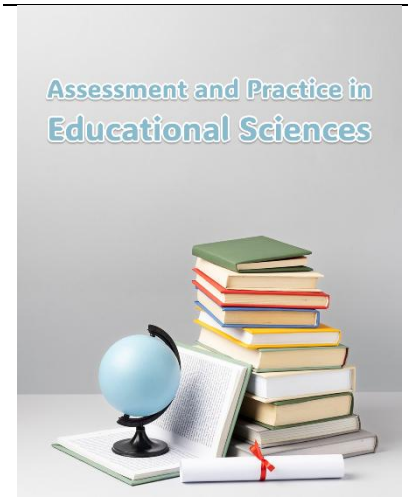
Assessment and Practice in Educational Sciences



Managerial Factors Influencing the Empowerment of Student Teachers: Developing and Validating a Model Based on a Mixed-Methods Approach (Qualitative–Qualitative–Quantitative)

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ABSTRACT

Achieving school effectiveness requires the empowerment of teachers within schools. Teacher empowerment is a critical factor in improving the quality of education, benefiting learners, teachers, schools, and the broader educational landscape. Therefore, the present study aimed to design and validate the managerial factors that influence the empowerment of student teachers. The research employed a sequential exploratory strategy with a mixed-methods approach (qualitative meta-synthesis – qualitative interviews – quantitative validation). Participants in the meta-synthesis phase included all Persian and English books, research studies, and scholarly works conducted in the field of empowerment between 2010 and 2024, resulting in the selection of 61 studies. In the interview phase, participants consisted of experts, professors, and specialists from teacher education universities who were engaged in the development and empowerment of students, student teachers, and related areas of educational development and human capital empowerment. Using purposive and snowball sampling, 17 experts were selected. In the quantitative phase, the statistical population consisted of student teachers enrolled during the 2024–2025 academic year, among whom 90 individuals were selected as the sample. Data collection instruments included a checklist for the qualitative meta-synthesis phase, semi-structured interviews with experts, and a researcher-made questionnaire for the quantitative phase. The validity and reliability of the questionnaires were confirmed by field specialists. For data analysis, thematic analysis was used in the qualitative phase, while descriptive and inferential statistics were applied in the quantitative phase using SPSS and SmartPLS 3.8 software. Overall, the findings indicated that managerial factors influencing the empowerment of student teachers can be conceptualized in three main domains: managerial styles (five components), management tasks (seven components), and managerial competencies (six components). The results of structural equation modeling confirmed the validity of the proposed model. Based on these findings, it appears that the process of enhancing teachers' capabilities and performance, as well as formulating effective educational policies and practices, strongly depends on professional development activities.

Keywords: empowerment; organizational factors affecting empowerment; student teacher empowerment

Introduction

Teacher empowerment has emerged as a central concept in contemporary educational research and practice because it directly influences teachers' professional identity, their instructional quality, and ultimately student learning outcomes (1). Empowered teachers demonstrate greater confidence in their pedagogical abilities, exercise meaningful decision-making, and engage proactively in professional development initiatives (2). In educational systems worldwide, including those undergoing reform and modernization, empowering teachers is viewed as a catalyst for innovation and sustainability within schools (3). The Iranian teacher education system, with its unique organizational and cultural characteristics, is also increasingly focused on managerial and structural conditions that enable the empowerment of student teachers. This concern is part of a global movement recognizing that empowering teachers during their preparation programs helps ensure long-term retention, resilience, and high-quality teaching performance (4).

Research on teacher empowerment shows it is multi-dimensional, encompassing psychological, organizational, and professional elements (5). Psychological empowerment, for instance, involves teachers' perceptions of autonomy, competence, and impact on educational outcomes (6). Organizational empowerment relates to decision-making structures, access to resources, and supportive leadership (7). These constructs are mutually reinforcing: teachers who feel trusted and valued by school leaders tend to engage more deeply in collaborative work and innovative instructional strategies (1, 8). In teacher education institutions, managers and program leaders play a decisive role in shaping the conditions that facilitate empowerment by setting clear expectations, fostering collegial environments, and aligning policies with teacher autonomy (9).

Leadership style has been widely documented as a determinant of empowerment (10, 11). Transformational leadership, for example, is positively associated with teachers' sense of autonomy and professional growth (12). In contrast, overly hierarchical and transactional leadership approaches can limit teachers' agency and reduce motivation (13). Studies have shown that when leaders adopt learning-centered and participative strategies, teachers report greater involvement in school decision-making and stronger professional identity (7, 14). Effective instructional supervision is another leadership practice linked to empowerment because it encourages reflection, feedback, and skill development (15). These dynamics are not limited to experienced educators; they are also critical during pre-service training where future teachers begin to form their professional self-efficacy (16).

Professional development and continuous learning opportunities are equally crucial. Teachers' empowerment is strengthened when institutions invest in structured, relevant, and culturally responsive professional development programs (17, 18). Research in diverse contexts, from New Zealand to Indonesia, has shown that culturally and linguistically appropriate training supports both the technical and socio-emotional needs of teachers, thereby enhancing retention and instructional effectiveness (18, 19). This is particularly significant in multi-ethnic and rapidly changing societies, where teachers need adaptive skills and inclusive practices (20). Empowerment initiatives that integrate digital tools and innovative pedagogies also prepare teachers to navigate 21st-century classroom complexities (3).

Another vital dimension is motivation and job satisfaction, which are closely tied to empowerment (21, 22). Teachers who perceive themselves as empowered are more motivated, display higher organizational commitment, and experience less burnout (23, 24). Motivation has both intrinsic and extrinsic elements; supportive school culture, fair evaluation systems, and recognition of teacher contributions feed into an empowering climate (21). Conversely, lack of recognition and overly rigid structures discourage teachers from exercising professional judgment and stifle creativity (25). In teacher preparation, nurturing motivation and well-being is key to helping future teachers enter the profession with resilience and a strong sense of purpose (26).

Institutional culture and management systems further shape empowerment (27, 28). Schools and teacher education programs that adopt systematic quality management frameworks tend to create clearer professional standards, effective feedback loops, and collaborative work cultures (27). Effective principal leadership behaviors — such as providing resources, facilitating collegial exchange, and supporting innovation — enhance both teacher performance and student achievement (29, 30). These findings highlight the interconnectedness of management practices and classroom-level outcomes. In developing educational contexts, empowering teachers often requires organizational reforms to dismantle bureaucratic barriers and improve resource allocation (14, 31).

International comparisons underscore that empowerment is not a one-size-fits-all construct; cultural and contextual factors matter (11, 20). For instance, in some systems, hierarchical respect remains strong, but shared decision-making can still be introduced to enhance agency without undermining cultural values (32). In others, digital transformation has created new opportunities for self-directed learning and innovation, but requires careful management to avoid overwhelming teachers (3). These global insights are essential for contexts like Iran, where teacher education institutions must balance traditional hierarchies with modern demands for autonomy and innovation (5).

Retention and career sustainability are also strongly linked to empowerment (4, 6). When teachers feel that their voices matter and their growth is supported, they are more likely to remain in the profession, reducing costly attrition and ensuring instructional continuity (33). Beginning teachers especially benefit from mentoring systems and opportunities to influence curriculum and school decisions (4). In turn, this improves student outcomes and strengthens the education system overall (34).

In addition to leadership and culture, structural empowerment — including access to resources, control over scheduling and instructional decisions, and participation in policy formation — is repeatedly highlighted (35, 36). Studies emphasize that when teachers can meaningfully engage in shaping curricula, assessments, and school improvement plans, they demonstrate stronger ownership and commitment (36). For pre-service teachers, early involvement in decision-making processes fosters professional confidence and readiness (28).

Recent systematic reviews also highlight that empowerment is dynamic and must be continually adapted to meet the evolving demands of education, including inclusion, digitalization, and global competitiveness (1, 3). Teacher empowerment frameworks must therefore integrate psychological, managerial, and policy dimensions to remain effective (2, 10). In this sense, empowerment is not only a product of leadership but also of institutionalized support systems, quality assurance, and coherent policy implementation (14, 27).

Against this backdrop, Iran's teacher education system faces the dual challenge of modernizing its management practices and addressing the professional development needs of its student teachers. While international literature provides models of empowerment through participative leadership, structural supports, and motivational frameworks (11, 29, 30), localized understanding is needed to align these strategies with national educational goals and cultural realities (5).

Given the importance of managerial factors in shaping empowerment outcomes, this study seeks to design and validate a model tailored to the Iranian context, informed by global evidence and adapted to local institutional conditions.

Methods and Materials

Since the present study aimed to design and validate a model of managerial factors influencing the empowerment of students in the Iranian teacher education system, it can be classified as a sequential exploratory mixed-methods study and, in terms of purpose, as developmental and applied research. Accordingly, this study employed an exploratory sequential mixed-methods approach to design and validate the empowerment model for student teachers. To achieve this goal, the required data were first

collected qualitatively and used to develop the research model. Then, the quantitative phase was implemented using a questionnaire to gather the necessary data for validating the model through structural equation modeling.

The mixed-methods approach in this research utilized three strategies for data collection. The first qualitative approach involved synthesizing studies in the initial qualitative stage to identify the factors, components, and dimensions of managerial factors affecting the empowerment of student teachers and to propose a model. For this purpose, the meta-synthesis method was applied using the seven-step approach proposed by Sandelowski and Barroso (2009).

The population studied in the meta-synthesis phase included all Persian and English books, research studies, and scholarly works conducted in the field of empowerment from 1995 to 2024. It should be noted that articles published between 2010 and 2024 were reviewed in detail because scientific and conceptual developments in recent years regarding the empowerment of student teachers were particularly relevant, and the use of updated information contributes to the applicability of the research in the present context. Accordingly, based on the research domain, the following keywords were selected: empowerment, human capital empowerment, teacher empowerment, student empowerment, and student teacher empowerment, in relation to managerial factors affecting empowerment. These keywords were searched in databases including ScienceDirect, Scopus, ProQuest, Sage, Springer, Emerald, ERIC, DOAJ, ScienceOpen, Civilica, Noormags, Magiran, and the Iranian Research Information System (SID), IranDoc, as well as the first ten pages of Google Scholar search results. The selected keywords were widely used in previous empowerment studies.

Initially, 1,500 studies were screened based on their titles. To accomplish this, the aforementioned keywords were used to search the selected databases, and the retrieved titles were reviewed. As a result, 1,250 documents were excluded due to misalignment of their titles with the study's variables and research question, leaving 250 documents. In the next step, the abstracts of the 250 selected documents were examined. Considering the content of the abstracts (including the use of quantitative research methods, lack of relevance to the study topic, and reported findings) and excluding invalid papers (such as non-indexed conference papers and articles without impact factor), 150 documents were removed, leaving 100. Then, by reviewing the remaining studies' content and assessing their credibility, additional sources were excluded. At this stage, the research problem, methodology, and findings of each study were examined to ensure the content could be used in the present research. The information about these studies is presented in Table 3-1.

Table 1. Information on the Documents Reviewed in the Meta-Synthesis Phase

Code	Author(s)	Year	Document Type	Code	Author(s)	Year	Document Type
001	Oliveira et al.	2023	Q2 journal article	031	Namdari, Pourkarimi, Mirkamali & Farasatkhah	2017	Scientific journal (Grade B)
002	Pub & Glarck	2024	Q1 journal article	032	Shariati & Valipour	2016	Scientific journal (Grade B)
003	Yang Zhang & Perkins	2023	Q1 journal article	033	Karani	2021	Scientific–Research article
004	Rahimi et al.	2024	Q2 journal article	034	Ali Mohammadi et al.	2019	Scientific journal (Grade A)
005	Xu & Kang	2022	Q1 journal article	035	Esmaeilzadeh et al.	2021	Scientific journal (Grade B)
006	Apostol et al.	2024	Q1 journal article	036	Shamseddini et al.	2023	Scientific journal (Grade B)
007	Nakamura & Macapugay	2024	Q2 journal article	037	Saeedipour & Mohammadi-Pour	2020	Scientific journal (Grade B)
008	Mokhlis & Hakim Abdullah	2024	Q2 journal article	038	Shahmoradi & Mahmoudbabouei	2018	Scientific journal (Grade B)
009	Nansen	2024	Q2 journal article	039	Heidari	2020	Scientific journal (Grade B)
010	Zembylas & Papanastasiou	2007	Q1 journal article	040	Hanabiooks et al.	2024	Q1 journal article
011	Piji Wu	2024	Scientific journal (Grade B)	041	Namdari et al.	2020	Scientific journal (Grade A)

012	Kashef Al-Anwar et al.	2024	Scientific journal (Grade B)	042	Salehi Najafabadi	2022	Scientific journal (Grade B)
013	Matos Pedro et al.	2023	Q1 journal article	043	Kazemin et al.	2017	Scientific journal (Grade B)
014	Ixia	2024	Scientific journal (Grade B)	044	Taghipour Zahir et al.	2018	Scientific journal (Grade A)
015	Ahrari & Ruslan	2021	Q2 journal article	045	Sivanandi et al.	2021	Scientific journal (Grade B)
016	Stoddard et al.	2024	Scientific journal (Grade B)	046	Deylam & Rahmani	2012	Scientific journal (Grade B)
017	Najafabadi	2023	Scientific journal (Grade B)	047	Habibi	2016	Scientific journal (Grade B)
018	Karani	2021	Scientific journal (Grade B)	048	Hosseini & Kamali Moghadam	2018	Scientific–Research article
019	Balkar	2016	Q2 journal article	049	Khamri & Faribarzi	2022	Scientific journal (Grade B)
020	Hong et al.	2008	Q1 journal article	050	Ali Mohammadi et al.	2019	Scientific journal (Grade A)
021	Chauhan & Sharma	2015	Scientific journal (Grade B)	051	Dennis Kanila	2018	Book
022	Mokhopadhyay	2014	Scientific journal (Grade B)	052	Ahmadi, Safari & Nemati	2017	Book
023	National Council for Teaching Quality	2011	Scientific journal (Grade B)	053	Doustar & Babaei	2015	Book
024	Delshad & Eqbal	2010	Scientific journal (Grade B)	054	Abdollahi & Noweh Ebrahim	2007	Book
025	Reinhart & Short	2005	Q1 journal article	055	Goudarzi & Amani	2016	Book
026	Abdollahi	2022	Doctoral dissertation	056	Ziaei	2013	Book
027	Sangari & Akhsh	2017	Scientific journal (Grade B)	057	Buckingham & Keifton	2021	Book
028	Tajeri & Heidari	2019	Scientific journal (Grade B)	058	Scott & Zhaf	1996	Book
029	Sadeghi & Hedayati	2017	Scientific–Research article	059	Blanchard	1999	Book
030	Kharoushi & Nasr Esfahani et al.	2017	Scientific journal (Grade B)	060	Bates	2015	Book
061	Knight	2003	Q2 journal article	062	Jones	2013	Q1 journal article

After selecting the final sample, the quality of the content had to be assessed. For this purpose, the Critical Appraisal Skills Programme (CASP) checklist was applied, using its 50-point scale. The CASP model assesses the rigor, validity, and significance of each study by addressing ten key questions about the research objectives, methodological logic, study design, sampling strategy, data collection, reflexivity, ethical considerations, accuracy of data analysis, clarity of findings, and the overall value of the research. Based on this assessment, the final 61 sources were classified according to their quality rating. The process of searching and selecting appropriate resources is summarized in the figure below:

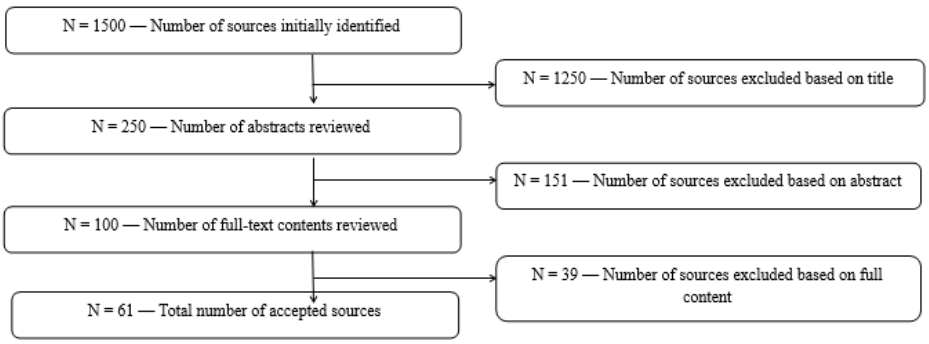

Figure 1. Process of Searching and Selecting Appropriate Sources

In the second stage of the qualitative phase, the statistical population of the study consisted of experts, professors, and specialists from teacher education universities who were involved in the development and empowerment of students, student teachers, and the training and improvement of students, as well as areas related to the development and empowerment of human capital, teachers, and students. In other words, they were recognized specialists in the subject matter of the research. Purposeful convenience sampling was used to select these individuals. Purposeful sampling was applied because the researcher sought participants with knowledge of the research subject and because this sampling strategy provides a non-biased sample (Gall, Borg, & Gall, 2007, p. 365). The convenience aspect was due to the impossibility of accessing the entire population. The sample size in this phase was 17 participants. Specifically, after interviewing 15 participants, the responses and findings became similar and repetitive; however, two additional interviews were conducted to ensure theoretical saturation. Theoretical saturation was confirmed at the 17th interview.

Intercoder agreement was used to examine the reliability of the interviews, which also contributes to confirming the validity and trustworthiness of the findings. To assess agreement between two evaluators, the audio files of three interviews were given to a doctoral student whose dissertation focused on teacher competencies, to serve as a research collaborator and code these interviews. This collaborator was asked to code each interview and categorize the open codes obtained based on the conceptual model of the research into the three main categories: components and dimensions of student teacher empowerment and contextual factors influencing empowerment. Simultaneously, the principal researcher coded the same interviews using the same procedure. Cohen's Kappa coefficient was used to check interrater reliability.

For analyzing qualitative data collected through semi-structured interviews and document review (meta-synthesis), three-step coding following Strauss and Corbin's method (open, axial, and selective coding) was applied.

The second part of the study was conducted using a quantitative approach. This phase employed a survey method and a questionnaire to address the quantitative research questions and to validate the components of the model. The statistical population of the quantitative phase comprised student teachers enrolled during the 2024–2025 academic year at Farhangian University of Tehran and Shahid Rajaee Teacher Training University in Tehran at the doctoral and master's levels. It is worth noting that the population was selected due to their ability to analyze and relative mastery of the research concepts and subject matter, as well as their greater teaching experience in the educational sciences and psychology programs at these universities. According to student enrollment statistics, this included 110 students at Farhangian University of Tehran and 100 students at Shahid Rajaee University.

To determine the sample size, the G*Power software and Cohen's effect size formula were used. The outputs of this online tool are fully consistent with the official G*Power tables and support sample size calculation for one to fifteen predictor variables at three effect size levels (small, medium, large) with a statistical power of 80%. Based on the software calculation, for the five areas examined in this study, a minimum of 92 participants was required.

For data collection in the quantitative phase, a researcher-developed questionnaire was used. This questionnaire measured the managerial factors influencing empowerment components and was designed based on the results of the qualitative phase; the open codes extracted regarding empowerment components served as the source for formulating the questionnaire items. The questionnaire contains 35 items derived from the qualitative findings and evaluates six dimensions of managerial factors.

Table 2. Information on the Questionnaire of Managerial Factors

Main Factor	Sub-Factor	Number of Items	Item Numbers
Managerial Factors – University	Management Tasks	5	1 to 5
	Management Style	4	6 to 9
	Managerial Competencies	5	10 to 14

To establish the validity of the questionnaire, it was evaluated by several subject matter experts and faculty members. Factor validity was considered a form of construct validity and was assessed through factor analysis. For reliability measurement, Cronbach's alpha coefficient was calculated using SPSS version 26. For this purpose, a pilot sample of 30 pre-test questionnaires was administered, and the data obtained were analyzed. The Cronbach's alpha coefficients for the questionnaire scales ranged from 0.853 to 0.959, indicating a high level of reliability and internal consistency.

Table 3. Results of Reliability Testing (Cronbach's Alpha) for the Main Research Scale

Dimension / Scale	Cronbach's Alpha
Management Tasks	0.853
Management Style	0.912
Managerial Competencies	0.959

For quantitative data analysis, both descriptive and inferential statistics were employed. After extracting the questionnaire data, descriptive methods such as frequency, percentage, mean, and standard deviation were used to analyze demographic and variable characteristics. Subsequently, inferential statistics were used to address the research questions. Descriptive analyses were conducted using SPSS, and for construct validity assessment of each factor and component, as well as for validating the final model, structural equation modeling was applied using confirmatory factor analysis and path analysis with SmartPLS 3.8 software.

Findings and Results

What Are the Main and Sub Dimensions and Components of Managerial Factors Influencing the Empowerment of Students in the Iranian Teacher Education System?

To answer this question, 62 valid scientific documents were analyzed in the document analysis phase. Open codes were extracted and categorized into subcategories and main categories, or organizing and overarching themes. Subsequently, semi-structured interviews were conducted with 17 subject matter experts, and the findings from these interviews were again extracted and categorized using three-stage coding. Due to the extensive analyses and in order to avoid excessive length and complexity in the research findings, the final results of the coding conducted in the document analysis and interviews are summarized in the following comprehensive table. It should be noted that sample checklists for document analysis and interview analysis were presented in the first qualitative section.

Table 3. Findings from Coding of Documents and Interviews to Identify Dimensions and Components of Managerial Factors Influencing Student Teacher Empowerment

Meta-Synthesis (Source of Code)	Interview Statements	Open Codes (Basic Themes)	Subcategories (Organizing Themes)
Delshad & Eqbal (2010); Taghipour Zahir et al. (2018); Apostol et al. (2024); Zembylas (2007); Ahrari et al. (2021)	"What predominates is managerial behavior and participatory management; one wrong decision can disrupt everything and change the path (M06). The manager's role in changing perspectives is crucial — participatory leadership … (M15). Among the main factors are managers and their mindset, planning systems, and participatory decision-making (M09). Managers play a role in involving others in decision-making (M16)."	Participatory decision-making and management	Managerial Style
Hanabiooks et al. (2024)	"The manager's role in communication, participation, and engaging students to create the most appropriate teacher training ecosystem is highly significant (M13)."	Student participation in decision-making	
Mohammadi (2016)	"University managers can play a key role in empowering student teachers by creating a supportive and motivating environment (M10). A supportive manager who considers individual needs and plans development for students	Supportive management	

	accordingly (M14). Supportive leadership is critical in schools (M15)."		
Taghipour Zahir et al. (2018)	"A growth-oriented and developmental outlook influences student progress. Conservative managers who resist change impede development (M09). University managers should be transformative and make decisions responsive to changing needs (M13)."	Transformational and change-oriented leadership	
Tenolo (2018); Salehi Najafabadi (2023); Hosseini, Kamali Moghadam & Harandi (2019); Yang Zhang & Perkins (2023); Piji Wu (2024); Khamri et al. (2022)	"Supporting factors such as managerial style play a major role (M05)."	Educational leadership style and university management practices	
Abdollahi (2007); Goudarzi (2016); Khamri et al. (2022)	"Empowerment is the process of simultaneously transferring knowledge and power to make an individual productive for the organization (M03). Managers influence delegation and participatory decision-making (M16). I have enough knowledge in my field but no autonomy or decision-making power (M03). Managerial support and granting teachers decision-making authority is crucial (M15)."	Delegation of decision-making power	Management Tasks
	"Cost and budget management at the university is important (M01). Making effective use of existing resources depends on the managers' wisdom and judgment; financial resources can be managed well (M04). University managers should have expertise and experience in proper budgeting and financial management (M07)."	Budget and cost management	
Delshad & Eqbal (2010); Taghipour Zahir et al. (2018)		Comprehensive learning quality management	
Taghipour Zahir et al. (2018)	"Managers should strive for the development of all human resources in the university (M04, M07)."	Human resource development management	
Abbaspour (2016); Jabbari, Alimohammadi & Niyaz Azari (2020)		Knowledge management	
	"One of the duties of the Supreme Council of Education is demographic analysis and foresight. Accurate demographic analysis and forecasting clearly show the human resources needed (M08). Foresight and anticipation are vital for teacher training (M04, M17)."	Futures studies and foresight	
Taghipour Zahir et al. (2018)	"University managers should participate in policy formulation and be aware of macro-level policies (M08, M17)."	Strategic management — policy formulation and implementation	
	"Managers at Farhangian University are currently appointed rather than selected based on merit. Selection is not based on teaching or educational understanding but only on compliance with policies or academic rank. This is a major mistake — we need managers with strong teaching experience and understanding of modern educational challenges (M02, M08, M11)."	Teaching background and school experience	Managerial Competence
Taghipour Zahir et al. (2018)	"A manager with strong external relations can secure resources for empowering students; negotiation and environmental intelligence are vital (M04, M13)."	Negotiation and communication skills	
Piji Wu (2024)	"A manager may have systemic thinking but without budget no action occurs (M06). They need systemic and strategic thinking, understanding of value creation, and capacity to lead structural changes (M13, M16)."	Systemic and strategic thinking	
	"Currently, managers are appointed without considering passion for the field; this is a major mistake — we need competent and motivated managers (M07, M08, M16)."	Competent and motivated (non-appointed) managers	
	"University performance varies with management type and mindset. At every managerial level, leaders directly influence student progress through their power and authority (M09, M11)."	Managerial mindset	
Taghipour Zahir et al. (2018)	"Innovation and creativity in managers and their forward-looking view affect student development. Conservative managers halt progress; creative and innovative managers in schools are essential (M09, M16)."	Innovation and creativity skills	

Based on the coding conducted in the document analysis and interviews — the results of which are presented jointly in Table 4 — it was determined that the main dimensions of managerial factors influencing student teacher empowerment are:

- Managerial Factors
- Organizational Factors
- Individual Factors

Under each of these, several subcategories are defined. Given the breadth of results, the main, sub, and component dimensions of student teacher empowerment are summarized in Table 4.

Table 4. Summary of Coding Results for Main, Sub, and Component Dimensions of Managerial Factors Influencing Student Teacher Empowerment

Organizing Theme	Basic Theme	Distinct Concepts from Meta-Synthesis	Distinct Concepts from Interviews	Total Basic Themes (Concepts)
Managerial Style	Participatory management	0	0	5
	Supportive management	0	0	
	Transformational and change-oriented leadership	0	0	
	Student participation in decision-making	0	0	
	Educational leadership style	0	0	
Management Tasks	Delegation of power	0	0	7
	Budget and cost management	0	1	
	Comprehensive learning quality management	1	0	
	Human resource development management	0	0	
	Knowledge management	1	0	
	Strategic management and policy formulation	0	0	
	Futures studies and foresight	0	1	
Managerial Competence	Negotiation and communication skills	0	0	6
	Competence-based management (non-appointed)	0	1	
	Systemic perspective	0	0	
	Innovation and creativity skills	0	0	
	Teaching experience	0	1	

Managerial mindset	0	1

To test and validate the conceptual model designed for this research and to confirm the accuracy of the confirmatory factor analysis and calculate the impact coefficients of the dimensions and components within the overall model, structural equation modeling (SEM) was employed using PLS software. SEM is a very general and powerful multivariate analysis technique from the family of multiple regression methods and, more precisely, an extension of the "general linear model." It enables the researcher to test a set of regression equations simultaneously. SEM provides a comprehensive approach to testing hypotheses about the relationships between observed and latent variables. Among multivariate analysis methods, only SEM can simultaneously examine both the measurement model and the causal relationships (Hair et al., 2006; Kumar et al., 2008).

What makes SEM powerful and widely used among researchers is its ability to present a graphical model for easier interpretation (Kumar et al., 2008) and to calculate multiple relationships among variables at the same time. As Hair notes, "none of the previous methods could simultaneously test the measurement model and estimate the causal relationships" (Kumar et al., 2008). In general, SEM, through a set of regression-like equations, reveals the internal structure of the relationships between variables.

Therefore, first, confirmatory factor analysis (CFA) of the extracted components was performed in this study, and then the final research model was tested and validated using SEM with the PLS software.

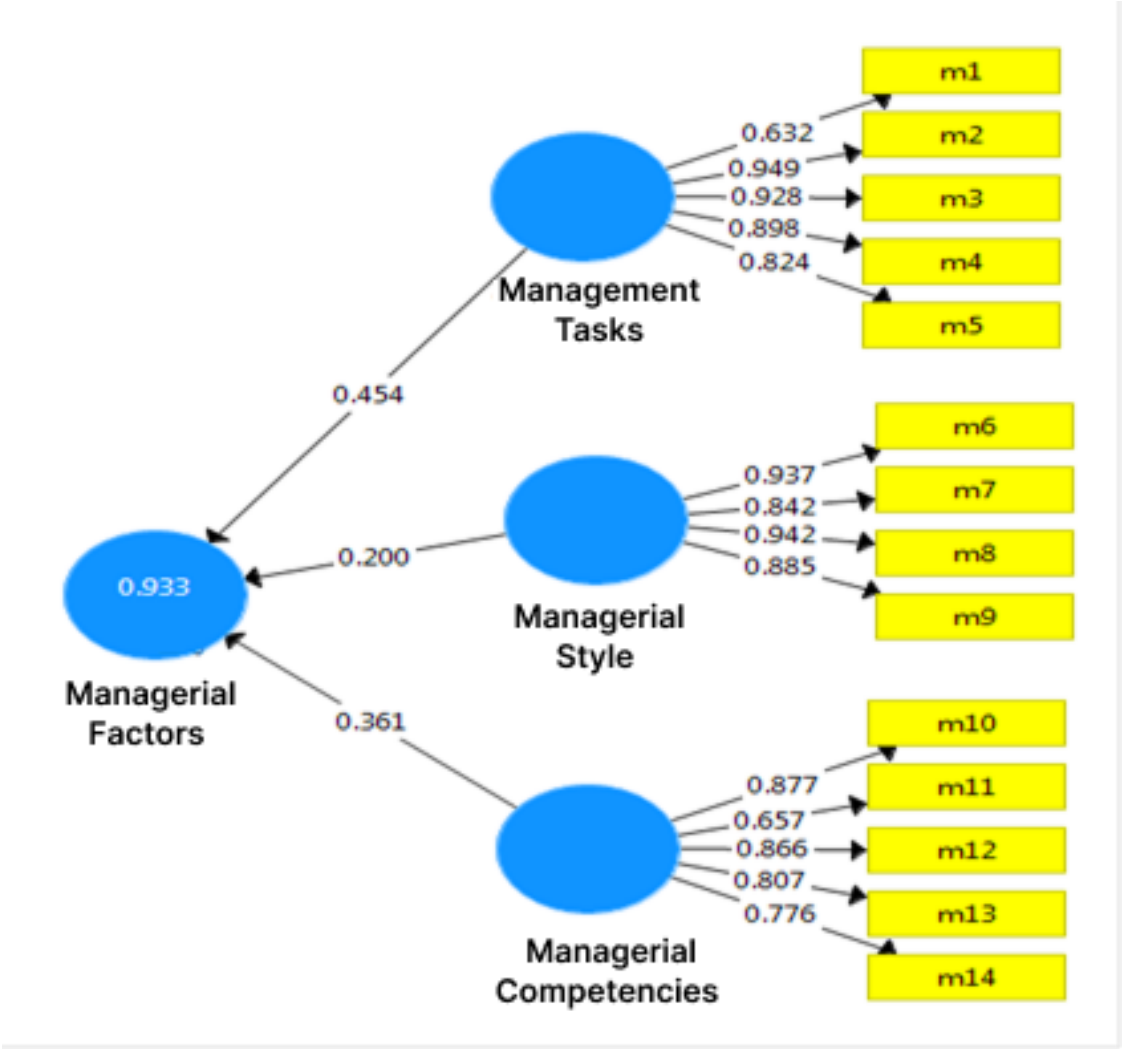

Figure 2. Structural Research Model with Factor Loadings in the Confirmatory Factor Analysis of Managerial Components and Indicators

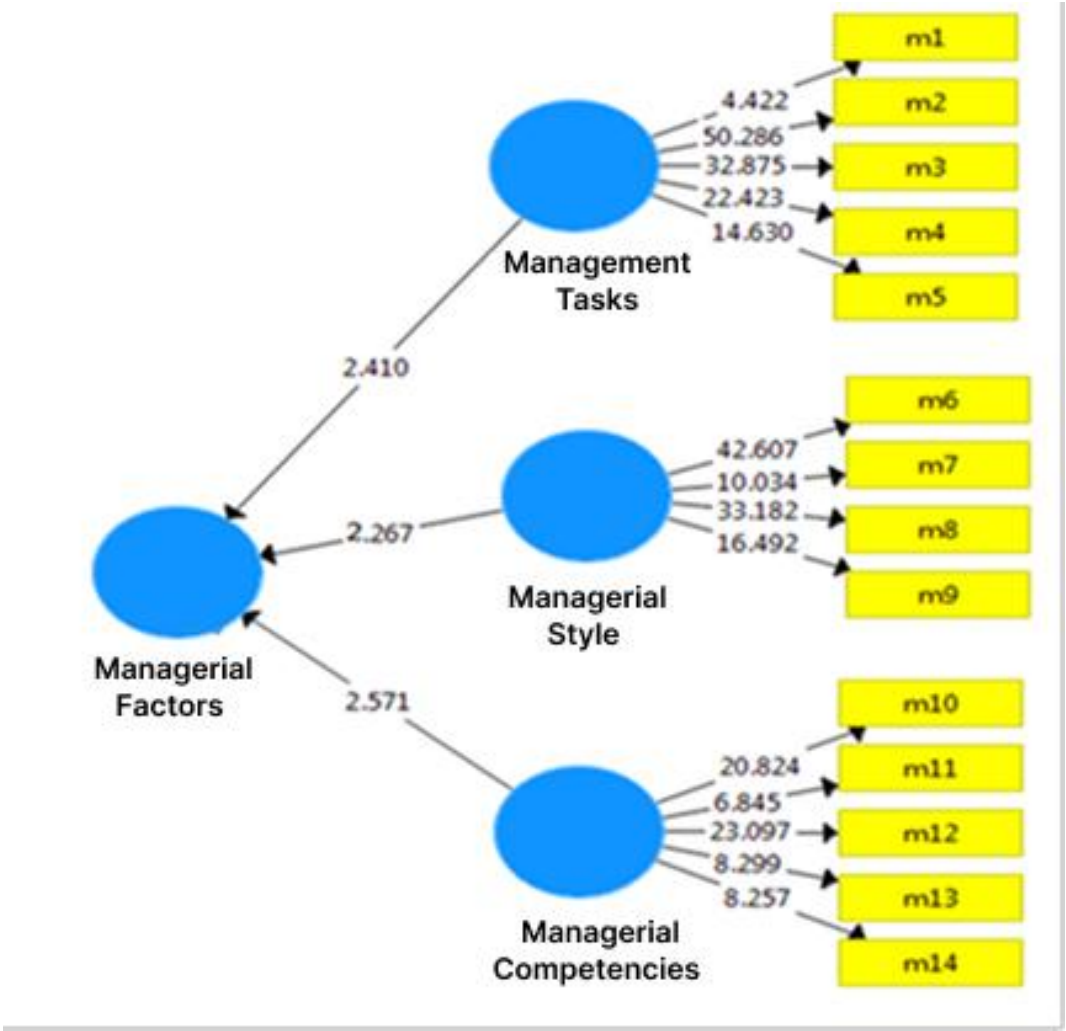

Figure 3. Structural Research Model with Significance Coefficients in the Confirmatory Factor Analysis of Managerial Components and Indicators

To evaluate the reliability of the research measurement model, the path coefficients, Cronbach's alpha coefficients, and composite reliability (CR) were examined.

Table 5. Factor Loadings of the Components and Indicators of the Managerial Factors

	Managerial Style	Managerial Competencies	Managerial Factors	Management Tasks
m1				0.632
m10		0.877		
m11		0.657		
m12		0.866		
m13		0.807		
m14		0.776		
m2				0.949
m3				0.928
m4				0.898
m5				0.824
m6	0.937			
m7	0.842			
m8	0.942			
m9	0.885			

The benchmark for acceptable factor loadings is 0.40. As shown in the table above, all factor loading coefficients for the questions exceed 0.40, indicating that these measurement indicators are appropriate. In other words, the observed factor loadings presented in Table 7 are all greater than 0.30, showing a proper correlation between the observed variables and their corresponding latent variables.

Furthermore, based on the measurement model results shown in Figure 2, the bootstrapping *t* statistic for all indicators exceeds the critical value of 1.96, which indicates that the correlations between observed and latent variables are statistically significant. Thus, each main variable is measured correctly, and the derived indicators are valid for hypothesis testing.

Following the PLS data analysis algorithm, after assessing the factor loadings, Cronbach's alpha and composite reliability were calculated and are presented in the next table.

Whenever a trait is measured by two or more methods, the correlation between these measurements provides key indicators of validity. If the correlations between tests measuring the same construct are high, the questionnaire demonstrates convergent validity. To assess convergent validity, Average Variance Extracted (AVE) and Composite Reliability (CR) were calculated. The following thresholds should be met: Alpha > 0.70, CR > 0.70, and AVE > 0.50.

Table 6. Cronbach's Alpha and Composite Reliability of the Latent Variables

Latent Variables	Cronbach's Alpha (α > 0.70)	Composite Reliability (CR > 0.70)	Average Variance Extracted (AVE > 0.50)
Managerial Style	0.923	0.946	0.814
Managerial Competencies	0.858	0.898	0.641
Managerial Factors	1.000	1.000	1.000
Management Tasks	0.901	0.930	0.729

Considering that the acceptable threshold for Cronbach's alpha and composite reliability is 0.70 and that all values in Table 8 exceed this criterion, the reliability of the measurement model can be confirmed.

The second key measure for evaluating the goodness-of-fit of the measurement models is convergent validity, which assesses the correlation of each construct with its associated indicators. According to Table 8, and given that the acceptable threshold for AVE is 0.50, all constructs have achieved acceptable AVE values. Thus, the convergent validity of the study is confirmed.

Referring to Figure 2, since the *t* values of the research hypotheses are all greater than 1.96, their statistical significance at the 95% confidence level is confirmed.

The second criterion for evaluating the fit of the structural model is the R^2 coefficients for the endogenous (dependent) latent variables. R^2 indicates the impact of an exogenous variable on an endogenous variable, with thresholds of 0.19, 0.33, and 0.67 considered weak, moderate, and strong, respectively. According to Figure 1, the R^2 values for the endogenous constructs in this study confirm the appropriate fit of the structural model.

The relationships between the research variables were tested using Partial Least Squares (PLS) path modeling. In the overall research model, the measurement model (relationship between observed variables and their latent construct) and the structural model (relationships among latent constructs) were both estimated. For testing the significance of the paths, the *t* statistic was calculated through bootstrapping, as shown in Figure 2.

To assess the overall model fit, the Goodness of Fit (GOF) index was used. The suggested thresholds for GOF are 0.01 (weak), 0.25 (medium), and 0.36 (strong). GOF is calculated using the following formula based on the average communality of the latent constructs.

Table 7. Results of Overall Model Fit

Communalities	R^2	GOF
0.338	0.993	0.579

With a GOF value of 0.579, the model demonstrates a relatively strong and acceptable fit for the indicators and components of the managerial factors construct.

Discussion and Conclusion

The findings of this study confirm that managerial factors shaping the empowerment of student teachers are multidimensional and interconnected. By integrating results from meta-synthesis and expert interviews, the study revealed three overarching domains — managerial style, management tasks, and managerial competencies — each composed of sub-dimensions and specific actionable elements. The confirmatory factor analysis validated these domains and demonstrated that leadership practices, decision-making structures, and the personal competencies of educational managers significantly contribute to creating empowering environments for student teachers. These findings resonate strongly with global research on teacher empowerment and leadership effectiveness (1, 2).

A critical insight emerging from this research is the pivotal role of managerial style, particularly participatory and supportive leadership. When leaders create spaces for shared decision-making and encourage collaboration, student teachers develop stronger self-efficacy and professional identity (9). This aligns with previous work emphasizing that participatory management strengthens teachers' trust and professionalism, directly impacting instructional practices (1). Similarly, transformational and change-oriented leadership identified in this study is known to empower teachers by fostering innovation and adaptability (12). Earlier studies have consistently shown that leadership that is future-focused and open to change drives motivation and agency among educators (10, 11).

Supportive leadership practices identified here also align with global evidence that teachers' motivation and job satisfaction improve when school leaders provide personalized support and mentorship (22, 24). Encouraging a supportive environment, particularly in teacher education settings, can alleviate stress and help student teachers navigate early career challenges. The results correspond with findings from Saudi Arabia and Malaysia, where leadership support was shown to predict higher organizational citizenship behaviors and professional satisfaction (22, 24). Moreover, creating a climate of trust and psychological safety, as highlighted in this study, echoes research indicating that empowerment is nurtured in contexts where teachers feel valued and secure (5, 26).

The second dimension — management tasks — further reinforces the importance of organizational structures in empowerment. Delegating power and granting decision-making authority to student teachers was shown to be a significant empowering factor, echoing global calls for shared governance in education (35, 36). When pre-service teachers are entrusted with meaningful responsibilities, they learn to take initiative and develop leadership capacities early in their careers (28). Budget and resource management also emerged as key, aligning with previous findings that equitable resource allocation and financial transparency enhance teachers' sense of autonomy and competence (27). In systems with limited resources, as in many developing contexts, managers' ability to optimize existing capacities is essential to support teachers' professional growth (14).

Additionally, comprehensive learning quality management and human resource development, identified in this research, echo global studies linking quality assurance frameworks with professional empowerment (3, 17). Ensuring that teacher education programs maintain high standards while supporting teachers' individualized growth plans helps balance accountability with professional autonomy (27). Futures thinking and strategic management were also confirmed as necessary

competencies for educational leaders. This finding aligns with research advocating that forward-looking leaders can anticipate change, adapt training curricula, and sustain innovation (29, 30).

The third domain — managerial competencies — underscores the personal and professional skills required of education managers. Communication and negotiation abilities are essential for securing resources, building networks, and creating empowering ecosystems (11). These findings parallel research on the importance of relational leadership and community engagement in fostering empowerment (8, 29). Systemic and strategic thinking also emerged as crucial, consistent with studies showing that leaders who view education holistically and manage complexity effectively can sustain teacher innovation and resilience (3, 7).

Moreover, this research affirms that selection and development of competent, passionate, and experienced managers is vital. International studies caution against purely formalistic or hierarchical appointment systems that disregard educational expertise (13, 32). Instead, choosing leaders with strong teaching backgrounds, mentoring skills, and current pedagogical knowledge contributes directly to empowering future teachers (6). Encouraging innovative and creative managerial approaches, as emphasized here, aligns with global recommendations to foster leaders who can navigate rapid technological, cultural, and pedagogical change (3, 30).

From a systems perspective, the structural model validated in this study — showing robust factor loadings and strong fit indices — indicates that empowerment is not a single-variable outcome but the result of well-integrated managerial strategies. High reliability scores (e.g., Cronbach's alpha > 0.85) and strong convergent validity (AVE > 0.6) suggest the proposed framework is psychometrically sound and adaptable. These results strengthen international discourse that effective empowerment models must integrate both organizational and psychological constructs (2, 36).

Another important alignment is with research on teacher retention and job satisfaction. Empowerment through managerial support and autonomy leads to stronger commitment and lower attrition (4, 25). By validating this dynamic in an Iranian teacher education context, the study contributes to understanding how early empowerment can help prevent burnout and turnover among new teachers (6, 33). This is especially crucial given global concerns about teacher shortages and declining morale (16).

Furthermore, the emphasis on culturally responsive and contextually adapted empowerment strategies reflects growing recognition that frameworks must fit local values and constraints (3, 20). In Iran, as in other non-Western contexts, respecting hierarchical norms while fostering autonomy requires sensitive, incremental approaches. The study's model integrates both globally validated constructs and local expert input, making it highly relevant for educational leaders seeking balance between tradition and innovation (5).

Finally, the results reinforce the interconnectedness of motivation, leadership, and systemic management in creating teacher-friendly learning environments. Previous studies in Nigeria, Kenya, and Indonesia have shown that when motivation is combined with supportive leadership and structured development pathways, teachers achieve higher professional effectiveness (15, 19, 21). The present research confirms these relationships and extends them to the pre-service level, offering a comprehensive view of how empowerment must begin during teacher preparation.

Although this study provides a robust, validated model of managerial factors affecting student teacher empowerment, several limitations should be acknowledged. First, the qualitative phases relied on purposive sampling and expert interviews within a specific cultural and institutional context, which may limit the transferability of findings to other teacher education systems. Second, while the sample size for the quantitative phase met statistical requirements, a larger and more diverse group of participants from multiple regions and program types could strengthen generalizability. Third, the cross-sectional design means that empowerment and managerial effectiveness were measured at a single point in time; longitudinal research is needed to examine how empowerment evolves across the teacher preparation and early career trajectory. Finally, although the study

integrated both psychological and structural dimensions, external factors such as national education policy shifts and resource constraints were not examined in depth.

Future studies should explore longitudinal approaches to track how managerial factors impact empowerment over time, particularly from pre-service through in-service teaching. Comparative cross-national research could help determine how cultural contexts mediate the impact of participatory leadership and structural empowerment. Additionally, mixed-methods investigations with larger and more varied samples, including student teachers from different subject areas and geographic regions, would provide deeper insights. Future research could also integrate emerging themes such as digital leadership, remote mentoring, and technology-enabled professional learning, which are increasingly important in contemporary teacher education. Finally, there is scope for examining the role of national policy frameworks and macro-level governance in either facilitating or hindering teacher empowerment.

Educational policymakers and leaders in teacher education institutions can use the validated model to strengthen empowerment strategies systematically. Selecting and developing managers with strong pedagogical expertise, mentoring capacity, and innovative thinking should be prioritized over purely administrative credentials. Institutions should institutionalize participatory governance structures that involve student teachers in curriculum and decision-making to cultivate early professional agency. Providing targeted professional development, including socio-emotional support and culturally relevant training, can help create a resilient, motivated teaching workforce. Moreover, aligning budgeting and resource allocation with empowerment goals can sustain initiatives beyond isolated interventions. By embedding empowerment into organizational policies, teacher education systems can produce adaptive, committed, and high-performing teachers ready to face the demands of modern classrooms.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

All ethical principles were adhered in conducting and writing this article.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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