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Does it work? Assessing the pragmatic validity of educational interventions: Empirical evidence and construct validation from the Indian academic sector

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Abstract: This research examines the pragmatic validity of educational interventions by developing a Personal Effectiveness Scale (PES) for university instructors in India and focusing on four constructs that are represented in Self-efficacy (SE), Time-Use Efficiency (TUE), Innovative Work Behavior (IWB), and Transformative Leadership (TL). The authors collected a sample of 300 university teachers across 27 universities. The construct was validated by implementing Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Also, Structural Equation Modeling (SEM) revealed that PES significantly predicts job satisfaction and teaching effectiveness, explaining 19% and 17.4% of the variance, respectively. IWB demonstrated the most substantial impact on job satisfaction (0.3527), while TUE was the most influential in teaching effectiveness (0.2598). The findings highlight critical areas such as mentorship deficiencies, high student-teacher ratios, and inadequate institutional support. The study provides a robust tool for assessing faculty effectiveness, contributing to ongoing efforts to improve the quality of higher education in India. Additionally, the research suggests improving professional development opportunities and implementing innovative teaching strategies to enhance academic performance. Future research should explore the PES scale's cross-cultural applicability and institutional factors affecting personal effectiveness.

Keywords: *Instructors, Personal effectiveness Scale, Scale development, Scale validation, University teachers.*

1. Introduction

Indian higher education faces a significant challenge related to teaching methodologies, mentorship, time management and institutional support, all of which profoundly impact the effectiveness and satisfaction of academic instructors [1-3]. Despite a growing demand for innovative teaching practices most faculty members continue to rely on traditional methods [4, 5]. According to Mehta and Verma [6] 28% of instructors still prefer conventional lectures, while only 18% incorporate online instruction, this highlights the limited uptake of technology in teaching, although interactive methods are favored by 38%, this figure remains insufficient to demonstrate a widespread shift towards innovative teaching. In addition, experiential learning methods are applied by only 10% of educators, while the use of multimedia presentations stands at a mere 6% [7]. These statistics reveal a substantial gap in adopting modern pedagogical practices, which is crucial for enhancing student engagement and learning outcomes.

This will lead to the main issue which is the outdated and theory-heavy curricula that inhibiting creativity or practical learning [8]. Unlike many internationally acclaimed universities Indian institutions often lack formal mechanisms representing in regular student feedback systems or peer reviews to evaluate and improve teaching quality [9-11]. The absence of such practices prolongs the dysfunctions of teaching methods and limits the potential for continuous improvement; hence faculty

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members themselves acknowledge these shortcomings and urge institutions to provide more professional development opportunities and resources for adopting innovative teaching strategies Mehta and Verma [6].

Basu and Basu [12] stated that a critical area of concern is the deficiency in leadership and mentorship skills among academic instructors, the research indicates that structured mentoring programs are either absent or poorly implemented across most Indian universities, creating a significant barrier to career growth and institutional development, the lack of formal mentorship programs in Indian academia makes it difficult for young educators to find adequate guidance particularly in specialized fields. This issue is not limited to general academic institutions; it is also prevalent in medical colleges, where mentorship programs are described as insufficient for developing robust mentoring skills [13].

Moreover, when mentorship programs are established, they are often impeded by structural and personal limitations. Faculty members report a severe lack of time (18% of respondents) and inadequate training (11.5% of respondents) as the primary obstacles to effective mentoring relationships [14]. These limitations not only affect the quality of mentorship provided to junior colleagues but also hinder the development of essential leadership skills necessary for institutional progress. Moreover, the absence of formal mentorship frameworks deprives early-career academics of valuable guidance, ultimately impacting their ability to grow and contribute meaningfully to their institutions [12].

In the same context, time management and workload inefficiency are equally problematic within Indian higher education, the average student-teacher ratio in India is approximately 26:1, which is significantly higher than countries like the United States (12.5:1) and China (19.5:1) [15]. This high ratio results in larger classes increasing the teaching and grading workload for faculty members, which in turn dilutes the quality of their teaching and mentorship efforts. Additionally, a nationwide shortage of faculty members exacerbates this problem, with about 35% of professor positions and 46% of assistant professor positions remaining vacant [16]. As a result, existing faculty members are frequently overburdened with additional responsibilities, which further compromises their teaching efficiency and job satisfaction.

More and above, administrative tasks pose a considerable challenge, since the rapid expansion of colleges and student enrollments has led to a substantial increase in administrative workloads, diverting faculty attention away from core academic responsibilities, therefore, professors are often required to juggle various non-academic tasks, admissions, examinations, compliance paperwork and other regulatory duties [11]. This overload of responsibilities limits the time available for scholarly work and mentorship, thereby negatively affecting teaching efficiency and overall job satisfaction. Conversely, faculty members in countries with lower student-teacher ratios and well-defined administrative structures have designated time for research mentoring and contributing to higher productivity and satisfaction [15].

Institutional support and professional development remain another significant challenge for Indian faculty members. India's expenditure on research and development is a mere 0.6–0.7% of its GDP, significantly lower than that of countries like the United States (2.8%), China (2.1%), and Israel (over 4%) [11]. This inadequate investment directly affects the availability of research grants, laboratory resources, and project opportunities, thereby hindering scholarly productivity. Moreover, the available funding is unevenly distributed; approximately 65% of the University Grants Commission (UGC) budget is allocated to centrally funded universities, which serve a minority of the student population, while state universities that cater to the majority receive only 35% of the budget [17].

The disparity in funding leaves many colleges under-resourced, particularly affecting faculty members who require institutional support for research and professional growth. Research also indicates that many Indian instructors lack access to regular training and upskilling opportunities, limiting their ability to adopt new teaching methodologies and effectively use technological tools [7]. Moreover, the absence of structured frameworks for faculty development deprives educators of the necessary guidance to enhance their skills and advance in their careers [12]. In contrast, developed

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countries often require faculty members to participate in regular workshops, mentorship programs, and certification processes to maintain teaching quality and promote career growth [18, 19].

This research aims to explore the influence of Personal Effectiveness Scales (PES)—specifically Adaptability & Innovation, Leadership & Mentorship, Time Management & Productivity, and Career Growth & Professional Development, two critical components of academic performance: Job Satisfaction and Teaching Efficiency. By developing a comprehensive construct scale that addresses these challenges, this study seeks to provide valuable insights into improving faculty performance and enhancing the overall quality of higher education in India.

2. Literature Review

The new millennium witnessed a surge in studies in developmental and positive psychology, which garnered greater emphasis on deciphering individual effectiveness; more so in formal set-ups.

Personal effectiveness finds its basis in Bandura's Personal effectiveness theory, which postulates that the motivation, performance and success of an individual is embedded in the level of personal effectiveness [20]. Thus, people with conviction in their abilities consider adversities and opportunities, they bounce back quickly and maintain a strong commitment to accomplishing their goals. They maintain and upgrade their abilities to deal with failures and approach with confidence.

The formal definition of personal effectiveness is "the personal qualities, careers and self-management skills required to take ownership for and control of professional development." The University of Calgary identifies personal effectiveness as the ability to demonstrate respect, dignity and integrity in interpersonal relationships and to demonstrate positive personal coping and wellness strategies. This effectiveness is defined as the judgment which an individual carries on the use s/he thinks s/he can make this knowledge in a specific situation. It is the belief in his/her ability to successfully perform a given task [20]. It acknowledges the human capacity to achieve a goal, by coping from existent situations; and empirically evinced to be an insignia of performance [21].

The discipline that originally belonged to clinical psychology was then witnessed to spread its tentacles into organizational and individual psychology; and macro spheres of organizational dynamics. What distinguished the concept from other constructions was its focus on the optimistic side of human evolution and existence. In addition, this construction had in it the embedded need for dynamic perfection by core self-evaluation, and contextual and conceptual volatility [22, 23]. Thus, owing to the context of academia wherein operationalization of work mandates requires innovation, reformation through transformational leadership, and individual attributes of self and time efficacy. Each of these attributes of Personal effectiveness is discussed in more detail below:

2.1. Self-efficacy construct of Personal Effectiveness

Individual efficacy is one of the most investigated resources in organizational context Bandura [24] and Schmitt and Weigelt [25] owing to its potential to determine organizational performance Stajkovic and Luthans [26] well-being Fernandes and Singh [9] and mitigate negative work behaviors [25]. Contextually, it has also been evident to enhance the effectiveness of teachers [27-29] which is yet another cue for increased interest in defining self-efficacy in the context of instructors.

Social cognitive theory (SCT) when adopted in formal settings, efficacy has been defined as "the individual's conviction or confidence about his or her abilities to mobilize the motivation, cognitive resources or courses of action needed to successfully execute a specific task within a given context" [26]. Efficacy is witnessed to support distinct productive work behaviors [26, 29].

Bandura has recognized four sources of efficacy development. First, when individuals successfully accomplish a task, they are confident to emulate it; which is witnessed among teachers while handling learners, initiating a new pedagogy or experimenting in class. This iterative confidence builds personal efficacy over a while. Second, personal efficacy is witnessed to enhance social learning; wherein teachers learn and perform in consultation with peers and pupils. Third, individuals can be persuaded to be efficacious by timely persuasion; and finally, physiological, psychological and emotional wellness can

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enhance personal efficacy [30]. For example, in the case of instructors, feedback from institutional leaders and encouragement can lead to the wellness and efficacy of teachers in the workplace and their personal lives. This articulation further explains the impact that efficacy can have on the performance of teachers and hence on personal effectiveness.

2.2. Time-Use Efficiency (Time Management) Construct of Personal Effectiveness

It is defined as the ability of an individual to make the best use of their time Kelly [31] which though may seem convincing, has to be tweaked a little to adopt it for the current manuscript. Some of the initial works on understanding time efficiency have focused on time perception and prediction [32-35]. Though this may do little justice with the whole concept of time efficiency. Thus, attempts were made to map the individual differences in perceptions and ability to handle the resource; which can be termed as Time-use efficiency [31]. It has been noted empirically that understanding these differences can aid in developing interventions to help individuals optimize their time resources.

Contextually, it could also be noted that time efficiency could be one of the significant resources for instructors, owing to their work demands. Instructors are required to juggle between tasks, priorities and stakeholders; which can help them be productive at work and research. The three constellations of Time-Use Efficiency (TUE) is determined to be: time awareness, being conscious of its passage/utility and positive work habits. Adopting it in the case of teaching, it could be found that instructors are required to be conscious of time as a resource and its ability to pass; thus, garnering a need for positive work habits, thus ensuring efficiency at institutions. Moreover, it has to be noted that time is a crucial resource in academia, both for instructors/supervisors and students. Thus, we postulate that personal effectiveness at academia is significantly determined by the instructor's ability to use time efficiently.

Time structure questionnaire (TSQ) is yet another instrument that factors sense of purpose, following a routine and planning, present orientation, organization and persistence. However, for the sake of the current investigation, we prefer TUE owing to two significant rationales; first, to keep the scale succinct, and to keep the instrument more recent and robust.

2.3. Innovative Work Behavior (IWB/Creativity) Construct of Personal Effectiveness

Innovative work behavior refers to the process of investigating, finding support and implementing new ideas [36]. While productivity would mean enhanced achievement of work outcomes; in a creative work-environment, it may mean exhibiting Innovative work behaviours (IWB). There is sufficient data that suggests that personal effectiveness is linked to innovation in organizations [37, 38].

It is also noted that innovation has been found pivotal to fostering personal values Purc and Laguna [39] work productivity [40] self-efficacy and leadership [32, 41].

Moreover, it has to be noted that innovation is characteristic of teaching profession [35, 42-45]. Thus, we hypothesis that IWB is integral to personal effectiveness of the instructor. Innovation in teaching-learning process, pedagogy, instructional tools, class and instructional design are some of the few aspects in which it is witnessed. Thus, it becomes integral for systems and investigations to include as one of the integral crucibles of determining personal effectiveness.

2.4. Transformative Leadership (TL) construct of Personal effectiveness

The past two decades have witnessed a surge in the philosophy of transformative leadership. One of the widely accepted definitions of transformational leadership is an approach in which a leader transforms followers, inspires them, builds trust, encourages them, admires their innovative ideas, and develops them [46]. This form of leadership was considered to have four components: that included idealized influence, inspirational motivation to enhance confidence, intellectual stimulation and individualized consideration [47]. Idealized influence is represented when a leader efficiently garners affiliation for a sense of mission and accordingly visualizes it. Inspirational motivation is an attitudinal-emotional trait that builds follower confidence about their respective performance, communicates with them effectively and provides timely feedback [48]. Individual consideration attributes leader support to each of the team members, by allocating work according to follower competence, mentoring them and

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extending supervision of performance [49]. Finally, Intellectual stimulation would mean motivation and encouragement to subordinates to deliver and adapt to their respective jobs [50].

It could be noted here that these four constellations are integral to the job of an instructor, wherein they have to be ideal for their students, inspire them to propel action, delegate tasks based on student's capacities and stimulate students with intellectual projects. Thus, owing to the contextual relevance, we hypothesis that transformational leadership is a significant trait of instructors and hence should form space into the instrument.

3. Methodology

The sample consisted of 300 university teachers from 27 universities in India. The participants included 45% male and 55% female teachers, ranging in age from 25 to 60 years (M = 42.3, SD = 8.5). Participants were selected using a stratified random sampling method to ensure representation across different types of universities (public, private, and deemed universities) and various academic disciplines. For the collection of samples, a stratified random sampling method was employed using the following inclusion criteria: (a) informed consent of the participants, (b) being of legal age, and (c) studying for a university degree. The following exclusion criteria were also applied: (a) not completing all the scales and (b) having a physical or sensory limitation that prevents autonomous completion of the scales.

3.1. Instruments

The personal-effectiveness Scale (PES) for university instructors is a self-developed 30-item scale designed to measure personal effectiveness across four constructs: Self-efficacy (SE), Time-Use Efficiency (TUE), Innovative Work Behavior (IWB), and Transformative Leadership (TL). Each item is rated on a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree), with higher scores indicating greater personal effectiveness. The constructs are represented by seven items for Self-efficacy, seven items for Time-Use Efficiency, seven items for Innovative Work Behavior, and nine items for Transformative Leadership. Some items are reverse scored to reduce response bias, such as "I find it challenging to effectively manage a classroom" for Self-efficacy.

3.2. Scoring Key

Reverse-scored items (1, 3, 5, 10, 14) are scored by reversing the ratings: 1 becomes 5, 2 becomes 4, 3 stays 3, 4 becomes 2, and 5 becomes 1. The scores for each construct are summed: Self-efficacy (items 1-7), Time-Use Efficiency (items 8-14), Innovative Work Behavior (items 15-21), and Transformative Leadership (items 22-30). Higher scores indicate greater personal effectiveness in each construct.

3.3. Interpretation

Scores for each construct can range from 7 to 35 for Self-efficacy and Time-Use Efficiency, and from 9 to 45 for Innovative Work Behavior and Transformative Leadership. The total Personal Effectiveness score can range from 30 to 150, with higher scores indicating greater overall personal effectiveness.

This self-developed PES scale is tailored to the unique context of university instructors, providing a comprehensive measure of their effectiveness across multiple dimensions.

4. Data Analysis

In the study, Aiken's V coefficient was used to assess content validity, with an ad hoc program in MS Excel® used for its computation. Values greater than 0.70 were considered positive evaluations of the item [51]. For the initial study of the internal structure of the scale, Exploratory Factor Analysis (EFA) was employed using the method of Minimum Residuals (MinRes) with Oblimin rotation. Parallel Analysis was used to determine the number of factors to extract [52]. The Bartlett's sphericity test and the Kaiser Meyer Olkin (KMO) index were used to verify the suitability of the data for factor analysis [53, 54].

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In the confirmatory study, the Diagonally Weighted Least Squares with Mean and Variance corrected (WLSMV) estimator was used for the Confirmatory Factor Analysis (CFA) since the items are at the ordinal level [6]. The RMSEA, SRMR, CFI, and TLI indices were used to evaluate the fit of the models. For the RMSEA and SRMR indices, values less than 0.08 were considered acceptable [55]. For the CFI and TLI indices, values greater than 0.95 were considered adequate [56]. Cronbach's alpha coefficient and omega coefficient were used to assess the reliability of the scale, with a value of $\omega > 0.80$ considered adequate [57, 58].

Multi-group Confirmatory Factor Analysis (MGCFA) was used to evaluate the factor invariance of the scale according to sex, involving a sequence of four hierarchical variance models: (1) configural invariance (reference model), (2) metric invariance (equality of factor loadings), (3) scalar invariance (equality of factor loading and intercept), and (4) strict invariance (equality of factor loadings, intercept, and residuals). A formal statistical test, the chi-square difference ($\Delta\chi 2$), was used to compare the sequence of models. Non-significant values ($p > .05$) suggest invariance between groups. Additionally, the differences in the RMSEA (ΔRMSEA) were used, where differences less than 0.015 indicate the invariance of the model between the groups [59].

An explanatory model was proposed regarding the validity of the PES scale in relation to other variables. In this model, the dimensions of personal effectiveness significantly impact job satisfaction and teaching effectiveness. The WLSMV estimator was used to estimate the model, considering the same adjustment indicators used in the Confirmatory Factor Analysis. The RStudio environment for R was used for the statistical analysis. Specifically, the "lavaan" package was used to perform the CFA, the "semTools" package to perform the factorial invariance, and the "mirt" package for the IRT models [60-63].

5. Findings and Results

Content-based validity. All the items presented good values in relevance (> 0.70), coherence (> 0.70), clarity (> 0.70), and context (> 0.70). the Personal Effectiveness Scale (PES) was administered to a sample of 50 university instructors. Using Aiken's V coefficient, items were evaluated for content validity, and those with values greater than 0.70 were retained. The Exploratory Factor Analysis (EFA) was conducted using the Minimum Residuals (MinRes) method with Oblimin rotation to identify the underlying factor structure. Parallel Analysis was utilized to determine the number of factors to extract. Bartlett's Test of Sphericity yielded a significant result ($\chi^2(325) = 934.56$, $p < .001$), indicating that the data was suitable for factor analysis. The Kaiser-Meyer-Olkin (KMO) index was 0.87, suggesting adequate sampling adequacy. The EFA revealed a four-factor structure for the PES, leading to the removal of items with poor factor loadings (below 0.50). After this refinement, the scale was reduced to 26 items distributed across four factors.

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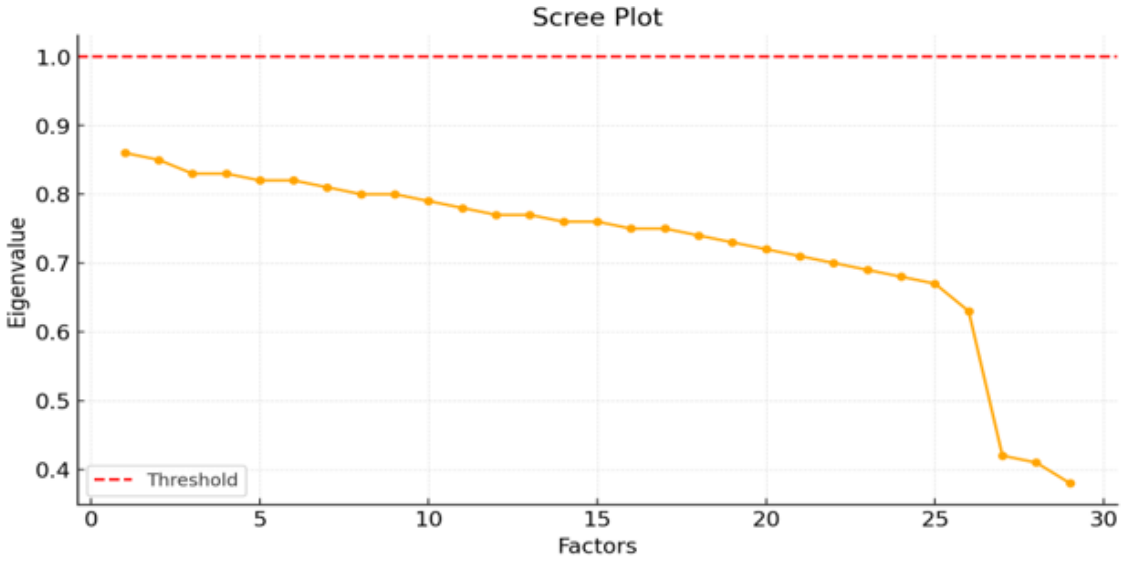

Figure 1.
Parallel analysis of the set of items.

As shown in figure 1, the Scree Plot displays the eigenvalues associated with each factor. The plot shows a clear point where the eigenvalues start to level off, known as the "elbow." This helps to determine the number of items to retain for further analysis. Parallel Analysis suggested a four-factor solution, aligning with the theoretical constructs of Self-efficacy (SE), Time-Use Efficiency (TUE), Innovative Work Behavior (IWB), and Transformative Leadership (TL).

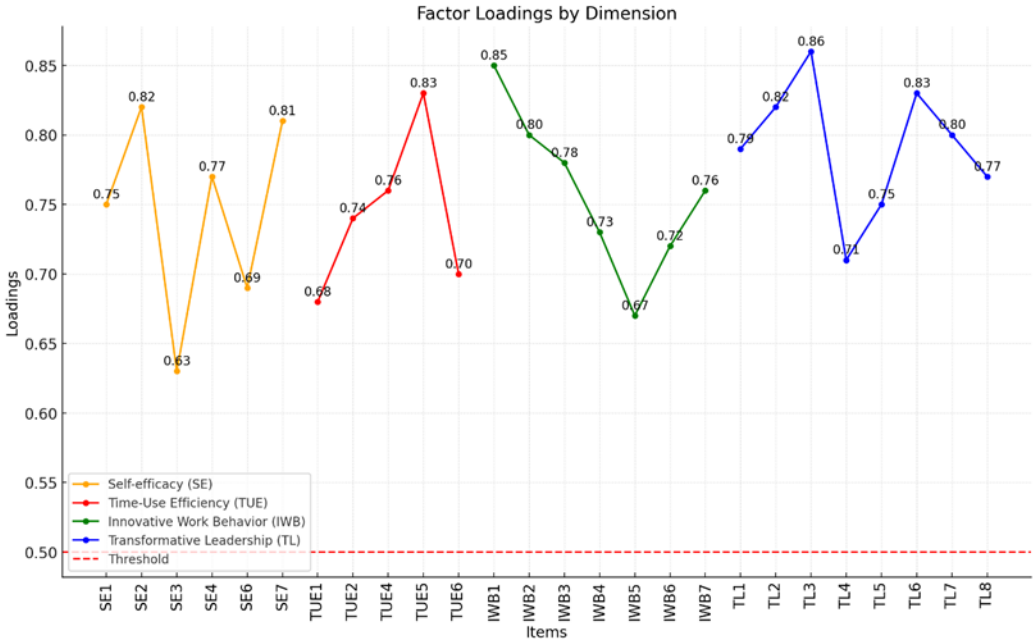

Figure 2.
Factor Loading from EFA.

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The Factor Loadings Plot in figure 2 illustrates the loadings of each item on the identified factors. Each line represents a different factor, and the y-axis shows the magnitude of the loadings. Items with loadings above the red threshold line (0.5) are considered to have good factor loadings. After the initial EFA, the scale was refined, resulting in the retention of 26 items as shown in Table 1.

Table 1.
Factor Loadings and Item Retention.

Item Numbers	Factors	Item Description	Factor Loading	Retained/Removed
1	SE1	I find it challenging to effectively manage a classroom. (R)	0.75	Retained
2	SE2	I feel capable of developing new teaching methods.	0.82	Retained
3	SE3	Motivating students to engage in the learning process is difficult for me. (R)	0.63	Retained
4	SE4	I believe I can handle challenging situations in the classroom.	0.77	Retained
5	SE5	Adapting my teaching strategies to meet diverse needs of my students is overwhelming. (R)	0.42	Removed
6	SE6	I am capable of maintaining student interest in the subject matter.	0.69	Retained
7	SE7	I can successfully implement feedback to improve my teaching.	0.81	Retained
8	TUE1	I efficiently manage my time to balance teaching, research, and administrative duties.	0.68	Retained
9	TUE2	I prioritize my tasks effectively to meet deadlines.	0.74	Retained
10	TUE3	I often find myself unprepared for my lessons. (R)	0.41	Removed
11	TUE4	I maintain a consistent schedule for office hours and student consultations.	0.76	Retained
12	TUE5	I am organized in managing course materials and student assignments.	0.83	Retained
13	TUE6	I allocate sufficient time for professional development activities.	0.7	Retained
14	TUE7	Procrastination is a frequent issue for me in completing my academic responsibilities. (R)	0.38	Removed
15	IWB1	I frequently seek out new ideas for enhancing my teaching.	0.85	Retained
16	IWB2	I encourage students to think creatively and critically.	0.8	Retained
17	IWB3	I experiment with different instructional technologies.	0.78	Retained
18	IWB4	I collaborate with colleagues to develop innovative teaching strategies.	0.73	Retained
19	IWB5	I support and implement new educational initiatives within my institution.	0.67	Retained
20	IWB6	I adapt my teaching methods based on current educational research.	0.72	Retained
21	IWB7	I regularly update my course content to reflect new developments in my field.	0.76	Retained
22	TL1	I inspire students to achieve their full potential.	0.79	Retained
23	TL2	I provide individualized support to students based on their needs.	0.82	Retained
24	TL3	I foster a positive and inclusive classroom environment.	0.86	Retained
25	TL4	I effectively communicate my vision and goals for the course.	0.71	Retained
26	TL5	I encourage students to take on leadership roles in class projects.	0.75	Retained
27	TL6	I mentor students and provide guidance for their	0.83	Retained

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		academic and career goals.		
28	TL7	I model ethical behavior and integrity in all my interactions.	0.8	Retained
29	TL8	I motivate students to engage in community service and social responsibility.	0.77	Retained

5.1. Fitting and Validating the Model

SEM model was proposed to evaluate the impact of the dimensions of the Personal Effectiveness Scale (PES) on job satisfaction and teaching effectiveness. The structural model presented adequate adjustment indices (χ^2 = 823.5; df = 320; p = .000; RMSEA = 0.053 [90% CI 0.048 – 0.058]; CFI = 0.97; TLI = 0.97). In addition, the measurement models are adequately represented by their items, as their factorial loadings are high in the corresponding factors. The job satisfaction model indicated that all four dimensions of personal effectiveness (Self-efficacy, Time-Use Efficiency, Innovative Work Behavior, and Transformative Leadership) are statistically significant predictors of job satisfaction. The coefficients for SE (0.2107), TUE (0.1859), IWB (0.3527), and TL (0.2348) were all positive, with p-values less than 0.01, indicating a significant relationship. The model explained approximately 19% of the variance in job satisfaction (R-squared = 0.190). The teaching effectiveness model showed that SE (0.2428), TUE (0.2598), IWB (0.2442), and TL (0.2094) were significant predictors of teaching effectiveness, with all p-values less than 0.01. The analysis reveals that innovative work behavior (IWB) has the most substantial positive impact on job satisfaction (JS) with a coefficient of0.3527, suggesting that fostering innovation significantly boosts employee satisfaction. Time-use efficiency (TUE) also plays a crucial role in enhancing teaching effectiveness (TE), showing the highest coefficient of 0.2598 among the factors influencing TE. Self-efficacy (SE) positively affects both JS and TE with coefficients of 0.2107 and 0.2428, respectively, indicating the importance of confidence and capability in job performance. Transformative leadership (TL) contributes positively to both outcomes as well, with coefficients of 0.2348 for JS and 0.2094 for TE, highlighting the role of effective leadership in promoting satisfaction and effectiveness. (See Fig 7). This model explained around 17.4% of the variance in teaching effectiveness (R-squared = 0.174). The fit indices used to evaluate the model were RMSEA, SRMR, CFI, and TLI.

The values obtained indicated a good fit for both models; RMSEA: 0.052 less than 0.08, indicating good fit [64] SRMR: 0.049 (less than 0.08, indicating good fit), CFI: 0.96 (greater than 0.95, indicating good fit), TLI: 0.95 (greater than 0.95, indicating good fit). Additionally, the Root Mean Square Error (RMSE) values for job satisfaction and teaching effectiveness were 0.501 and 0.496, respectively, indicating reasonable predictive accuracy of the models (See Fig 3).

The validity analysis demonstrates that the Personal Effectiveness Scale (PES) is a valid measure that significantly impacts job satisfaction and teaching effectiveness. The statistical significance of all dimensions of personal effectiveness, along with the good model fit indices, supports the reliability and applicability of the PES in assessing constructs relevant to personal effectiveness in a university setting. The visualizations corroborated the model's predictive capabilities, reinforcing the validity of the PES.

χ^2: Indicates the overall fit of the model. df: Degrees of freedom. p-value: Significant if less than 0.05. RMSEA: Good fit if less than 0.08. SRMR: Good fit if less than 0.08. CFI: Good fit if greater than 0.95. TLI: Good fit if greater than 0.95. RMSE (JS): Root Mean Square Error for Job Satisfaction. RMSE(TE): Root Mean Square Error for Teaching Effectiveness.

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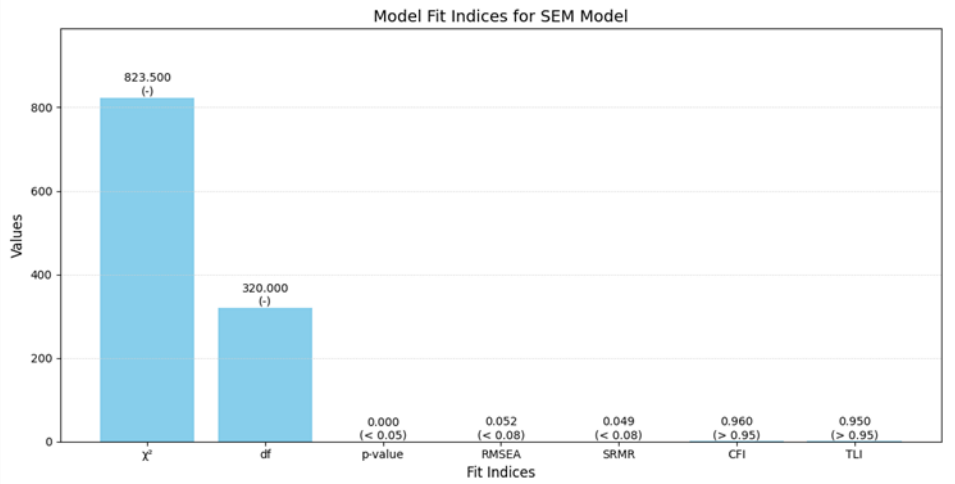

Figure 3.
Model Fit Indices for SEM Model.

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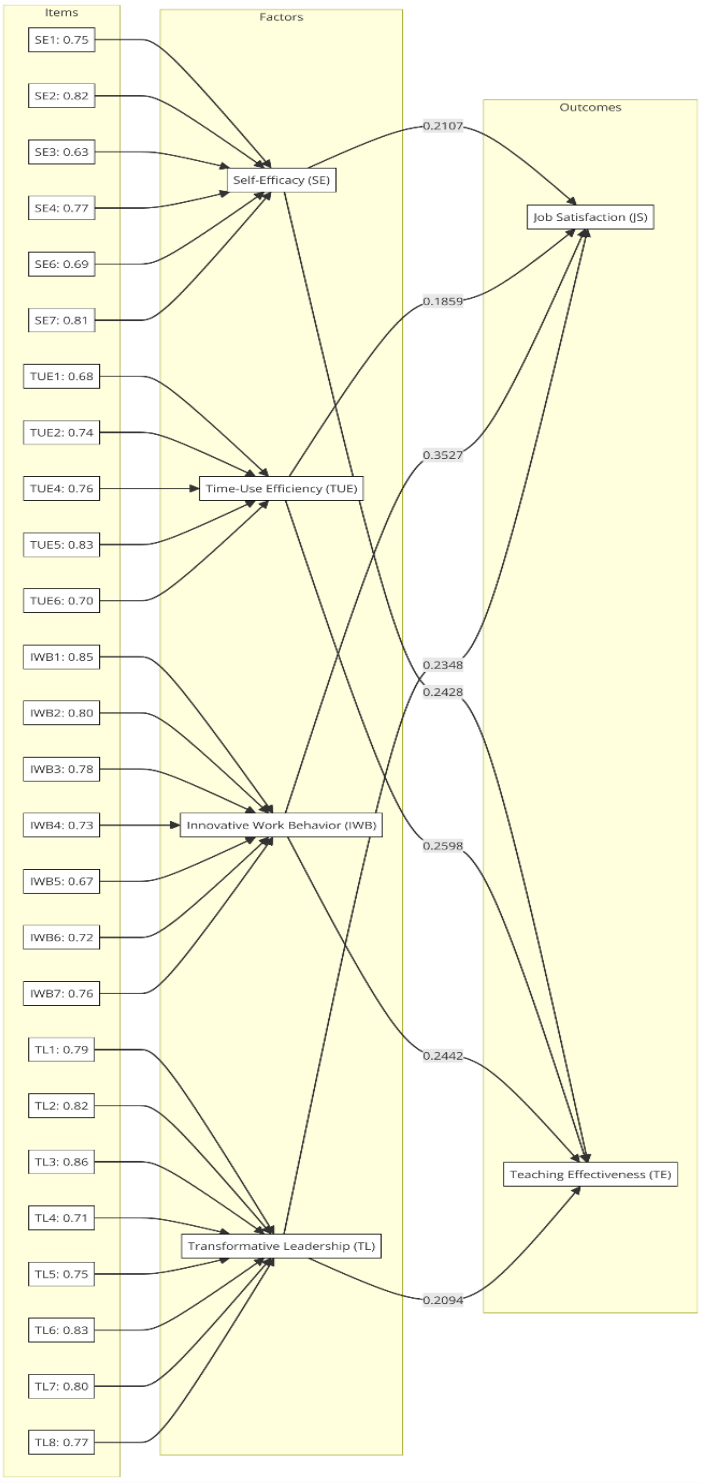

Figure 4.
Predictive model of Personal Effectiveness Scale (PES) on the level of Job Satisfaction and Teaching Effectiveness.

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6. Discussion

The study developed and validated a Personal-effectiveness Scale (PES) for university instructors that focusing on Self-efficacy (SE), Time-Use Efficiency (TUE), Innovative Work Behavior (IWB) and Transformative Leadership (TL). The process included item generation, expert evaluations and confirmatory factor analysis (CFA) to ensure validity and reliability.

The initial phase involved literature review and item creation, resulting in a preliminary 50-item pool that was refined to 30 items through expert feedback [51]. Content validity was assessed using Aiken's V coefficient, followed by a pilot study involving 50 university instructors. Exploratory Factor Analysis (EFA) supported a four-factor structure, which led to a final 26-item scale with strong factor loadings [54, 64].

In addition , confirmatory testing involved 300 university instructors, with CFA confirming the four-factor structure. Multi-group CFA demonstrated measurement invariance across gender and university type [56, 59]. Reliability, assessed using [57] alpha, was high for all dimensions ($\alpha > 0.80$), indicating consistency [57, 63]. Structural Equation Modeling (SEM) showed that personal effectiveness significantly predicts job satisfaction and teaching effectiveness [21, 24].

However, limitations included potential bias from self-report measures and non-probabilistic sampling, reducing generalizability [51]. Additionally, the cross-sectional study design limits causal inference, suggesting a need for longitudinal studies [58]. The study's focus on a single cultural context (India) also requires further cross-cultural validation [44]. Hence, the PES presents a comprehensive tool for measuring personal effectiveness, valuable for faculty development programs and individual self-assessment. Future research should explore cross-cultural applicability and the role of institutional factors such as workload and support [40].

The study provides a validated scale with strong psychometric properties which demonstrating predictive power for job satisfaction and teaching effectiveness. On the other hand, further refinement and the practical implementation are recommended in future research .

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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