quiet driver of self-editing habits and growth-mindset thinking (Oktaviani, 2022). None of this comes free of concern, though: several authors warn that leaning on AI-generated answers too heavily can dull a student's own analytical instincts (Bernstein et al., 2025; Discover AI, 2022), and that classrooms built around AI interaction risk losing the peer-to-peer contact that social-emotional learning depends on (Ivanov, 2023).

Critical Thinking

Facione (1990) and Ennis (2012) both treat critical thinking as a foundational non-cognitive skill , the ability to weigh assumptions, test evidence, and build an argument that holds up under scrutiny. Paul and Elder (2014) break the skill into reasoning ability, disposition, and a problem-solving orientation, while older reflective-practice traditions going back to Dewey (1910) and Schön (1983) frame it as a loop of experience, action, and reflection rather than a single mental move. Where AI enters this picture is in the tools built to force that loop open: platforms like Riff Bot ask users to justify a decision before moving on, and Grammarly's suggestions push a writer to reconsider phrasing rather than accept a first draft, both of which function as a kind of digital scaffolding for higher-order thinking (Ganguli et al., 2024; Lybeck et al., 2023). Other researchers push back on this optimism, arguing that under certain conditions digital tools narrow rather than widen independent reasoning (Purnomo et al., 2024; Sato, 2021).

Decision-Making

Decision-making research has its roots in management science, where Simon (1977) and later Schoemaker (1993) framed the process as three linked steps: defining the problem, weighing alternatives, and choosing. Hermkes (2024) draws a direct line from this literature to educational settings, arguing that structured decision-making is itself a non-cognitive competence worth teaching deliberately, and March's (2010) work on bounded rationality explains why real decision-makers rarely have the complete information the classical model assumes. AI enters here through its capacity to process far more data than a person could and to surface patterns a human reviewer would likely miss, which several authors credit with sharpening both the speed and the quality of decisions in business and education alike (Agrawal, Gans, & Goldfarb, 2019; Davenport & Ronanki, 2018). The caveat raised consistently in this literature is that AI should sharpen human judgment, not stand in for it , ethical reasoning and empathy remain squarely human responsibilities in any high-stakes decision.

Theoretical Framework

Two theories anchor this study, and they complement each other more than they overlap. Bandura's (1986) Social Learning Theory holds that people pick up new behaviors largely by watching others, being reinforced, and imitating what works; an AI tutor that consistently models patience, structured problem-solving, and calm feedback gives learners something to imitate, even without a human present. Picard's (1995) Affective Computing Theory adds the emotional half of the picture, proposing that a system capable of recognizing and responding to a user's emotional state can support self-awareness, stress management, and adaptive coping. Read together, the two theories suggest AI shapes non-cognitive growth along two separate but overlapping tracks ,one behavioral, built on observation and reinforcement, and one affective, built on emotionally responsive feedback.

AI Tools and Academic Performance

A wide range of AI applications , ChatGPT, DeepSeek, Grammarly, Udemy, and structured role-play simulations among them ,now sit inside routine academic work, from writing support to personalized tutoring (Barrot, 2025; Golan et al., 2023). Instructors report lighter administrative loads (Chen, 2022), students report faster and more frequent feedback (Sun, Yang, Yu, & Suen, 2025), and course content has generally become easier to access and adapt (Alam, 2021). None of that comes without cost: data privacy, algorithmic bias, and questions of academic integrity remain live concerns, and access to reliable AI infrastructure is still far from equal across regions (Kanalove et al., 2023; Openo, 2020) , a point with direct relevance to this study's setting.

Challenges and Opportunities

Taken as a whole, the literature reads less as a verdict and more as an open argument between two positions. On one side, AI is credited with enabling more personalized learning paths, faster and richer feedback, and a stronger sense among students that instruction is responsive to them specifically (SchoolAI, 2025; Chen & Wang, 2025). On the other, researchers flag risks to academic integrity, a thinning of peer interaction, and a real possibility that the convenience of AI displaces the kind of effortful thinking that non-cognitive growth actually depends on (Harvey, Koenecke, & Kizilcec, 2025; Azzahra, Natanael, & Toriqo Abimanyu, 2023). What both sides tend to agree on is that ad hoc adoption is not a strategy , institutions need deliberate, evidence-based frameworks for AI integration, and the University of Turbat, where such a framework is still taking shape, is precisely the kind of setting where this evidence is needed.

METHODOLOGY

Research Design

The study used a concurrent mixed-methods design: quantitative and qualitative data were gathered in the same window of time rather than one after the other, so that the numeric results and the interview material could be checked against each other rather than treated as two separate stories. This choice was practical as much as theoretical , it let the study capture both how strongly students agreed with specific statements about AI, and why teachers thought those numbers looked the way they did.

Population and Sampling

Participants were drawn from the Science and Education departments at the University of Turbat, chosen because these departments held the largest concentration of graduate learners with regular access to AI tools. A random sampling approach gave every eligible student and teacher roughly equal odds of being selected. Questionnaires went out to 200 students and 25 teachers; 165 usable responses came back , 150 from students and 15 from teachers , which formed the basis for the descriptive analysis reported below.

Instruments and Data Collection

The quantitative arm relied on a twenty-item Likert-scale questionnaire built by the researcher after reviewing related literature and adapting items from established scales. The qualitative arm used semi-structured interviews with the 15 teachers, centered on what they had personally observed in students' motivation, persistence, confidence, emotional regulation, and decision-making when AI tools were part of the picture. Before full administration, both instruments went through a pilot round with the same 165 participants to catch unclear wording or ambiguous items.

Data Analysis

Questionnaire responses were processed in SPSS, with means, standard deviations, and percentage-agreement figures used to summarize how students perceived AI's role in their own non-cognitive development. Interview transcripts were coded and grouped through thematic analysis, moving iteratively from initial codes to broader categories until six stable themes emerged across teachers' accounts.

Delimitations

The study was confined to the University of Turbat and, within it, to the Science and Education departments. Readers should treat the findings as bound to this setting rather than as a claim about Pakistani higher education more broadly.

RESULTS

Quantitative Findings

Across the twenty questionnaire items (Table 1), item means clustered between 3.01 and 3.33 on the five-point scale , a band that reads as consistently positive but rarely enthusiastic. Students agreed most strongly with two items: using a variety of AI tools when solving problems (57.9%, M = 3.33) and relying on AI to support decision-making (56.4%, M = 3.31). At the other end, only 41.5% agreed that AI had helped them persist through difficult academic tasks (M = 3.09), and just 35.0% credited AI with building their overall academic confidence and independence (M = 3.01) , the single lowest score in the set. Read together, these

numbers suggest a fairly consistent pattern: students see AI as a genuinely useful problem-solving and decision-support tool, but they are far less convinced it builds the kind of grit or self-reliance that shows up when a task gets hard and no one is helping.

Table 1

#	Survey Item	% Agreement	Mean
1	AI tools provide strong support for academic success	52.1%	3.26
2	Increased confidence in critical thinking after adopting AI	45.7%	3.11
3	AI assists in distinguishing facts from opinions	47.9%	3.13
4	Increased learning confidence after using AI	52.1%	3.19
5	AI supports becoming a better decision-maker	56.4%	3.31
6	AI enhances thinking capacity and academic participation	52.8%	3.26
7	AI improved critical thinking for problem-solving	49.3%	—
8	Use of AI tools to analyze issues for problem-solving	57.7%	—
9	DeepSeek offers new directions for decision-making	54.3%	3.29
10	AI strengthened well-informed academic decisions	47.9%	3.31
11	Motivation as a skill developed through AI support	47.7% disagree	—
12	Daily AI use supports root-cause problem analysis	43.6%	3.15
13	Use of varied AI approaches when solving problems	57.9%	3.33
14	AI boosts motivation in a better learning environment	51.5%	3.11
15	AI improved problem-solving strategies and decisions	48.6%	3.19
16	AI reduced mistakes in decision-making	51.5%	3.29
17	AI applied across situations for better problem-solving	57.2%	—
18	AI encourages critical thinking before deciding	51.4%	3.33
19	AI helped persistence in challenging academic tasks	41.5%	3.09
20	AI contributed to overall academic confidence/independence	35.0%	3.01

Note. Percentages represent proportion of respondents who agreed or strongly agreed with each item (N = 150 students); means are reported on a five-point Likert scale where available.

Qualitative Findings

Six themes emerged from the teacher interviews once the coding was complete.

- Theme 1 - AI as a Catalyst for Motivation and Sustained Engagement: Teachers described AI platforms as good at keeping students in the game — quick feedback and step-by-step guidance seemed to cut down frustration and kept learners from simply giving up.

- Theme 2 - Enhancement of Persistence and Resilience: Because AI offers explanations again and again without any hint of judgment, several teachers noticed students becoming more willing to retry a problem rather than avoid it.

- Theme 3 - Confidence Building through AI Integration: Both students and teachers reported feeling steadier when AI validated a response or walked through a decision, especially on unfamiliar or complex material.

- Theme 4 - AI-Assisted Decision-Making and Critical Thinking: Teachers valued AI's ability to lay out alternatives and possible solutions side by side, but were quick to add that students still need to interrogate what the AI produces rather than take it at face value.

- Theme 5 - Emotional Regulation and Stress Reduction: The fact that AI never judges appeared to lower academic anxiety noticeably, giving students room to ask the same question repeatedly without embarrassment.

- Theme 6 - Future Potential of AI in Non-Cognitive Skill Development: Teachers were, on balance, optimistic — several suggested AI could eventually be woven into the curriculum on purpose, rather than used ad hoc, specifically to build persistence and independence.

Taken together, these themes echo and sharpen the quantitative picture: AI comes across as a solid support for confidence, decision-making, and emotional steadiness, but its payoff for genuine, self-directed persistence looks conditional , it shows up when teachers build deliberate scaffolding around the tool, not when students are simply left to use it on their own.

DISCUSSION

The overall picture is one of real but uneven influence. Bandura's (1986) account of learning through observation and reinforcement fits well with the strongest results here , students who repeatedly watch an AI system model structured problem-solving seem to pick some of that structure up themselves, and this shows most clearly in the higher agreement scores for decision-making and problem-solving (Table 1, items 5, 9, 13). That lines up with earlier work describing AI as a form of cognitive scaffolding that strengthens analytical reasoning and self-belief (Luckin et al., 2016; Ganguli et al., 2024).

The weaker results tell a different, and arguably more important, story. Low agreement on persistence (item 19) and independent confidence (item 20) matches a concern that keeps surfacing in the literature: that leaning on AI too much can substitute for self-regulation rather than build it (Bernstein et al., 2025; Discover AI, 2022). Picard's (1995) framework offers one way to read this , AI seems genuinely good at lowering anxiety and creating a safe space to keep asking questions (Theme 5), but that safety net does not automatically translate into the kind of internal motivation a student needs when the AI is not there to help.

The interview data point to the same conclusion from a different angle. Teachers who emphasized the need to critically evaluate AI output (Theme 4) were, in effect, describing the difference between AI used deliberately and AI used passively , a distinction the wider literature also draws (Purnomo et al., 2024; Sato, 2021). Structured, teacher-facilitated use appears to pay off more reliably than simply handing students a tool and leaving them to it.

Context matters here too. Balochistan's uneven access to reliable internet, devices, and licensed platforms means the moderate agreement levels reported above may partly reflect patchy exposure rather than any ceiling on what AI can actually do (UNESCO, 2021). If that reading is right, the more promising lever for raising these numbers in future is not a better AI tool but more consistent access to the tools already in use.

Put simply: AI in this study looks most trustworthy as a scaffold for thinking and deciding, and least trustworthy as a stand-in for the internal drive that keeps a student working when things get hard. Curriculum designers would do well to keep that distinction in mind rather than treating AI as a single, uniform intervention.

CONCLUSION AND RECOMMENDATIONS

Overall, AI technologies play a real but selective role in shaping non-cognitive growth among graduate learners at the University of Turbat. The strongest gains show up in decision-making, problem-solving, and confidence; the weaker gains, in persistence and independent self-efficacy. Both patterns fit comfortably within the Bandura-Picard framework used here, with the behavioral and affective pathways each explaining part of what the data show.

A few practical recommendations follow. Universities, particularly in under-resourced settings like Balochistan, should write AI-integration policies that explicitly separate AI-as-scaffold from AI-as-substitute, rather than treating all AI use as equivalent. Faculty development should train instructors to build AI-assisted activities around reflection and debriefing, not just answer retrieval. Foundation courses should give students basic AI literacy early on. And policymakers should treat equitable access , internet, devices, licensed platforms , as a precondition for any of this to work, not an afterthought.

Because this study is cross-sectional and tied to one institution, future work should widen the net: more universities, more provinces, longitudinal or quasi-experimental designs capable of testing causal claims, and closer attention to how gender and socioeconomic background shape the results. In the end, what AI contributes to a student's growth will likely depend less on how advanced the tool is and more on how intentionally institutions, teachers, and students choose to use it.

LIMITATIONS OF THE STUDY

A few limitations are worth flagging directly. The sample, while large enough for the descriptive analysis reported here, was drawn from a single institution, so the results should not be read as representative of Pakistani higher education more broadly. The design is cross-sectional, meaning it captures a snapshot of perception rather than evidence of change over time or proof that AI use causes the outcomes reported , a longitudinal or quasi-experimental follow-up would be needed for that. Self-reported survey and interview data always carry some risk of social-desirability bias, and that risk may be slightly elevated here given how novel and popular these AI tools currently are. Finally, the analysis did not break results down by gender, discipline, or prior AI familiarity, any of which could plausibly change the strength of the patterns reported.

REFERENCES

Agrawal, A., Gans, J., & Goldfarb, A. (2019). Prediction machines: The simple economics of artificial intelligence. Harvard Business Review Press.

Alqahtani, M. (2023). AI tools like GPT-4 and Deep Seek: Impact on developing non-cognitive skills. International Journal of AI in Education, 8(3), 245–268.

Azzahra, F., Natanael, M. J., & Toriqo Abimanyu, A. (2023). Students' dependence on ChatGPT explanations reduces social interaction and analytical skills. Edukatif: Jurnal Ilmu Pendidikan, 6(5), 7109–7125.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Prentice-Hall.

Bernstein, S., Rahman, A., Sharifi, N., Terbish, A., & MacNeil, S. (2025). Negative consequences of AI usage in education. Journal of Educational Ethics, 12(1), 45–67.

Chen, L., et al. (2020). AI in education: Intelligent tutoring systems, educational robots, learning analytic dashboards, adaptive learning platforms. Frontiers in Education.

Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. Harvard Business Review, 96(1), 108–116.

Dewey, J. (1910). How we think. D.C. Heath.

Discover AI. (2022). Heavy AI dependence prevents analytical and reflective skill development. AI in Education Report.

Dwivedi, Y. K., et al. (2023). So what if ChatGPT wrote it? International Journal of Information Management, 71, Article 102642.

Ennis, R. H. (2012). The nature of critical thinking: An outline of critical thinking dispositions and abilities. University of Illinois.

Facione, P. A. (1990). Critical thinking: A statement of expert consensus for purposes of educational assessment and instruction. American Philosophical Association.

Ganguli, D., et al. (2024). Large language models and educational reasoning improvement. OpenAI Research Report.

Golan, R., Reddy, R., Muthigi, A., & Ramasamy, R. (2023). AI and writing skills development in academic institutions. Journal of Educational Technology, 11(2), 88–104.

Heckman, J. J., & Kautz, T. (2012). Hard evidence on soft skills (NBER Working Paper No. 18121). National Bureau of Economic Research.

Heckman, J. J., Stixrud, J., & Urzua, S. (2006). The effects of cognitive and noncognitive abilities on labor market outcomes and social behavior. Journal of Labor Economics, 24(3), 411–482.

Hermkes, R. (2024). Decision-making frameworks in educational administration. Educational Management Review, 19(1), 55–74.

Ivanov, M. (2023). AI usage reduces student–teacher interactions for social-emotional learning in adult students. International Journal of Adult Education, 14(2), 89–105.

Kanalove, R., et al. (2023). Data privacy and student protection in AI-supported learning. Journal of Educational Technology Ethics, 5(1), 22–40.

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). Intelligence unleashed: An argument for AI in education. Pearson Education.

Lybeck, K., et al. (2023). AI-assisted learning and cognitive skill development in higher education. Journal of Educational Computing Research, 61(4), 812–834.

Ma, Y. X., Diao, L., & Wang, W. H. (2026). 21st century AI: Positive impact on non-cognitive skills development. Journal of Educational Technology, 15(2), 112–130.

March, J. G. (2010). The ambiguities of experience in organizational decision making. W. W. Norton & Company.

Oktaviani, R. (2022). Positive impact of AI tools and Grammarly on student writing. Journal of Language and Technology, 14(2), 67–89.

Openo, J. (2020). Academic integrity and assessment in online learning environments. Canadian Journal of Learning and Technology, 46(2), 1–18.

Organisation for Economic Co-operation and Development. (2015). Skills for social progress: The power of social and emotional skills. OECD Publishing.

Organisation for Economic Co-operation and Development. (2021). OECD digital education outlook 2021: Pushing the frontiers with artificial intelligence, blockchain and robots. OECD Publishing.

Paul, R., & Elder, L. (2014). Critical thinking: Tools for taking charge of your learning and your life. Pearson.

Picard, R. W. (1995). Affective computing (Technical Report No. 321). MIT Media Laboratory.

Purnomo, A., et al. (2024). Digital transformation in education and its impact on soft skills development. Journal of Digital Education and Learning, 7(1), 33–50.

Russell, S. J., & Norvig, P. (2021). Artificial intelligence: A modern approach (4th ed.). Pearson.

Sato, Y. (2021). Challenges of digital learning environments on interpersonal communication. Journal of Educational Sociology, 33(2), 101–118.

Schoemaker, P. J. H. (1993). Multiple scenario development: Its conceptual and behavioral foundation. Strategic Management Journal, 14(3), 193–213.

Schön, D. A. (1983). The reflective practitioner: How professionals think in action. Basic Books.

Simon, H. A. (1977). Administrative behavior: A study of decision-making processes in administrative organization (4th ed.). Free Press.

Sun, Y., Yang, L., Yu, X., & Suen, H. (2025). AI capacity to fulfill and address learning requirements of students through educational content adaptation. Journal of Educational Technology Systems, 53(2), 145–168.

World Economic Forum. (2020). The future of jobs report 2020. World Economic Forum.

Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—Where are the educators? International Journal of Educational Technology in Higher Education, 16, Article 39.