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Development and Validation of Komal & Qureshi AI Dependency Scale (KQAIDS 2025)



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Abstract

Purpose: The main purpose of this study was to develop and validate a scale for artificial intelligence dependency. AI has enabled the machines to think, learn and solve problems just like human but over reliance on AI has introduced many perils like decreased creativity, problem solving skills, competence and emotional dependency.

Methodology: A mixed research design was used in this study consisting of two phases, qualitative phase for item generation and quantitative for establishing psychometric properties of the scale. Purposive sampling was used (N=300). To determine and confirm the factor structure EFA and CFA were conducted.

Findings: EFA revealed three factors structure (emotional dependency, relatedness thwarted and competence thwarted) with 14 items for the scale confirmed by CFA with good reliability ($\alpha=.74$). It's convergent and discriminant validity was also established.

Unique Contribution to Theory, Practice and Policy: This study contributes theoretically by encompassing Self-Determination Theory into the evolving field of human AI collaboration and conceptualizing AI dependency through psychological aspects of emotional dependency, relatedness thwarted, and competence thwarted. Practically, KQAIDS provides a validated tool to recognize maladaptive AI dependency patterns and design targeted interventions. At the policy level, the findings show the need for guidelines endorsing responsible AI use in educational settings, stressing AI as a helpful tool rather than a substitution for human abilities. It is recommended that educational institutes incorporate AI literacy programs, endorse critical thinking and self-regulation skills, and start monitoring frameworks for healthy AI engagement.

Keywords: *AI, Dependency, Development, Validation*

JEL Codes: *I21, O33, D83*

Introduction

With the growing acceptance of tools like ChatGPT and Sora, artificial intelligence (AI) has become a worldwide important point. AI is expressively impacting several phases of daily life, including education (Zhai *et al.*, 2020) and healthcare (Reddy *et al.*, 2019). The developing effect of AI in current society has given upsurge to an extensive variety of integrated exploration. From its preliminary emphasis on mechanization and data-oriented management to its development toward improving everyday life, addressing compound public complications, and alleviating ecological tasks, it has transformed the manner we relate to the world (Gruetzemacher & Whittlestone, 2022). Through inventions such as Dall-E 2, GPT-4, and Copilot, these tools has not merely obstructed creative dominion but similarly delivered help in chores of data and everyday requirements. Yet, the prevalent implementation of artificial intelligence stances dares and dangers that must be sensibly handled to confirm viable and advantageous usage for humanity (Feuerriegel *et al.*, 2023).

In arena of learning, artificial intelligence has transformed in what way instruction and education happen. Initial stages to advanced learning, artificial intelligence uses are reforming customary education approaches. This expertise offers programmed aid and enables computer-generated communication, basically changing the underlying forces of orthodox education and grips the strength to skill more useful curricula malleable to weights of the 21st century (Ocaña-Fernández *et al.*, 2019). Besides, incorporation of ordinal expertise in learning has expressively upgraded entrance and education competence, making learners for a progressively technical and constantly altering realm (Haleem *et al.*, 2022). Advanced learning, in certain, practiced a digital transformation flow owing to the COVID-19 epidemic, moving to a rapid conversion headed for virtual learning. This catastrophe forced educational organizations to hold connecting expertise and instructional inventions, flashing amplified concern in generating a collective computerized education culture in advanced qualification (Bygstad *et al.*, 2022).

Regardless of the benefits AI conveys to learning, its implementation increases moral and real-world apprehensions. Amid these worries, dependence on artificial intelligence by pupils and teachers stands out. The collaboration between pupils and teachers in virtual knowledge situations is impacted by AI, producing both potentials and worries in advanced learning (Seo *et al.*, 2021). Dependence on artificial intelligence could cause damage of intellectual abilities and a deterioration in apprentice inspiration (Ahmad *et al.*, 2023). Reliance, in its wider sagacity, indicates an uncontrollable necessity for something to work or sense ample. This reliance can be marked as an influential effort distressing administrative, self-recognition, and connection with other life features. In a clinical setting, addiction has conventionally been linked with stuffs, such as liquor or pills, described by tolerance and extraction signs (Gilder *et al.*, 2004; Schuckit *et al.*, 2007; DSM, 2013). Nonetheless, in the artificial intelligence age, reliance has stretched to behavior dependences, like compulsive gaming and internet dependence disorder, involving resemblances in their neuro-biological and behavior developments (Fu *et al.*, 2010; Sairitupa-Sanchez *et al.*, 2023).

In this respect, bearing in mind AI, reliance can be defined as a tendency or requisite to excessively depend on computerized structures for resolutions, works, or support. Innovative tools like AI have the likely to make simpler the procedures and improve efficacy, but can also inculcate a feeling of self-doubt or distress of being missing after if one does not have speed with them. AI grounded tools, such as ChatGPT, have got momentous changes in areas like script, exploration, and software design, giving significant help in these arenas. However, apprehensions have been upstretched about possible adverse penalties, such as the harm to critical intellectual abilities and an extreme reliance on technologies (Liu *et al.*, 2023). In this framework, it's important for consumers, particularly apprentices, to be knowledgeable about prospects and moral problems related to these expertise, to confirm their accountable and precarious use in educational and expert progress (Dwivedi *et al.*, 2023).

To address these provocations related to mounting high-tech dependence, many scales have been developed. Including Young's Internet Addiction Scale Young (1998) to further precise tools dedicated to addictions like virtual gaming (Sairitupa-Sanchez *et al.*, 2023). Yet, social inconsistency stances an extra test in recognizing the effect of tools, as insights and use of equipment extensively vary through social settings. Data and Communication Tools, precisely, genuinely form our means of existing and cooperating (Tripathi, 2017). Given the complication of reliance on artificial intelligence use, the necessity for a particular scale to improved measure and comprehend this occurrence is obvious. This instrument would not only ease a better comprehension of artificial intelligence dependency but also support alleviate related perils.

Theoretical Background

Using Self-Determination Theory (SDT) as a background to develop a scale for AI dependency is a dynamic approach, as it permits us to measure not just the occurrence of use, but the fundamental quality of motivation and the psychological needs that AI might be satisfying or frustrating. In psychology, the concept of psychological needs can be viewed from numerous viewpoints. This work is based the extensively used self-determination theory (SDT) background (Deci & Ryan, 2000). SDT is one of the most widespread present social-cognitive models. SDT conceives how societal settings may maintain or frustrate human working based on the social surroundings' capability to fulfill applicants' rudimentary psychological requirements. Precisely, SDT recommends that people have three rudimentary psychological requirements, specifically autonomy (i.e., appealing in a behavior with a full wisdom of choice), competence (i.e., understanding supremacy and efficiency), and relatedness (i.e., necessity to sense associated to other folks in a significant means) (Deci & Ryan, 2000).

The conceptualization of KQAIDS in the current study draws upon recognized theories of dependence (Chen, 2007) and mirrors the mounting reliance on AI systems to execute chores conventionally needing human struggles, such as communiqué, creativeness, decision-making, and passionate help. As people, societies, and structures gradually incorporate AI into daily

customs (Naqbi *et al.*, 2024), a change in accountability from mortal to technical support is happening. Like other practices of technical reliance, such as social media or mobile phone dependence (Mahmud *et al.*, 2018; Ratan *et al.*, 2021), extra dependence on artificial intelligence may decrease independence, welfare and lead to important emotional and behavior apprehensions.

Psychological Needs viewpoint of Self-determination theory proposes a vigorous background for comprehending the motivational and emotional concepts core to AI dependence. Rendering to SDT, emotional welfare and active self regulation based on contentment of three rudimentary mental requirements: autonomy, competence, and relatedness. When these desires are ineffectively fulfilled, people may pursue outward resolutions to reimburse, possibly growing their vulnerability to dependent behaviors. Artificial intelligence systems are mostly fine sited to allegedly consider these mental requirements. Desire for competency may be satisfied as artificial intelligence empower consumers to resolve complications, produce material, and ample the chores with a feeling of expertise and usefulness (Giannakos *et al.*, 2024). In the same way, relatedness may be quickly contented with virtual, people like connections delivered by chatbots and AI buddies (Siddals *et al.*, 2024), present customers a feeling of association in the nonexistence of social contact. Autonomy may primarily be improved by elasticity and authorization artificial intelligence gives customers in chasing their objectives and creating judgements autonomously (Chan, 2020; Klingbeil *et al.*, 2024).

While AI can momentarily accomplish these psychological desires, trust on such tools as major source of fulfilling these requirements may unexpectedly weaken self-control with the passage of time (Salah *et al.*, 2024). Extreme reliance on artificial intelligence may move the center of control from the person, wearing away real independence and capability (McKee *et al.*, 2021). While artificial intelligence may at the start appear to boost autonomy by giving resourceful tools for policymaking and problem resolving (Dhoni, 2023; Naqbi *et al.*, 2024). As people give way chores usually needing human creativity to AI structures, their ability to act self-sufficiently and assertively may reduce, generating a dependency circle (Zhang *et al.*, 2024).

Additionally, persons with prevailing liabilities, such as little self-esteem or prolonged inconclusiveness, may be mainly susceptible to use AI as a temporary resolution for fulfilling psychological requirements (Zhang *et al.*, 2024). Even though this may firstly offer assistance, it eventually aggravates dependence by additionally declining the person's ability to traverse tasks individualistically. Through the view of SDT, artificial intelligence reliance may reveal a condition of reduced self-regulation as a result of conditional or long-lasting discrepancies in these mental requirements (Salah *et al.*, 2024). Finally, while artificial intelligence can satisfy a momentary sense of affiliation, dependence on artificial intelligence comradeship may gradually dwindle eloquent social relations. This replacement outcome may lead to more emotional state of isolation and societal cutting off over time (Jacobs, 2024), further extending the cycle of dependency.

Significance of the Study

This study represented a pioneering application of SDT to AI dependency, extending the theory beyond traditional domains into emerging educational technologies. By examining how AI impacts basic psychological needs, the research bridges a critical theoretical gap in understanding human-technology relationships through established motivational frameworks. It will introduce a nuanced conceptualization of AI dependency that moves beyond behavioral frequency measures to examine the underlying motivational quality and need satisfaction dynamics. The AI Dependency Scale may provide educational institutes with a validated diagnostic tool to identify at-risk students and develop targeted intervention programs.

This research offers practical guidance for educators routing AI integration by providing frameworks to identify healthy vs. problematic AI use. Informing pedagogical strategies that balance AI benefits with dependency risks and enabling early identification of maladaptive AI use patterns. Moreover, supporting the development of digital self-regulation skills.

Objectives

- 1- To develop Komal and Qureshi AI Dependency Scale (KQAIDS).
- 2- To develop the psychometric properties of Komal and Qureshi AI Dependency Scale (KQAIDS) that reliably measures the spectrum of AI dependency among students.

Research Design and Methodology

The study is completed in two phases.

Phase 1

Item generation pool

In first phase, semi-structured interviews of 30 students (15 males, 15 females) from both public and private universities of Punjab Pakistan were conducted. Questions of the interview were about which AI tools they use, how AI use effected their abilities and competence, negative outcomes they have experienced due to AI use and how it affected their relationships etc. Based on these interviews the initial item pool was developed which included 56 items. To improve the item set, discussion was accompanied with three experts, who own proficiency in psychological dimension and technology use (one supervisor, one colleague, and one IT expert). Experts individually revised the items for lucidity, aspect applicability, and face validity. Their response was then cross-checked and argued, leading to satisfactory amendments (26 items) that upgraded the general soundness and readability of the scale.

In next stage 75 participants were recruited from public and private universities. This stage used a revised 26-item KQAIDS, and scale used a 5-point Likert response layout (1 = Strongly Disagree to 5 = Strongly Agree). Items were reviewed for clearness and applicability grounded on response and outcomes from initial stage.

Phase 2

Phase 2 of the study was to set validity, reliability and construction of scale. Psychometric properties of the Scale are proven through factor analysis and convergent and discriminant validity. It is hypothesized that:

- 1- AI dependency has positive correlation with AI literacy scale.
- 2- AI dependency has negative correlation with Generative AI dependency scale.

Sample

To encounter the suggested standard of at least 10 responses per item (Boateng et al., 2018), a least of 320 contributors were employed, resulting in 300 contributors (age in years: $M = 1.51$, $SD = .615$). Participants were recruited from both public and private universities of Punjab Pakistan. Informed consent was gained earlier. The assessment comprised of the 26-item KQAIDS, followed by demographic question. Statistics for this research is gathered between November to December 2025.

Table 1 Description of the demographic variables of the research participants

	N	Range	M	SD	Variance	Skewness	Kurtosis
Age	300	2	1.51	.615	.378	.801	-.348
Gender	300	2	1.52	.501	.251	-.067	-2.00
Qualification	300	3	1.30	.571	.326	1.739	1.993
SES	300	2	1.95	.266	.071	-2.25	9.90
Family system	300	2	1.64	.481	.231	-.586	-1.66
Birth order	300	6	2.85	1.38	1.38	.581	.014
Residence area	300	2	1.37	.48	.233	.556	-1.70

Note: M=Mean, SD=Standard Deviation

Exploratory Factor Analysis

An EFA is piloted to inspect the principal factor construction of the scale. This systematic method is chosen because the existing form of the scale comprised rephrased items and included emotional dependency items, based on results from the earlier investigation and interviews. This allowed assessment for revealing of cross-loadings, fragile items, and unexpected factor arrangements preceding to CFA. To measure the appropriateness of data for factor analysis, primarily steered Bartlett's Test of Sphericity and assessed the Kaiser-Meyer-Olkin (KMO) Measure of Sampling sufficiency. A significant Bartlett's test and KMO tenets surpassing .60 specify satisfactory factor ability (Shrestha, 2021). Bartlett's test was statistically substantial, ($\chi^2=670.732$ $p < .001$), showing that data is suitable for factor exploration. EFA stemmed in a final three-factor configuration including 14 items. Factor 1 (Emotional dependency) items range

from .546 to .725, factor 2 (Relatedness thwarted) items ranges from .556 to .645 and factor 3 (Competence thwarted) items ranges from .400 to .722.

Table 2: Factorial structure of Komal & Qureshi AI Dependency Scale (KQAIDS 2025)

Item	Factor 1	Factor 2	Factor 3
KQAIDS1			.400
KQAIDS2			.668
KQAIDS3			.722
KQAIDS4			.694
KQAIDS5		.589	
KQAIDS6		.645	
KQAIDS7		.573	
KQAIDS8		.588	
KQAIDS9		.556	
KQAIDS10	.546		
KQAIDS11	.688		
KQAIDS12	.725		
KQAIDS13	.603		
KQAIDS14	.604		

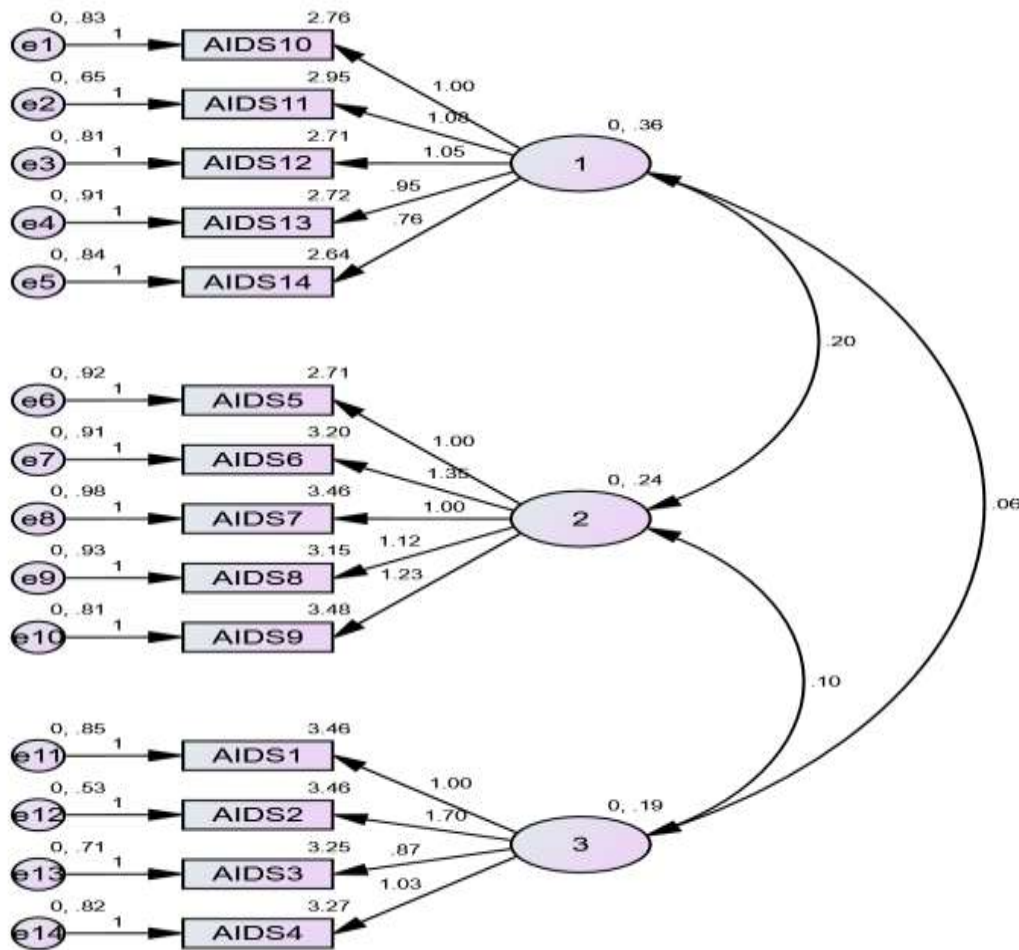
Confirmatory factor analysis

After the results from phase one and EFA (N=350), CFA was directed to confirm the factor configuration of the refined KQAIDS. The total sample included 250 participants. Informed consent was acquired before contribution. The survey contained of KQAIDS, monitored by demographic questions. While 14 items were directed to partakers, established on the basis of the EFA for further psychometric refinement ($\alpha = .74$). Items were rated on a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). CFA was accompanied to test three-factor structure of AI Dependency Scale, and the model is stable with the detected data (χ^2 (158.875) =, $p < .001$), CFI = .85; TLI = .75; RMSEA = .056). The fit indices meet generally established inceptions for standard model fit. While χ^2 was statistically substantial, this was probable in small samples (Bergh, 2015). Taken together, the outcomes offer provision for the three-factor structure.

Table 3: Confirmatory Factor Analysis of Komal & Qureshi AI Dependency Scale

Goodness of fit indices	X2	df	RMSEA	CFI	GFI	TLI
AI	158.875	74	.056	.85	.84	.75
dependency scale						

Note: Df= Degree of freedom. RMSEA= Root mean square error of approximation. CFI= Comparative fit index. GFI= Goodness of fit index. TLI= Tucker-Lewis index.



Validity analysis

The AI dependency scale was found positively linked with AI literacy scale (AILS) showing convergent validity of the newly constructed scale. For discriminate validity of new scale it was analyzed with Generative AI scale dependency scale and non-significant correlation was found, therefore it represents discriminate validity of the newly developed scale. As it was

expected that AILS has positive correlation with KQAIDS has verified the hypothesis. It is also hypothesized that GAI has negative correlation with KQAIDS and the descriptive statistics analyzed no correlation.

Table 4: Correlation matrix of Komal & Qureshi AI Dependency Scale (KQAIDS-2025) with Generative AI and AI literacy scale (N=300)

	KQAIDS	AILS	GAI-DS
KQAIDS	-	.11*	.03
AILS		-	
GAI			-

Note. * $p < .05$, AILS= AI Literacy Scale. GAI-DS= Generative AI Dependency Scale.

Discussion

AI has impacted many aspects of everyday life, from computerization to resolving difficult problems. Its effect on learning has been noteworthy, altering education and learning methods, particularly in higher education where AI expertise permit custom-made education. However, the growing reliance on AI offers moral and real defies, counting possible damage of cognitive abilities and declined learner enthusiasm. The current study constructed and validated the Komal and Qureshi AI Dependency Scale (KQAIDS), an innovative tool intended to apprehend distinct dissimilarities in reliance on AI tools. Throughout the validation procedure, KQAIDS proved strong psychometric properties and vigorous factor structure. The present study used self-determination theory as background because SDT theorizes how societal circumstances may improve or impede human working grounded on the social surroundings' capacity to mollify contributors' rudimentary psychological desires. Precisely, SDT proposes that people have three simple psychological requirements, that is independence (involving in a conduct with a complete intellect of will), competence (i.e., the practice of expertise and efficiency), and relatedness (i.e., necessity to feel attached to other human in an evocative manner) (Deci & Ryan, 2000).

After carrying out EFA, we identified three factors including emotional dependency, relatedness thwarted and competency thwarted. Emotional dependency on AI in students refers to a maladaptive, one-sided attachment where students over-rely on AI systems for emotional support, companionship, or validation, often at the expense of real-world social connections and mental well-being. A pattern of excessive, compulsive use of AI chatbots or companions for emotional comfort, leading to diminished human socialization and increased loneliness, Among adolescents, 17.14% reported AI dependence at one time point, rising to 24.19% at a later follow-up (Huang et al. 2024). A longitudinal study of 981 participants found that higher everyday chatbot use linked with greater emotional dependence, isolation, and negative usage (Fang *et al.* 2025). AI chatbots are designed to be always available, non-judgmental, and emotionally consistent,

creating a “perfect” listener that real humans cannot match (Visio, 2025). More daily interaction with AI chatbots strengthens emotional attachment and Students who feel lonely, isolated, or unable to access timely counseling are more likely to turn to AI for comfort (Andoh, 2025). While AI may provide short-term relief, long-term dependency can exacerbate anxiety, depression, and obsessive thoughts (Visio, 2025).

Second factor identified is relatedness thwarted. AI dependency can thwart relatedness our innate psychological need for meaningful, reciprocal social connections is a central concern in the emerging literature. This dimension measures how AI use replaces human interaction, making social collaboration feel more difficult or less necessary. This is a critical empirical contribution, as recent reviews highlight that a major concern of AI integration is the reduction of face-to-face interaction, which can lead to social isolation and loneliness (Klimova & Pikhart, 2025), The concept is also supported by research on thwarted belongingness, a known predictor of negative emotional outcomes, showing how technology-mediated interaction can fail to satisfy the deep human need for meaningful connection (Gong *et al.*, 2022). It suggests that AI relationships, while appealing, can actively impair the development and maintenance of real-world social bonds, especially among students and adolescents. Greater day-to-day chatbot usage related with more aloneness, emotive reliance, and problematic use, and decreases socialization with actual people across various interaction modes (Fang *et al.*, 2025). Higher satisfaction and emotional interaction with an AI chatbot was related to poorer real-life personal communication among consumers (Yuan *et al.*, 2024).

Third factor is competence thwarted, several studies provide evidence that relying on AI can thwart competence, our psychological need to feel effective and capable by eroding core cognitive skills, reducing mental effort and even altering how our competence is perceived by others. Items in this dimension reflect fears about declining critical thinking, loss of skill, and avoidance of challenges without AI support. This directly validates concerns in the literature that over-reliance on AI can deskill learners and erode their confidence in their own unaided abilities. Literature shows a significant destructive correlation between regular AI tool use and critical thinking abilities, with "intellectual depositing" as a key mechanism (Gerlich, 2025), ChatGPT users wrote 60% faster, but brain activity and "relevant cognitive load" dropped. 83% of AI-assisted writers couldn't recall a passage they just wrote, students perform better with AI but worse when the tool is taken away, suggesting they bypassed the learning process (Chen et al. 2025).

Psychologically, there were limited remarkable discoveries. Firstly, KQAIDS is positively associated with AI literacy, as literature shows AI literacy positively predicts dependency (Zhang et al., 2025), advanced literacy enables deeper, more integrated use of AI tools. As users become more skilled (satisfying a need for competence), they may weave AI more tightly into their daily workflows and problem-solving processes. This deep integration can paradoxically lead to reliance and emotional attachment, especially if the tool becomes a primary means of achieving goals or regulating emotions (Fang et al. 2025), students with higher AI literacy might use AI more

intensely to cope with performance pressure or competence threats, leading to the dependency patterns KQAIDS captures.

To establish discriminant validity, the newly developed SDT-based AI Dependency Scale was correlated with the Generative Artificial Intelligence Dependency Scale (GAI-DS). A non-significant correlation was found. The GAI-DS, in line with prevailing instruments in the field, is grounded in behavioral and addiction-based models (Robayo-Pinzon et al. 2025). It operationalizes dependency through symptoms such as compulsive use, withdrawal, and loss of control, often adapting frameworks used for internet or social media addiction. In contrast, our scale is derived from Self-Determination Theory, which posits that maladaptive behaviors and ill-being stem from the thwarting of basic psychological requirements for competence, and relatedness (Morales-García et al. 2024). Consequently, while the GAI-DS asks 'how often or intensely do you behave in a dependent way?' our scale assesses 'to what extent does your AI use undermine your sense of capability, connection, and self-direction?' The lack of correlation, therefore, indicates that the two scales are measuring different layers of the dependency phenomenon: one captures surface-level behavioral symptoms, and the other captures the deeper, internalized psychological costs. This clear divergence supports the discriminant validity of our SDT-based scale and underscores its unique contribution. It moves the measurement of AI dependency beyond a behavioral checklist to a diagnosis of its impact on fundamental human motivation and well-being."

Implications

The growing reliance on AI in different communal and qualified domains calls for a thoughtful reevaluation of our collaborations with tools. Artificial intelligence exceeding its part as a simple high-tech tool, has started considerably affecting self-perception and social relations. These results pinpoint the significance of constructing comprehensive and adjustable guidelines that view artificial intelligence as a counterpart, instead of a replacement, to human capabilities. In this perspective, KQAIDS can be used to identify at-risk students and create tailored interventions (e.g., workshops on rebuilding self-efficacy, fostering study groups to counteract social displacement). Discriminant validity of this scale fills a research gap which is crucial for targeted intervention. Identifying behavioral symptoms is a first step, but understanding why the dependency persists such as a student using AI to compensate for feelings of incompetence (thwarted competence) or a lack of social support (thwarted relatedness) allows for more nuanced educational and psychological strategies aimed at restoring need satisfaction. Future researchers can conduct longitudinal studies to test if need-thwarting predicts future behavioral dependency.

Limitations

While this investigation offers valued understandings into dependency on AI, it's vital to identify and talk about its confines. Initially, the cross-sectional type of research shows data is taken at only one particular time. Longitudinal investigations could propose better understandings

into how this dependency grows and what dynamics may affect these variations. The sample used, may not be evocative of the whole population. Traditional and socio-economic variances that impact human association with artificial intelligence might occur, and these variables were neither measured nor discovered in this study. Future investigation should ponder these aspects to achieve a more elaborated grip of people's connection with AI.

Recommendations

Based on the results of this study, few recommendations are put forward for educators, policymakers, and researchers. First, universities and educational institutes should incorporate the KQAIDS as a tool in student wellness programs to recognize students at risk of maladaptive AI dependency. Early identification can allow timely, targeted interventions that address the specific psychological need being thwarted rather than treating dependency as a uniform behavioral problem. Second, curricula at the higher education level should be reformed to purposely foster independent critical thinking, cooperative learning, and metacognitive skills. AI tools should be placed as additions to human reasoning rather than replacements for it. Third, student counseling services should be trained to identify the emotional dependency aspect of AI use, mainly among students who report loneliness, social withdrawal, or reduced motivation to engage with peers.

Lastly, future research should engage longitudinal designs to track how AI dependency advances across academic years and in response to changes in AI tool availability and literacy. Cross-cultural replications of the KQAIDS validation are also necessary, as socio-economic context, cultural attitudes toward technology, and educational norms considerably shape how individuals interact with and develop dependencies on AI systems.

Conclusion

The present study makes an important and timely contribution to the growing body of literature on human and AI collaboration by developing and validating the Komal & Qureshi AI Dependency Scale (KQAIDS 2025). Grounded in Self-Determination Theory, the scale moves beyond the behaviorally focused frameworks leading in existing AI and technology addiction literature, instead capturing the deeper motivational and psychological costs of extreme AI dependence. By operationalizing AI dependency through three empirically reinforced aspects emotional dependency, relatedness thwarted, and competence thwarted the KQAIDS proposes a theoretically rich and psychometrically sound instrument capable of distinguishing the internal experience of dependency from its surface-level behavioral displays.

The two-phase mixed-methods development procedure starting with qualitative item generation through semi-structured interviews, followed by iterative quantitative improvement via EFA and CFA lends credibility to the scale's structure and content. The acceptable reliability coefficient ($\alpha = .74$) and the demonstration of both convergent validity with the AI Literacy Scale and discriminant validity from the Generative AI Dependency Scale collectively confirm that the KQAIDS captures a psychologically distinct and meaningful construct. The KQAIDS equips

researchers and practitioners with the conceptual and empirical tools needed to identify, study, and intervene in this emerging challenge. It is hoped that this instrument will serve as a base for future longitudinal and cross-cultural studies.

Ethics Statement

This study received approval from SZABIST university's Ethics Committee and was conducted as per regulation and institutional requirement.

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Conflict of Interest

Author discloses no conflict of interest.

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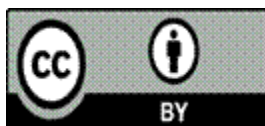
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