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Original Article

Perceived Control of Time as a Linking Mechanism Between Time-Management Behaviours and Pedagogical Performance Among Female University Faculty in Algeria

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Abstract
This study examined associations among goal setting/prioritization, time planning/organization, perceived control of time, and self-reported pedagogical performance among 425 female faculty members across 68 Algerian institutions. The sample was predominantly early career: 60.5% reported fewer than five years of seniority and 64.7% were Assistant Professors. Spearman correlations, a covariate-adjusted Gamma generalized linear model, and covariate-adjusted bootstrap path analyses were used. Perceived control of time showed the strongest bivariate association with pedagogical performance ($\rho = .496$) and remained positively associated in the Gamma model ($B = .048$, $p < .001$); planning/organization also remained positive ($B = .028$, $p = .003$), whereas goal setting/prioritization did not ($p = .311$). Indirect associations through perceived control were positive for both goal setting and planning. Sensitivity analyses deleting one planning item and two perceived-control items preserved the Gamma-model conclusions. Beta regression supported the planning and perceived-control main effects but identified a positive planning-by-control interaction, indicating that the interaction result is model-dependent. Because all focal measures were collected cross-sectionally by self-report, the findings do not establish causal mediation and may be inflated by common method variance. The study extends Macan's process logic to Algerian female faculty while delimiting generalization to senior faculty.

Keywords: time management, perceived control of time, pedagogical performance, female university faculty, Algeria

Introduction

University faculty work is inherently time-intensive and role-diverse. Teaching, assessment, student supervision, research, administrative service, and institutional engagement compete for limited time, often under rigid calendars and escalating expectations. Within this environment, faculty members' experience of time pressure and time stress has been documented across disciplines, and time allocation patterns reveal substantial trade-offs between core academic tasks and service demands (Chen et al., 2022; Link et al., 2008; O'Meara et al., 2017). These pressures are not evenly distributed. Evidence from multiple higher-education contexts indicates that female academics frequently carry disproportionate service and care burdens and face structural constraints that can intensify time scarcity and limit discretionary time for research and pedagogical innovation (Guarino & Borden,

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2017; Misra et al., 2011; Winslow, 2010). Understanding how time-management processes relate to pedagogical functioning is, therefore, not merely a matter of individual efficiency but a question tied to workload design, institutional equity, and academic quality.

Time management is commonly conceptualized as a set of behavioral strategies used to allocate time toward valued goals, including planning, prioritizing, and organizing tasks while navigating competing demands. Contemporary reviews emphasize that time management is not a single habit but a multidimensional construct that can operate through cognitive and motivational pathways, shaping how people structure their workdays and respond to time pressure (Aeon & Aguinis, 2017; Claessens et al., 2007). In organizational settings, time management has been linked to job performance and well-being indicators, with meta-analytic evidence suggesting small-to-moderate associations that vary by outcome definition and measurement approach (Aeon et al., 2021; Claessens et al., 2007). For faculty members, the relevance is intuitive: pedagogical work requires preparation, coordination, responsiveness, and sustained attention, all of which are sensitive to time fragmentation and workload unpredictability.

A foundational framework for clarifying these mechanisms is Macan's (1994) process model, which positions perceived control of time as a central psychological mechanism linking time management behaviors to outcomes. In this view, behaviors such as goal setting/prioritization and planning/organization improve outcomes largely to the extent that they enhance individuals' perceived control over their time—namely, the sense of being able to direct one's schedule and manage competing tasks effectively (Macan, 1994; Macan et al., 1990). Subsequent work in occupational contexts similarly differentiates planning behavior from perceived control of time and shows that these constructs can be empirically separable while closely related (Claessens et al., 2004). The implication for research design is straightforward: if perceived control of time is treated only as another "determinant" alongside planning and goal setting, the theory is blurred. A Macan-aligned model requires explicit attention to the potential linking role of perceived control of time between time management behaviors and performance-related outcomes.

Macan's model can also be situated within contemporary self-regulation accounts, which treat goal selection, planning, monitoring, and adaptive adjustment as cyclical processes. From this perspective, planning externalizes intentions into task structures, whereas perceived control is a proximal appraisal of whether those routines remain workable under changing demands (Tinajero et al., 2024; Uhlig et al., 2023). This integration updates rather than replaces Macan's process logic and suggests that planning and control may be more proximal to performance than goal articulation alone.

Despite the breadth of time-management research, two gaps remain particularly salient for the present study. First, evidence directly connecting time-management processes to pedagogical performance—as a multidimensional construct involving teaching practices, participation in pedagogical activities, and student supervision/tutorship—remains less developed than the broader literature on general job performance or student outcomes. Second, much existing evidence relies on cross-sectional self-report designs, which are informative for identifying associations and plausible mechanisms but do not establish causal effects. This is especially important when claims about "training" or "interventions" are made: observational associations cannot demonstrate that changing time-management behaviors will necessarily produce improvements in pedagogical outcomes. Accordingly, the contribution of cross-sectional survey research is best framed as theory-consistent model testing and context-specific description, rather than as a solution to the limited experimental evidence base (Aeon et al., 2021; Aeon & Aguinis, 2017; Claessens et al., 2007).

These issues are particularly consequential in non-Western higher-education systems where institutional constraints, resource conditions, and sociocultural norms can shape both time use and what "effective time management" looks like in practice. In Algeria, faculty members operate within evolving instructional demands, including the growth of online education and the shift toward English-

medium instruction in certain contexts, which can increase preparation time and administrative complexity (Kerras & Eddine Salhi, 2021; Yahiaoui et al., 2022). For female faculty members, time pressures may be intensified by gendered expectations around care and service roles, which can constrain discretionary time and increase role conflict (Misra et al., 2012; O'Meara et al., 2017; Winslow, 2010). These contextual dynamics make Algeria a meaningful setting for examining time-management processes, while motivating careful interpretation of observed cross-sectional associations.

In Algeria, the statutory faculty role encompasses teaching and assessment, preparation and pedagogical coordination, tutoring, participation in research, and—for relevant ranks—doctoral or research supervision and scientific responsibilities (Ministère de l'Enseignement supérieur et de la Recherche scientifique, 2008). These concurrent duties make temporal coordination integral to pedagogical work rather than an ancillary personal skill.

In addition to contextual gaps, measurement issues require careful handling. Time-management scales often show negatively skewed (ceiling-prone) response patterns in professional samples, raising concerns about social desirability and impression-management tendencies, as well as overlap among closely related constructs. When internal consistency becomes very high at the total-scale level, this may reflect redundancy among items or a strong general factor, rather than a clean multidimensional structure. For these reasons, construct validation is essential: empirical evidence is needed to assess whether items cluster as intended across goal setting/prioritization, planning/organization, and perceived control of time, and to evaluate the distinctiveness of these dimensions before interpreting associations with pedagogical performance (Claessens et al., 2007).

Against this background, the present study examines time management and pedagogical performance among Algerian female university faculty members using a survey design and an analytic strategy tailored to skewed self-report data. The study focuses on three core time-management dimensions—goal setting and prioritization, time planning and organization, and perceived control of time—and a multidimensional view of pedagogical performance comprising teaching, participation in pedagogical meetings/workshops, and student supervision/tutorship. Guided by Macan's (1994) process logic, the study pursues three objectives: (1) to describe patterns of time-management practices and pedagogical performance in this sample, (2) to test the associations between time-management dimensions and pedagogical performance using non-parametric correlation and model-based analyses appropriate for non-normal outcomes, and (3) to evaluate whether perceived control of time functions as a key linking mechanism between time-management behaviors and pedagogical performance within a Macan-aligned framework. Demographic and professional characteristics are treated as contextual covariates and are interpreted descriptively in relation to the primary associations rather than as evidence of causal moderation. In doing so, the paper aims to provide a concise, theory-aligned empirical account of time-management processes in faculty work that can inform both scholarship on temporal self-regulation and practical initiatives to support teaching quality under time pressure.

By contributing context-specific evidence from Algeria and by explicitly aligning the conceptual model with a process account centered on perceived control of time, this study aims to clarify how time-management behaviors relate to pedagogical functioning among female faculty members under substantial time constraints. These findings are intended to inform theory-consistent discussion and institutionally relevant implications while maintaining appropriate caution regarding causality.

Theoretical Framework and Literature Review

Time management as a multidimensional construct in academic work

Time management is typically treated as a set of behaviors and self-regulatory strategies through which individuals allocate time toward valued tasks under competing demands. Reviews of the time-

management literature emphasize its multidimensional nature and distinguish behavioral strategies (e.g., planning, prioritizing, scheduling) from the subjective experience of being "in control" of one's time (Aeon & Aguinis, 2017; Claessens et al., 2007). In academic work, this distinction is consequential because faculty roles involve simultaneous teaching, assessment, supervision, and service obligations that can fragment time and create chronic time pressure (Link et al., 2008; O'Meara et al., 2017). For female faculty members, time scarcity can be intensified by structural and sociocultural constraints, including uneven service expectations and work–family demands (Guarino & Borden, 2017; Misra et al., 2011; O'Meara et al., 2017; Winslow, 2010).

Macan's process model: Perceived control of time as the linking mechanism

Macan's (1994) model provides a clear process account that is directly applicable to the present study. Rather than treating all time-related dimensions as parallel predictors, Macan posits that time management behaviors (e.g., setting goals and priorities, planning and organizing tasks) influence outcomes largely through their effect on *perceived control of time*—the extent to which individuals feel able to direct their schedules and handle competing demands effectively (Macan, 1994; Macan et al., 1990). This model has two implications for theory-consistent empirical work: (1) time-management behaviors and perceived control of time should be measured as conceptually distinct constructs, and (2) perceived control of time should be examined as a mediating (indirect) pathway linking time-management behaviors to performance-relevant outcomes. Evidence from work settings supports the separability of planning behavior and perceived control of time, while also showing their close association (Claessens et al., 2004). Studies that explicitly examine perceived control as a mediator similarly report that it can carry the association between time-management behaviors and outcomes (Akhtar et al., 2021).

From time management to pedagogical performance

In this study, *pedagogical performance* is conceptualized as a multidimensional set of professional behaviors aligned with core instructional responsibilities. Consistent with the instrument used in the manuscript, pedagogical performance is captured through three domains: (a) teaching practices (e.g., syllabus completion, updating course content, supporting students, objective assessment), (b) participation in pedagogical meetings/workshops (e.g., departmental meetings, pedagogical committees, seminars), and (c) supervision and pedagogical tutorship (e.g., supervising students, evaluating thesis progress, proposing topics, contributing to evaluation committees). Time-management behaviors are theoretically relevant to each domain because they support advance preparation, sequencing of tasks, and timely follow-through under calendar constraints (Misra et al., 2011; O'Meara et al., 2017; Winslow, 2010)

Within a Macan-aligned framework, the link between time management and pedagogical performance is expected to operate primarily through perceived control of time. Planning and prioritization may help faculty structure preparation time, coordinate teaching materials, and allocate time to student follow-up; however, these behaviors are most likely to translate into pedagogical performance when they strengthen a faculty member's perceived ability to manage their schedule and respond to unexpected demands. Put differently, the model does not assume that planning automatically improves performance; rather, it proposes that planning contributes to performance to the extent that it enhances perceived control of time (Macan, 1994).

Interpretive scope of the study

The present study uses a cross-sectional self-report survey and is positioned as theory-consistent evidence on how time-management dimensions relate to perceived control of time and pedagogical performance in this sample. Its contribution is therefore threefold: it documents context-specific

patterns, tests associations consistent with Macan's process logic, and evaluates measurement structure to support interpretable conclusions—without making claims about intervention effectiveness (Aeon et al., 2021; Claessens et al., 2007).

Core constructs and operational definitions

The conceptual framework consists of three time-management dimensions and one outcome construct, following Aeon and Aguinis (2017), Claessens et al. (2007) and Macan (1994) who established time-management frameworks and measurement traditions:

Goal setting and prioritization (GSP): behavioral strategies involving defining professional goals, setting specific and measurable objectives, prioritizing goals, decomposing complex goals into actionable steps, and reviewing goals for adjustment.

Time planning and organization (TPO): behavioral strategies involving organizing tasks and schedules, using planning tools, estimating time required, setting deadlines, adjusting schedules to circumstances, avoiding time wasters, and balancing work/personal time.

Perceived control of time (PCT): a subjective sense of being able to manage one's time effectively, stay focused on planned tasks, handle unexpected circumstances, and avoid procrastination-related time loss.

Pedagogical performance (PP): a multidimensional outcome capturing teaching practices, participation in pedagogical meetings/workshops, and supervision/tutorship responsibilities.

Model logic

In line with Macan (1994), GSP and TPO are modeled as time management behaviors that are expected to be positively associated with PCT. In turn, PCT is expected to be positively associated with PP. Therefore, the primary theoretical claim is an indirect (mediated) association in which PCT links time management behaviors (GSP and TPO) to pedagogical performance.

Terminology

In this manuscript, *indirect association* refers to a statistical pathway in which a predictor is associated with the outcome through an intervening variable (here, perceived control of time), evaluated using bootstrap confidence intervals. *Interaction (moderation)* refers to a product-term specification in which the association between a predictor and the outcome varies across levels of another variable. To avoid causal overstatement given the cross-sectional design, results are interpreted as associations consistent with the proposed process logic rather than as causal effects.

Figure 1 presents the study's conceptual model. Consistent with a process perspective on time management, the model proposes that goal setting and prioritization and time planning and organization are positively associated with perceived control of time, which is specified as the mediating mechanism linking time-management behaviors to pedagogical performance. Pedagogical performance is conceptualized as a multidimensional outcome encompassing teaching, participation in pedagogical activities, and supervision/tutorship. To account for contextual heterogeneity, demographic and professional characteristics (age group, marital status, number of children, seniority, academic rank, and field of work) are included as covariates in the empirical models.

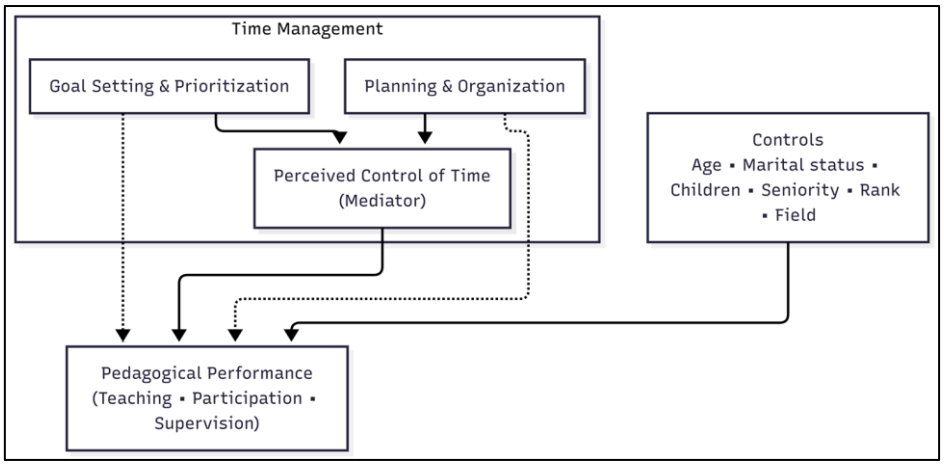

Figure 1. Conceptual Model of Time-Management Behaviors, Perceived Control of Time, and Pedagogical Performance

Note. Perceived control of time is specified as the mediating mechanism linking time-management behaviors to pedagogical performance. Demographic and professional variables (age, marital status, children, seniority, academic rank, and field of work) are included as covariates. Solid arrows represent hypothesized positive associations; dashed arrows indicate secondary direct paths evaluated empirically.

As shown in Figure 1, the model implies two expectations. First, behavioral time-management components (goal setting/prioritization and planning/organization) are expected to be positively associated with perceived control of time, which, in turn, is expected to be positively associated with pedagogical performance. Second, direct paths from behavioral components to pedagogical performance are treated as secondary and are evaluated alongside the mediation mechanism. Consistent with Macan's (1994) process logic, interaction terms are not treated as defining features of the theoretical model; where tested, they are framed as exploratory and interpreted cautiously given the cross-sectional design. The subsequent sections translate this structure into directional hypotheses and specify the analytic strategy used to test the proposed relationships while accounting for the covariates.

Hypotheses

Guided by Macan's (1994) process model, the present study proposes that behavioral time-management dimensions (goal setting/prioritization; planning/organization) relate to pedagogical performance primarily through perceived control of time. Because this is a process-oriented model, we distinguish (i) total associations with pedagogical performance (H1–H3) and (ii) the hypothesized indirect pathway through perceived control of time (H6–H7), while treating any residual direct effects as secondary to the mediation logic.

H1: Higher goal setting/prioritization is positively associated with pedagogical performance.

H2: Higher time planning/organization is positively associated with pedagogical performance.

H3: Higher perceived control of time is positively associated with pedagogical performance.

H4: Higher goal setting/prioritization is positively associated with higher perceived control of time.

H5: Higher time planning/organization is positively associated with higher perceived control of time.

H6: Perceived control of time carries a positive indirect association between goal setting/prioritization and pedagogical performance.

H7: Perceived control of time carries a positive indirect association between time planning/organization and pedagogical performance.

Exploratory analyses: Because demographic and professional characteristics can shape faculty workloads and time constraints, we examine their bivariate relationships with key study variables. These contrasts are treated as contextual descriptors rather than as formal moderation (interaction) tests.

Methodology

Research design

This study used a cross-sectional, questionnaire-based design to examine associations between time management dimensions and pedagogical performance among Algerian female university faculty. Given the observational nature of the design, all findings are interpreted as associations (and indirect associations in the model), rather than causal effects.

All focal predictors and the outcome were collected from the same respondents in one survey wave. Anonymity and separation of the questionnaire into construct sections were the only relevant procedural features; no temporal separation, marker variable, or common-method-factor analysis was used. Consequently, common method variance cannot be ruled out.

Target population, sampling, and data collection

The target population comprised female university faculty members in Algeria (33,084 women; 47.2% of total university faculty across 115 higher education institutions, as reported by MESRS, 2023). A female-only focus was adopted because female academics in Algeria face distinctive constraints shaped by cultural norms and societal expectations that can intensify work–family demands and time scarcity, with potential implications for how time management relates to professional functioning.

Data were collected via an electronic questionnaire over six weeks (September 1 to October 15, 2024). A total of 436 responses were received from female faculty across 68 accredited higher education institutions, of which 425 were retained as valid for analysis. Appendix D documents institutional representation patterns in the obtained sample.

Because the sample includes female faculty members only, the study does not support male–female comparisons; the focus is on within-sample associations.

Ethics and informed consent

This study involved anonymous and voluntary participation of adult university faculty members. No personally identifiable information was collected. Ethical review and approval were not required for this study in accordance with local institutional requirements. The research was conducted in line with the principles of the Declaration of Helsinki. Informed consent was obtained electronically at the beginning of the online questionnaire. Participants were informed about the study purpose, voluntary participation, anonymity, and their right to withdraw at any time.

Measures and instrument structure

The questionnaire comprised three sections: (1) demographic/professional information, (2) time management, and (3) pedagogical performance. The instrument captured age group, marital status, number of children, years of experience (seniority), academic rank, and field of work, as demographic and professional variables. In the analytic dataset, these variables are coded as categorical groups for age, marital status, seniority, academic rank, and field of work, and as a numeric count for number of children. Time management was operationalized through three subscales; (i) goal setting and prioritization (5 items) included setting annual goals, prioritizing goals, and breaking complex goals into actionable steps; (ii) time planning and organization (8 items) included creating task lists, setting deadlines, adjusting schedules, and balancing work and personal time; (iii) perceived control of time

(7 items) included using time effectively, focusing on planned tasks, handling unexpected situations, and avoiding delay or procrastination. On the other hand, pedagogical performance was measured through three subscales; (i) teaching (8 items) included adherence to the syllabus, updating course content, objective evaluation, and pedagogical support; (ii) participation in pedagogical meetings/workshops (6 items) included attending meetings, contributing to committees, and participating in seminars; (iii) supervision and pedagogical tutorship (5 items) included supervision follow-up, periodic evaluation of theses, and participation in evaluation committees.

All items used a five-point Likert response format. Higher values indicate stronger agreement: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. All items are positively keyed; no reverse-coded items are specified in Appendix A.

Subscale scores were arithmetic means of their constituent items: GSP (5), TPO (8), PCT (7), Teaching (8), Participation (6), and Supervision/Tutorship (5), each retained on the original 1–5 metric.

Two higher-order composite indices were also used: time management (TM) is mean of the three time-management subscales (goal setting/prioritization, planning/organization, perceived control) and pedagogical performance (PP) is mean of the three pedagogical-performance subscales (teaching, participation, supervision/tutorship).

The focal predictors were standardized before multivariable modeling. One interaction, TPO × PCT, was specified a priori as an exploratory test of whether the planning–performance association varied with the level of perceived control. This term was selected because Macan's process logic specifically positions perceived control as the condition through which planning is translated into outcomes; no analogous conditional role was proposed for GSP. Additional product terms available in the archived file were not analyzed, avoiding an untethered search across interactions.

Data integrity audit

During revision, the three submitted data files were cross-checked. The Excel file and 68-variable SPSS file were cell-identical, but the electronic-media planning item had been displaced across respondents in those exports; the archived 56-variable raw SPSS file retained the correctly aligned item vector. Exact matching on the other 50 raw variables uniquely reconciled all 425 records, and all 21,250 compared cells agreed. Restoring the item reproduced the archived eight-item TPO composite for 425 of 425 cases. Reliability and item-level EFA were therefore recomputed from the corrected raw file; the composite-level descriptive, correlational, Gamma, and path results were independently reproduced. The submitted data contained no missing values or exact duplicate records.

Validity and reliability srategy

Internal consistency was evaluated for each subscale using Cronbach's alpha. Construct validity was examined with item-level exploratory principal-components analyses followed by Varimax rotation, reported separately for the time-management and pedagogical-performance item sets. The primary analyses retained the original TPO8 and PCT7 scale definitions to preserve construct coverage and comparability; prespecified revision analyses recomputed TPO without the electronic-media item (TPO7) and PCT without the two self-improvement items (PCT5).

EFA reporting follows standard diagnostics: sampling adequacy (KMO), factorability (Bartlett's test), eigenvalues and explained variance, communalities, and rotated factor loadings with a prespecified loading threshold for interpretation (reported in the Findings and Appendices B–C).

Statistical analysis

Primary analyses were reproduced from the submitted SPSS-format source files and independently audited in four stages.

1. Descriptive statistics summarize demographic/professional characteristics and the distribution of scale scores.
2. Because normality tests indicate departures from normality, Spearman's rank correlation is used to examine bivariate associations among time-management dimensions and pedagogical performance.
3. The primary multivariable model was a Gamma generalized linear model with a log link for the strictly positive, non-normal PP composite (McCullagh & Nelder, 1989). Because PP is also bounded from 1 to 5, robustness was evaluated with maximum-likelihood beta regression after rescaling PP to 0–1 and applying the standard boundary transformation (Smithson & Verkuilen, 2006). Both outcome models used standardized GSP, TPO, and PCT, the exploratory TPO × PCT interaction, and the same dummy-coded demographic/professional covariates.
4. The indirect-association analysis was a separate standardized OLS path model rather than part of the Gamma GLM. PCT was regressed on GSP, TPO, and all demographic/professional covariates (the a-path equation); PP was then regressed on PCT, GSP, TPO, and the same covariates (the b-path equation). Indirect associations were products of the corresponding a- and b-path coefficients, with percentile confidence intervals from 5,000 casewise bootstrap resamples (seed = 20260830). This linear product-of-coefficients model permits standardized indirect estimates; the Gamma and beta models remain the primary bounded/non-normal outcome checks. All indirect estimates are associational, not causal.

Findings

Sample characteristics

A total of 425 valid responses from Algerian female university faculty were retained for analysis. Table 1 summarizes the main demographic and professional characteristics of the sample.

Table 1
Key characteristics of the study sample

Variable	Category	F	Percentage (%)
Age	Less than 30 years	16	3.8
	30–40 years	283	66.6
	40–50 years	104	24.5
	More than 50 years	22	5.2
Marital status	Single	134	31.5
	Married	280	65.9
	Divorced	10	2.4
	Widow	1	0.2
Number of children	No children	171	40.2
	One child	52	12.2
	Two to three children	160	37.6
	Four or more children	42	9.9

Variable	Category	F	Percentage (%)
Seniority	Less than 5 years	257	60.5
	5–10 years	81	19.1
	[10–15 years	34	8.0
	More than 15 years	53	12.5
Academic rank	Professor	24	5.6
	Associate Professor	126	29.6
	Assistant Professor	275	64.7
Field of work	Humanities and Social Sciences	270	63.5
	Formal Sciences	24	5.6
	Natural Sciences	76	17.9
	Applied Sciences	55	12.9

The sample is concentrated among faculty aged 30–40 years (66.6%), with fewer than five years of seniority (60.5%), and at Assistant Professor rank (64.7%). This early-career profile is substantively important: junior faculty may have heavier course-preparation demands, less scheduling autonomy, and fewer or newer supervision assignments than senior colleagues. Accordingly, the supervision/tutorship score and all process estimate primarily characterize early-career female faculty and should not be generalized uncritically to established professors.

Descriptive statistics and distributional properties

Table 2 reports scale-level descriptive statistics for the primary constructs. Because all scales are bounded (1–5) and responses are skewed toward agreement, distributions exhibit negative skewness (ceiling-prone responding), especially for teaching. Consistent with this, normality testing (Lilliefors-corrected) rejected normality for each scale ($p < .001$ for all), supporting the use of non-parametric associations (Spearman's ρ) and model-based approaches robust to non-normal outcomes.

Table 2

Descriptive statistics for the main study scales

Scale	N	Mean	SD	Skewness	Kurtosis
Goal setting and prioritization (GSP)	425	4.006	0.826	-1.232	2.057
Time planning and organization (TPO)	425	3.768	0.742	-0.540	0.114
Perceived control of time (PCT)	425	3.727	0.705	-0.393	0.059
Teaching	425	4.428	0.519	-1.667	5.924
Participation in meetings/workshops	425	3.800	0.783	-0.476	-0.116
Supervision and tutorship	425	3.987	0.793	-0.993	1.253
Overall time management (TM)	425	3.834	0.653	-0.759	1.013
Overall pedagogical performance (PP)	425	4.072	0.575	-0.673	0.598

Notes. All scales range from 1 to 5, where 1 = Strongly Disagree and 5 = Strongly Agree; higher scores indicate stronger endorsement of the practice/behavior. "Overall TM" is the mean of GSP, TPO, and PCT. "Overall PP" is the mean of Teaching, Participation, and Supervision/Tutorship.

Mean levels are high across constructs, consistent with a ceiling-prone response pattern. Teaching shows the highest mean (M = 4.428) and the strongest negative skewness (−1.667), indicating strong agreement clustering near the upper end of the scale. These distributional features support conservative interpretation and motivate the non-parametric and Gamma GLM modeling choices reported later.

Internal consistency reliability

Table 3 reports Cronbach's alpha (Cronbach, 1951) estimates recalculated from the corrected item-level source. Subscale alpha ranges from .756 for supervision/tutorship to .859 for GSP, exceeding the conventional .70 benchmark for research use (Nunnally & Bernstein, 1994). TPO8 reliability is .809; deleting the electronic-media item yields α = .810. The five-item PCT sensitivity score yields α = .810, compared with .844 for PCT7.

Table 3

Internal consistency reliability (Cronbach's α) by subscale

Scale	No. of items	Cronbach's α
Goal setting and prioritization (5 items)	5	0.859
Time planning and organization (8 items)	8	0.809
Perceived control of time (7 items)	7	0.844
Teaching (8 items)	8	0.764
Participation in meetings/workshops (6 items)	6	0.793
Supervision and tutorship (5 items)	5	0.756
Time management (all 20 items)	20	0.913
Pedagogical performance (all 19 items)	19	0.869
Full instrument (39 items)	39	0.923

Notes. Cronbach's α was computed at the item level. Values ≥ .70 are commonly interpreted as acceptable for research scales, but very high values at the full-instrument level may also reflect redundancy or a strong general factor.

Reliability is acceptable across the original and refined subscales. The high full-instrument alpha (α = .923) may reflect a broad response tendency or construct overlap rather than unidimensionality, so factorial structure and sensitivity estimates are considered alongside alpha.

Construct Validity Evidence (EFA; Varimax Rotation)

To examine construct validity, exploratory analyses with Varimax rotation (Kaiser, 1958) were conducted separately for the corrected time-management items and the pedagogical-performance items, following applied EFA guidance (Fabrigar et al., 1999).

Table 4
EFA summary for time-management items

Diagnostic	Result
Kaiser–Meyer–Olkin (KMO)	0.907
Bartlett's test of sphericity	$\chi^2(190) = 4046.609$, $p < .001$
Eigenvalues (first 3)	7.847; 1.684; 1.298
% variance explained (first 3)	39.237%; 8.420%; 6.492%
Total % variance explained (3-factor solution)	54.149%

Note. Extraction used the correlation matrix followed by Varimax rotation. Percentage variance is eigenvalue ÷ number of items × 100. Full rotated loadings and communalities are reported in Appendix B. Loadings ≥ |.40| are the primary interpretive threshold.

Sampling adequacy was strong (KMO = .907; Kaiser, 1974), and Bartlett's test supported factorability, $\chi^2(190) = 4046.609$, $p < .001$ (Bartlett, 1950). The corrected three-factor solution explains 54.15% of variance. The electronic-media item is no longer unrelated to the factor space (loadings = .383, .248, and .012; $h^2 = .208$), although its communality remains modest. The two self-improvement items continue to define a distinct third factor (primary loadings = .828 and .827), consistent with growth intentions rather than current control. The primary TPO8/PCT7 results are therefore accompanied by TPO7/PCT5 sensitivity analyses (Table 10).

Table 5
EFA summary for pedagogical-performance items

Diagnostic	Result
Kaiser–Meyer–Olkin (KMO)	0.871
Bartlett's test of sphericity	$\chi^2(171) = 2792.068$, $p < .001$
Eigenvalues (first 3)	6.028; 2.017; 1.388
% variance explained (first 3)	31.728%; 10.614%; 7.306%
Total % variance explained (3-factor solution)	49.648%

Note. Extraction used the correlation matrix followed by Varimax rotation. Full rotated loadings and communalities are reported in Appendix C. Loadings ≥ |.40| are the primary interpretive threshold.

KMO (0.871; Kaiser, 1974) and Bartlett's test of sphericity ($p < .001$; Bartlett, 1950) support factorability of the pedagogical-performance items. The rotated three-factor solution explains 49.65% of variance and broadly aligns with the intended structure (teaching; participation; supervision/tutorship). Nonetheless, Appendix C shows limited cross-loading for a small number of items, indicating that some behaviors may not be purely domain-specific in practice (e.g., items reflecting broader "professional engagement" tendencies). This is not treated as a fatal validity defect; rather, it reinforces the need to interpret associations conservatively under potential overlap and ceiling effects.

Bivariate Associations (Spearman's Rank Correlations)

Given the strong ceiling-prone responding and non-normality, Spearman's rank correlation (ρ) was used to examine associations among time-management dimensions and overall pedagogical performance.

Table 6

Spearman correlations among the primary constructs

Construct	1	2	3	4
1. Goal setting & prioritization (GSP)	1.000			
2. Time planning & organization (TPO)	0.598***	1.000		
3. Perceived control of time (PCT)	0.524***	0.671***	1.000	
4. Pedagogical performance (PP)	0.338***	0.457***	0.496***	1.000

Notes. *** $p < .001$ (two-tailed).

All time-management dimensions are positively associated with pedagogical performance. The strongest bivariate association with pedagogical performance is observed for perceived control of time ($\rho = 0.496$, $p < .001$), followed by planning/organization ($\rho = 0.457$, $p < .001$), and then goal setting/prioritization ($\rho = 0.338$, $p < .001$). The time-management dimensions are also strongly interrelated, particularly planning/organization with perceived control ($\rho = 0.671$, $p < .001$), which is consistent with the EFA evidence suggesting partial overlap between behavioral planning and perceived control in this sample.

Multivariable Model (Gamma GLM)

Overall pedagogical performance (PP) is modeled using a Gamma distribution with a log link (McCullagh & Nelder, 1989). Time-management predictors are standardized (z-scores) to aid comparability. Categorical covariates are dummy-coded using the following reference categories (coded as "1"): Age <30, Single, No children, <5 years seniority, Professor, and Humanities/Social Sciences.

Table 7

Gamma GLM model specification and fit indices

Index	Value
Family / link	Gamma / log
Number of predictors (excluding intercept)	21
Residual df	403
Deviance	6.893
Pearson χ^2	6.422
Scale	0.0159
AIC	683.683

Source. Authors' calculations from the survey dataset.

Notes. Fit indices are reported for transparency; inference and interpretation focus on parameter estimates (Table 8).

The Gamma GLM is used as a pragmatic modeling choice for a positively bounded, non-normally distributed outcome. Interpretation therefore emphasizes the direction and statistical support of associations rather than causal or purely magnitude-based claims.

Table 8

Gamma GLM parameter estimates predicting pedagogical performance (PP)

Predictor	B	SE	z	p	Exp (B)
Goal setting/prioritization (standardized; ZG)	0.0084	0.0083	1.013	.311	1.008
Planning/organization (standardized; ZP)	0.0280	0.0094	2.974	.003	1.028
Perceived control of time (standardized; ZC)	0.0481	0.0088	5.475	<.001	1.049
Interaction: ZP × ZC	0.0042	0.0049	0.856	.392	1.004
Age: 30–40 (vs <30)	0.0407	0.0336	1.214	.225	1.042
Age: 40–50 (vs <30)	0.0137	0.0371	0.370	.712	1.014
Age: >50 (vs <30)	0.0684	0.0474	1.443	.149	1.071
Married (vs Single)	-0.0080	0.0241	-0.334	.739	0.992
Divorced (vs Single)	-0.0164	0.0457	-0.359	.720	0.984
Widow (vs Single)	0.1258	0.1300	0.968	.333	1.134
One child (vs No children)	0.0043	0.0274	0.155	.877	1.004
Two–three children (vs No children)	0.0117	0.0237	0.493	.622	1.012
Four+ children (vs No children)	0.0195	0.0296	0.658	.511	1.020
Seniority: 5–10 (vs <5)	0.0292	0.0183	1.590	.112	1.030
Seniority: 10–15 (vs <5)	0.0546	0.0268	2.041	.041	1.056
Seniority: >15 (vs <5)	0.0180	0.0276	0.653	.514	1.018
Associate Professor (vs Professor)	0.0193	0.0328	0.586	.558	1.019
Assistant Professor (vs Professor)	0.0109	0.0333	0.327	.744	1.011
Formal Sciences (vs Humanities/Social Sciences)	-0.0209	0.0280	-0.748	.454	0.979
Natural Sciences (vs Humanities/Social Sciences)	-0.0071	0.0170	-0.418	.676	0.993
Applied Sciences (vs Humanities/Social Sciences)	0.0197	0.0193	1.023	.306	1.020

Notes. Gamma GLM with log link. Exp(B) represents the multiplicative change in the expected outcome associated with a one-unit increase in the predictor (or relative to the reference category for

categorical predictors). Standardized predictors (ZG, ZP, ZC) represent a one SD increase in the corresponding scale.

Perceived control of time and planning/organization show positive adjusted associations with PP. A one-SD increase in PCT is associated with a 4.9% higher expected PP (B = .0481, p < .001, Exp[B] = 1.049), and a one-SD increase in TPO with a 2.8% higher expected PP (B = .0280, p = .003, Exp[B] = 1.028). GSP is not supported after accounting for adjacent processes (p = .311), and the TPO × PCT interaction is not supported in the Gamma specification (p = .392). The only nominal demographic contrast is 10–15 versus <5 years of seniority (p = .041), but it does not survive Holm adjustment across 17 demographic contrasts (adjusted p = .702). Small categories—including age <30 (n = 16), Professor rank (n = 24), divorced (n = 10), and widowed (n = 1)—also make their contrasts imprecise; no demographic coefficient is interpreted substantively.

Indirect associations consistent with Macan's process logic

Indirect associations were estimated with the separate covariate-adjusted standardized OLS path model described above. In the a-path equation, GSP (β = .203, p < .001) and TPO (β = .552, p < .001) were positively associated with PCT. In the b-path equation, PCT remained positively associated with PP while GSP, TPO, and the same demographic/professional covariates were held constant (β = .339, p < .001).

Table 9
Indirect associations via perceived control of time

Indirect path	Indirect association (standardized; a×b)	95% bootstrap CI (lower)	95% bootstrap CI (upper)
GSP–PCT–PP (indirect path)	0.069	0.029	0.119
TPO–PCT–PP (indirect path)	0.187	0.120	0.257

Note. Standardized OLS path estimates include age, marital status, grouped number of children, seniority, academic rank, and field of work in both the PCT and PP equations, using the same reference categories as the Gamma model. Percentile confidence intervals use 5,000 casewise bootstrap resamples (seed = 20260830; Hayes, 2022; Preacher & Hayes, 2008). These cross-sectional indirect associations are not causal mediation effects.

Both adjusted indirect associations exclude zero: GSP → PCT → PP = .069, 95% CI [.029, .119], and TPO → PCT → PP = .187, 95% CI [.120, .257]. The larger planning pathway is consistent with Macan's process ordering, but the cross-sectional design cannot establish temporal sequence.

Table 10
Sensitivity Analyses for Measurement Refinement and the Bounded Outcome

Score specification	Outcome model	Predictor	B	SE	p
TPO7 / PCT5	Gamma log	GSP	0.014	0.008	.098
TPO7 / PCT5	Gamma log	TPO	0.023	0.010	.021
TPO7 / PCT5	Gamma log	PCT	0.046	0.009	< .001
TPO7 / PCT5	Gamma log	TPO × PCT	0.006	0.005	.246
TPO8 / PCT7	Beta logit	GSP	0.066	0.045	.136

Score specification	Outcome model	Predictor	B	SE	p
TPO8 / PCT7	Beta logit	TPO	0.163	0.051	.001
TPO8 / PCT7	Beta logit	PCT	0.331	0.048	< .001
TPO8 / PCT7	Beta logit	TPO × PCT	0.115	0.027	< .001
TPO7 / PCT5	Beta logit	GSP	0.092	0.045	.039
TPO7 / PCT5	Beta logit	TPO	0.134	0.054	.013
TPO7 / PCT5	Beta logit	PCT	0.318	0.049	< .001
TPO7 / PCT5	Beta logit	TPO × PCT	0.122	0.029	< .001

Note. TPO7 excludes the electronic-media planning item; PCT5 excludes the two self-improvement items. The primary TPO8/PCT7 Gamma model is reported in Table 8. Beta models rescale PP from 1–5 to 0–1 and apply the boundary transformation (y[n − 1] + 0.5)/n before maximum-likelihood estimation (Smithson & Verkuilen, 2006). Beta coefficients are on the logit scale and are not numerically comparable with Gamma log-link coefficients.,

Sensitivity analyses

Deleting the electronic-media item and the two self-improvement items preserves the Gamma conclusions for TPO (B = .0228, p = .021) and PCT (B = .0461, p < .001); the interaction remains unsupported (p = .246). The refined indirect associations also remain positive: GSP → PCT5 → PP = .041, 95% CI [.005, .087], and TPO7 → PCT5 → PP = .201, 95% CI [.130, .278]. Beta regression supports the TPO and PCT main effects under both score definitions, but it yields a positive TPO × PCT interaction (p < .001) and supports GSP only with refined scoring (p = .039). Thus, the positive TPO and PCT main associations are the most stable findings; GSP's adjusted association and the interaction are model-dependent.

Evaluation of hypotheses

H1 receives mixed support: GSP is positively correlated with PP but is not supported in the primary adjusted Gamma model. H2 and H3 are supported by the bivariate and primary adjusted estimates for TPO and PCT. H4 and H5 are supported by the positive covariate-adjusted a-paths from GSP and TPO to PCT. H6 and H7 are supported as indirect associations because both bootstrap intervals exclude zero. These designations concern directional associations, not causality. The TPO × PCT term is exploratory rather than one of H1–H7 and, as Table 10 shows, its inference depends on the outcome model.

Discussion

The results identify perceived control of time and planning/organization as the most consistent correlates of self-reported pedagogical performance among Algerian female faculty. GSP is related to PP bivariately but not in the primary adjusted model, whereas both indirect pathways through PCT remain positive. Measurement refinement preserves the Gamma findings; bounded-outcome modeling confirms the two main associations but makes the exploratory interaction model-dependent.

Perceived Control of Time as the Most Proximal Correlate

Perceived control of time emerged as the strongest and most consistent correlate of pedagogical performance. At the bivariate level, perceived control showed the largest positive association with pedagogical performance (ρ = 0.496), exceeding planning/organization (ρ = 0.457) and goal

setting/prioritization (ρ = 0.338). In the Gamma GLM, perceived control remained a robust predictor of pedagogical performance after accounting for adjacent dimensions (B = 0.0481, p < .001; Exp(B) = 1.049). This pattern aligns with Macan's (1994) process model, which conceptualizes perceived control as a proximal psychological mechanism translating time-management behaviors into downstream outcomes.

The pattern is consistent with Macan's (1994) claim that perceived control is proximal to outcomes and with contemporary self-regulation accounts in which planning, monitoring, and adaptive adjustment convert goals into workable action structures (Tinajero et al., 2024). Field evidence that daily planning reduces unfinished tasks and rumination provides a complementary mechanism: externalizing task structure may preserve cognitive flexibility and perceived command over competing demands (Uhlig et al., 2023). These studies do not establish the same mechanism in Algerian faculty, but they clarify why planning and control may be closer to pedagogical functioning than goal articulation alone.

Planning/Organization Retains an Independent Association, Whereas Goal Setting Does Not

Planning/organization demonstrated an independent association with pedagogical performance, even when modeled alongside perceived control and goal setting (B = 0.0280, p = .003; Exp(B) = 1.028). By contrast, goal setting/prioritization, while positively correlated with pedagogical performance (ρ = 0.338), did not retain a unique association in the multivariable model (B = 0.0084, p = .311). This suggests that, within this sample, the "performance-relevant" variance captured by goal setting may overlap substantially with more execution-oriented processes—particularly planning behaviors and perceived control.

This interpretation is theoretically consistent with time-management frameworks that treat goal setting as an integral component of planning rather than a stand-alone predictor at later modeling stages (Claessens et al., 2004, 2007; Macan, 1994). Empirically, research in educational and student populations likewise indicates that goals translate into outcomes most effectively when accompanied by structured planning, sequencing, and monitoring of activities (e.g., Çetin & Eren, 2019; Stevenson, 2016; Zuo et al., 2024). Taken together, the evidence suggests a practical inference: for pedagogical performance, the "implementation layer" of time management (planning/organization) and the subjective experience of control may matter more than goal articulation in isolation.

Model-Dependent Evidence for the Planning × Perceived Control Interaction

The Gamma model does not support the TPO × PCT interaction (p = .392; refined-score p = .246), but both beta models yield a positive interaction (p < .001). The discrepancy likely reflects different mean–variance and boundary assumptions rather than a simple replication failure. The study therefore cannot claim a model-invariant moderation effect or a model-invariant absence of moderation. Replication with preregistered bounded or ordinal models is needed before interpreting this conditional association.

Limited Explanatory Power of Demographic and Professional Characteristics

Demographic and professional coefficients offer little stable explanatory leverage. The nominal 10–15-year seniority contrast does not survive multiplicity adjustment, and sparse reference or comparison cells make several contrasts unstable. More importantly, the sample's early-career concentration bounds the meaning of the process estimates: Assistant Professors may be developing teaching routines, have less schedule autonomy, and have fewer supervision opportunities than senior faculty. The results should therefore be read as evidence about a predominantly junior female-faculty sample, not as a career-stage invariant account.

Theoretical implications

The theoretical contribution is to connect Macan's control-centered process model with contemporary cyclical self-regulation. Planning and monitoring are not merely personal techniques; their effectiveness depends on whether academic work leaves sufficient temporal autonomy for those routines to be enacted. In a female-only sample, the data cannot demonstrate gender differences. Nevertheless, prior evidence that women receive disproportionate service and care demands (Guarino & Borden, 2017; Misra et al., 2012; O'Meara et al., 2017) helps interpret PCT as a possible subjective imprint of workload allocation and schedule predictability, not simply individual competence. This interpretation remains theoretical because care load, service requests, and temporal autonomy were not measured directly.

Practical implications for higher education

The contribution extends beyond Algeria at the level of a testable mechanism, not a universal effect size. Higher education systems that combine teaching, supervision, service, and research under fragmented schedules can examine whether temporal autonomy and planning supports predict pedagogical functioning. Cross-national generalization requires replication because governance, workload allocation, digital infrastructure, and gender-role expectations differ across systems.

Three implication directions follow directly from the findings:

1. Support perceived control through structural conditions. Institutions can publish teaching timetables earlier, protect recurring focus blocks, designate meeting-free periods, coordinate assessment and reporting calendars, and make service allocations transparent. Each mechanism reduces avoidable unpredictability and should be evaluated against PCT and pedagogical indicators before wider adoption.

2. Translate goals into executable plans. Semester workload maps, shared milestone calendars, weekly implementation plans, and administrative support for repetitive reporting can help faculty convert goals into time-bounded actions. Planning interventions should accommodate interruptions and teaching/supervision cycles rather than assume a fully controllable schedule (Uhlig et al., 2023).

3. Pair individual training with workload redesign. Training in prioritization, interruption management, and adaptive replanning may be useful, but the present study did not test an intervention. Pilot programs should therefore combine skill support with schedule and service reforms and assess changes longitudinally, preferably with administrative, peer, or student-reported outcomes.

For Algerian institutions, these mechanisms are especially relevant to the concurrent statutory duties of teaching, pedagogical coordination, tutoring, research, and supervision. For institutions elsewhere, the actionable question is whether comparable role bundles reduce perceived temporal control and whether locally appropriate structural supports restore it.

Scope and Future Directions

The conclusions are bounded by a cross-sectional, single-wave, self-report design. Predictors and PP were obtained from the same respondents in the same instrument, with no temporal separation, marker variable, or method-factor test. Anonymity and construct sections do not eliminate common method variance; uniformly positive correlations and ceiling-prone responses could therefore reflect generalized positivity, consistency motives, or impression management in addition to substantive associations (Podsakoff et al., 2003). Reverse direction and biased cross-sectional indirect effects also remain possible (Maxwell & Cole, 2007), so neither causal mediation nor the magnitude of the associations should be inferred.

Future studies should use temporal separation or longitudinal measurement, incorporate administrative teaching loads, student feedback, or peer ratings, and test marker or latent-method-factor specifications where appropriate. Oversampling senior ranks would permit more stable career-

stage comparisons and clarify whether supervision/tutorship operates similarly among junior and senior faculty. Measurement work should also cross-validate the TPO7 and PCT5 refinements before replacing the original scales.

Conclusion

This study examined associations among GSP, TPO, PCT, and self-reported pedagogical performance in 425 Algerian female faculty members. The sample was predominantly early career, and all focal measures were collected cross-sectionally from the same source.

PCT and TPO are the most stable adjusted correlates of PP across original and refined scoring and across Gamma and beta outcome models. GSP is positive bivariately but not in the primary Gamma model. The covariate-adjusted indirect associations through PCT remain positive under both score definitions. The exploratory TPO × PCT inference is model-dependent: unsupported under Gamma but positive under beta regression.

No demographic contrast is robust to multiplicity adjustment, and sparse categories preclude strong interpretation. Together with the early-career skew and common-method risk, this limits generalization and rules out causal claims.

The most defensible conclusion is that planning and perceived control are consistently aligned with pedagogical functioning in this sample. Institutional mechanisms that increase schedule predictability and support executable planning merit longitudinal or experimental evaluation in Algeria and other higher education systems.

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Appendices

Appendix A: Questionnaire Statements

	A1: Time Management
	Subscale 1: Goal Setting and Prioritization
1	I set my professional goals for each year.
2	I set specific, achievable, and measurable goals.
3	I prioritize my goals.
4	I break down complex goals into actionable steps.
5	I review my goals to see if they need adjustment.
	Subscale 2: Time Planning and Organization
1	I create a task list to organize my time
2	I use a tool (notebook, planner, phone...) to take notes on each task or goal
3	I rely on electronic media to manage my time
4	I estimate the time needed to achieve each goal
5	I make sure to set deadlines for completing my work and adhere to them
6	I adjust my schedule according to circumstances and challenges
7	I avoid time wasters and focus on completing my tasks
8	I balance my time between work and personal life fairly and equally
	Subscale 3: Perceived Time Control
1	I use my time effectively
2	I adhere to the schedule to achieve the goal
3	I am able to focus on the tasks planned
4	I can handle unexpected situations and circumstances
5	I work on improving my time management and developing my organizational and planning skills
6	I work on improving my organizational skills, planning, and consciously managing my time
7	I make sure not to delay tasks and procrastinate to avoid stress
	A2: Pedagogical Performance
	Subscale 1: Teaching
1	I adhere to the ministerial syllabus for the supervised modules
2	I complete the syllabus for the supervised modules
3	I make sure to update the information presented to the students
4	I use electronic means in presenting pedagogical work (lessons, practical work...)
5	I ensure coordination between lecture content and practical work or directed work
6	I provide pedagogical support to students to help them improve their grades
7	I evaluate students' work objectively
8	I provide pedagogical handouts for all the modules I teach
	Subscale 2: Participation in Pedagogical Meetings and Workshops
1	I attend scheduled pedagogical meetings in the department
2	I make sure to study points on pedagogical committee agendas for constructive input

	Subscale 1: Teaching
3	I participate in pedagogical seminars aimed at students
4	I make sure to organize pedagogical seminars aimed at students
5	I study student results for discussion in deliberation committees
6	I contribute to the preparation of lessons and exams with the pedagogical team for the module
	Subscale 3: Student Supervision and Tutorship
1	I make sure to supervise students at all levels of progression and organize periodic work sessions with the students I supervise
2	I ensure the periodic evaluation of the theses and work of the students I supervise
3	I propose graduation topics to the students I supervise
4	I work in discussion committees for the objective evaluation of students' theses
5	I accompany students in specialized committees/programs (entrepreneurship, business incubators...)

Appendix B: Rotated Factor Matrix for Time-Management Items (3-Factor Varimax Solution; N = 425)

Item	F1	F2	F3	h^2
I set my professional goals for each year.	0.123	0.759	0.103	0.602
I set specific, achievable, and measurable goals.	0.174	0.733	0.222	0.617
I prioritize my goals.	0.200	0.766	0.189	0.663
I break down complex goals into actionable steps.	0.108	0.703	0.288	0.589
I review my goals to see if they need adjustment.	0.226	0.674	0.185	0.540
I create a task list to organize my time	0.347	0.605	0.108	0.498
I use a tool (notebook, planner, phone...) to take notes on each task or goal	0.345	0.500	0.009	0.369
I rely on electronic media to manage my time	0.383	0.248	0.012	0.208
I estimate the time needed to achieve each goal	0.491	0.488	0.193	0.516
I make sure to set deadlines for completing my work and adhere to them	0.603	0.351	0.187	0.522
I adjust my schedule according to circumstances and challenges	0.295	0.353	0.409	0.379
I avoid time wasters and focus on completing my tasks	0.699	0.221	0.241	0.596
I balance my time between work and personal life fairly and equally	0.636	0.163	0.008	0.431
I use my time effectively	0.750	0.075	0.266	0.639
I adhere to the schedule to achieve the goal	0.730	0.207	0.276	0.652
I am able to focus on the tasks planned	0.604	0.228	0.397	0.574
I can handle unexpected situations and circumstances	0.309	0.049	0.592	0.448
I work on improving my time management and developing my organizational and planning skills	0.130	0.259	0.828	0.770
I work on improving my organizational skills, planning, and consciously managing my time	0.114	0.243	0.827	0.757
I make sure not to delay tasks and procrastinate to avoid stress	0.485	0.177	0.439	0.459

Note. Varimax rotation; factor signs are oriented for interpretive clarity. h^2 = communality in the three-factor solution.

Appendix C: Rotated Factor Matrix for Pedagogical-Performance Items (3-Factor Varimax Solution; N = 425)

Item	F1	F2	F3	h^2
I adhere to the ministerial syllabus for the supervised modules	0.551	0.022	-0.067	0.309
I complete the syllabus for the supervised modules	0.731	0.024	-0.135	0.553
I make sure to update the information presented to the students	0.712	0.121	-0.288	0.604
I use electronic means in presenting pedagogical work (lessons, practical work...)	0.501	0.298	-0.010	0.340
I ensure coordination between lecture content and practical work or directed work	0.636	0.086	-0.281	0.491
I provide pedagogical support to students to help them improve their grades	0.646	0.188	-0.133	0.467
I evaluate students' work objectively	0.741	0.125	-0.050	0.568
I provide pedagogical handouts for all the modules I teach	0.676	0.209	-0.071	0.507
I attend scheduled pedagogical meetings in the department	0.409	0.188	-0.159	0.260
I make sure to study points on pedagogical committee agendas for constructive input	0.327	0.487	-0.180	0.322
I participate in pedagogical seminars aimed at students	0.229	0.646	-0.090	0.477
I make sure to organize pedagogical seminars aimed at students	0.219	0.699	-0.052	0.536
I study student results for discussion in deliberation committees	0.219	0.686	-0.090	0.523
I contribute to the preparation of lessons and exams with the pedagogical team for the module	0.199	0.720	-0.077	0.563
I make sure to supervise students at all levels of progression and organize periodic work sessions with the	0.034	0.286	-0.741	0.634
I ensure the periodic evaluation of the theses and work of the students I supervise.	0.092	0.225	-0.780	0.670
I propose graduation topics to the students I supervise	0.049	0.340	-0.675	0.573
I work in discussion committees for the objective evaluation of students' theses	0.115	0.337	-0.712	0.632
I accompany students in specialized committees/programs (entrepreneurship, business incubators...)	0.518	0.371	-0.074	0.325

Note. Varimax rotation. A factor's sign is arbitrary: multiplying every F3 loading by −1 produces the identical solution. The negative supervision/tutorship loadings therefore reflect the reporting orientation of F3, not lower supervision or an inverse substantive relationship. h^2 = communality in the three-factor solution.

Appendix D: Distribution of the Research Sample by Institutional Affiliation (Grouped)

Category	Institutions	Total
High representation (≥ 20)	University of Constantine 2 (48); Jijel (42); Annaba (23); Batna 1 (20).	133
Moderate (10–19)	University of Ouargla (16); Skikda (15); Setif 1 (13); Souk Ahras (12); Djelfa (11).	99
Low (5–9)	University of Tlemcen (9); Guelma (9); M'sila (9); Blida 2 (9) Algiers 1 (8); Chlef (8); Center of Tipaza (8); Center of Mila (8); Constantine 1 (7); El Tarf (7); Medea (7); Setif 2 (6); Ghardaia (6); Sidi Bel Abbes (6); Center of Barika (6); Tiaret (6); Adrar (6); Khemis Miliana (5); Biskra (5); Oran 2 (5); Ain Temouchent (5); Higher School of Teachers (ENS) – Setif (5).	90
Very low (2–4)	University of Tissemsilt (4); Batna 2 (4); Oran 1 (4); Algiers 3 (4); Mascara (4); Bechar (3); Constantine 3 (3); Bejaia (3); Tizi Ouzou (3); ENS – Mostaganem (4); National School of Computer Science - ESI (3); Algiers 2 (3); Higher School of Saharan Agriculture – El Oued (3); Relizane (3); Blida 1 (2); ENS – Ouargla (2); National Higher School of Artificial Intelligence (2); ENS – Bechar (2); Center of Aflou (2).	67

Category	Institutions	Total
Minimal (1 only)	University of Science and Technology (USTHB); Emir Abdelkader; Laghouat; Tamanrasset; Center of Naama; Center of El Bayadh; National School of Forestry; Khenchela; Oum El Bouaghi; ENS – Bouzaréah; National Higher School of Agronomy – Algiers; School of Superior Studies in Commerce (EHEC); ENS – Laghouat; Higher School of Computer Science of Sidi Bel Abbès; Higher School of Food Sciences and Agro-Food Industries (Essaia); Higher School of Management and Digital Economy – Koléa; Bordj Bou Arreridj.	36
Total	68 institutions	425