

Designing a Model for Enhancing the Skills of Primary School Principals with an Emphasis on STEAM Education

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E d i t o r	R e v i e w e r s
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1. Round 1

1.1. Reviewer 1

Reviewer:

The title, “Designing a Model for Enhancing the Skills of Primary School Principals with an Emphasis on STEAM Education,” is relevant but conceptually broad. The term “skills” may refer to technical, interpersonal, conceptual, instructional, technological, or strategic abilities, while the findings encompass competencies, organizational capabilities, leadership behaviors, and implementation conditions. The authors should reconsider whether “managerial and leadership competencies” would more precisely reflect the six global themes. In addition, because the study used qualitative thematic analysis rather than model testing, the phrase “developing a qualitative framework” may be more methodologically accurate than “designing a model.” If the term “model” is retained, the manuscript should define what constitutes a model in this study and explain whether the relationships among dimensions are hierarchical, sequential, reciprocal, or merely categorical. The title should accurately communicate both the qualitative methodology and the conceptual status of the proposed framework.

In the first paragraph of the introduction, the statement that “STEAM education therefore represents more than the simultaneous teaching of several subjects” is theoretically appropriate, but the manuscript requires a clearer operational

definition of STEAM education. The authors should specify whether STEAM is conceptualized as multidisciplinary, interdisciplinary, transdisciplinary, project-based, design-based, or problem-based education. These approaches differ substantially in the degree of disciplinary integration and the roles assigned to science, technology, engineering, arts, and mathematics. The current introduction uses terms such as “integration,” “interdisciplinary learning,” and “meaningful relationships among disciplines” interchangeably without defining their conceptual distinctions. A concise definitional paragraph should explain the adopted interpretation of STEAM and justify why this conception is appropriate for primary schools. The same definition should guide the interview protocol, coding process, interpretation of themes, and recommendations for principals’ professional development.

The introductory paragraph beginning with “The significance of STEAM education is particularly evident at the primary school level” presents a persuasive argument, but it remains insufficiently connected to the specific responsibilities of primary school principals. The authors should explain how STEAM implementation at the primary level differs managerially from implementation at secondary schools. For example, primary schools may have generalist teachers, greater integration across subject areas, closer family involvement, age-specific safety requirements, and stronger dependence on principals for curriculum coordination. These characteristics may influence the required leadership and managerial competencies. Without this contextual analysis, the proposed model may appear applicable to school principals generally rather than specifically to primary school principals. The introduction should therefore establish why primary school leadership constitutes a distinct setting for STEAM implementation and how developmental, curricular, staffing, and organizational characteristics informed the study’s research problem.

The literature review relies on all supplied references, but several sources appear only indirectly related to school leadership or STEAM education. For instance, the discussion of “The Digitalisation of Finance Management Skills in Dementia” and the reference to emotional intelligence and parent–child relationships are transferred to educational management through analogy. In the paragraphs citing these studies, the authors should explicitly acknowledge the contextual differences and avoid presenting indirect evidence as if it directly validates the proposed school-management model. The sentence “Although such findings arise from a different organizational setting, they underscore a broader principle relevant to educational management” partially addresses this concern, but the theoretical mechanism underlying the transfer should be articulated more rigorously. The authors should explain why findings from healthcare or family contexts are relevant to managerial competence, identify the common construct, and distinguish direct empirical support from conceptual analogy. This will improve the evidentiary precision of the literature review.

The final paragraphs of the introduction identify a research gap, but the gap requires a more systematic formulation. The sentence “Studies commonly focus on student outcomes, teachers’ instructional practices, curriculum characteristics, or general managerial skills” should be supported by a structured synthesis showing what each strand of literature has addressed and what remains unresolved. The authors should explicitly distinguish between three gaps: a conceptual gap concerning the dimensions of STEAM-oriented principal competence, an empirical gap concerning the perspectives of Iranian educational experts, and a practical gap concerning competency-based professional development for primary school principals. The manuscript should also clarify whether previous models of STEAM leadership or educational technology leadership were reviewed and why they were inadequate for the Iranian primary education context. A sharper research gap would provide a stronger logical transition to the study aim and demonstrate the novelty of the proposed six-dimensional model.

The reporting of inter-coder agreement contains a probable numerical inconsistency. The sentence “The inter-rater agreement coefficient obtained in this study was 81.11%, indicating an approximately 81% level of agreement” appears to translate the Persian expression “11/81,” which may indicate 81.11 or 0.811 depending on the original notation. The authors must verify the original calculation and report the statistic in the conventional range for Scott’s pi, namely between -1 and $+1$. If the coefficient was 0.81, it should be reported as Scott’s $\pi = .81$, not 81.11%. The manuscript should provide the formula, coding units, number of categories, number of coded segments, and procedure used to resolve disagreements. It should also explain why four evaluators were used and whether Scott’s pi, which is commonly formulated for two coders, was computed pairwise or adapted for multiple raters. A more suitable multi-rater reliability coefficient may need to be considered.

The use of both “NVivo, Version 11, and MAXQDA 2020” requires clarification. The authors should explain which analytical tasks were conducted in each software package and why two platforms were necessary. For example, one program may have been used for data organization and initial coding, whereas the other may have been used to construct the thematic

network or visualization. Without this explanation, dual-software use appears redundant and raises questions regarding consistency of the coding database. The manuscript should specify whether data and codebooks were transferred between software programs, how coding integrity was preserved during transfer, and which software generated the final figure. In addition, software does not conduct thematic interpretation independently; therefore, expressions such as “the final research model extracted using MAXQDA” should be revised to indicate that the software facilitated data management and visualization while the researchers performed the conceptual analysis.

Authors revised the manuscript and uploaded the new document.

1.2. Reviewer 2

Reviewer:

In the methods section, the opening sentence states that “This study was applied in terms of its purpose and was conducted using a qualitative research approach. The research strategy was exploratory, and thematic analysis was employed as the primary analytical method.” This description is too general and should be methodologically refined. The authors need to identify the specific form of thematic analysis used, such as reflexive thematic analysis, codebook thematic analysis, or thematic network analysis. The findings refer to “global themes,” “organizing themes,” and “basic themes,” terminology that is specifically associated with thematic network analysis. Therefore, the manuscript should cite and describe the analytical framework used to move from initial codes to basic, organizing, and global themes. The epistemological orientation of the analysis—realist, interpretive, constructivist, or pragmatic—should also be reported because it influences how interview statements were interpreted and how the resulting model should be understood.

The participant description requires greater transparency. The methods section states that the population consisted of “15 primary school administrators and experts,” while Table 1 includes senior education administrators, university faculty members, and management-skills specialists, but apparently no currently serving primary school principal. This discrepancy must be resolved. If school principals participated, they should be clearly identified in Table 1. If they did not, the wording “primary school administrators” should be corrected, and the limitations of developing a principals’ competency model without direct participation from practicing principals should be acknowledged. The authors should also report explicit inclusion criteria, such as minimum years of experience, familiarity with STEAM education, academic specialization, management experience, or involvement in policy development. The rationale for the composition of the expert panel should be explained to demonstrate that participants possessed sufficient experiential and theoretical knowledge to contribute to model development.

The sampling procedure is described as “nonprobability purposive sampling,” but the specific purposive strategy is not identified. The authors should state whether they used criterion sampling, maximum-variation sampling, expert sampling, snowball sampling, or a combination of these approaches. Given the diversity of participant roles, maximum-variation sampling may have been intended, but this cannot be inferred without explicit explanation. The manuscript should describe how potential participants were identified, who contacted them, how many individuals declined participation, and whether the sample composition was adjusted as themes emerged. The statement that sampling continued until “theoretical saturation” also requires revision because theoretical saturation is generally associated with grounded theory. For thematic analysis, “code saturation” or “meaning saturation” may be more appropriate. The authors should explain how saturation was assessed, at which interview it was initially observed, and how subsequent interviews confirmed that no substantively new themes were emerging.

The data-collection paragraph states that “in-depth, semi-structured interviews and a review of relevant literature and documents” were used, but the document-review component is not described in sufficient detail. The authors should identify the types of documents examined, their inclusion criteria, publication period, sources, number, and role in the analysis. It remains unclear whether documents were analyzed as independent data, used to develop interview questions, or employed for triangulation. If document data contributed to the 155 initial codes, the findings should distinguish between codes derived from interviews and those derived from documents. If the document review merely informed the interview protocol, it should not be

presented as a separate data source. The absence of a transparent document-analysis procedure weakens the reproducibility of the study and prevents readers from determining how the final thematic network was generated.

The interview procedure requires substantial elaboration. The statement that “concurrent note-taking was used to document the interviews” suggests that interviews may not have been audio-recorded. If this is correct, the authors should justify the decision because note-taking alone may result in data loss, selective recording, and reduced interpretive depth. The methods should report the interview location or medium, approximate duration, number of interview sessions per participant, interviewer qualifications, interview language, and whether an interview guide was pilot-tested. Representative interview questions should be provided, either in the manuscript or as supplementary material. The authors should also clarify whether verbatim transcripts were produced. If only expanded field notes were analyzed, terms such as “transcription” and “participants’ statements” should be used cautiously, and the implications for credibility should be acknowledged in the limitations section.

The manuscript states that “The criteria proposed by Guba and Lincoln (1980) were used to establish the trustworthiness of the study,” but the implementation of these criteria is described too briefly. Member checking should be explained in terms of what was returned to participants—transcripts, preliminary codes, thematic summaries, or the final model—and how their feedback influenced the analysis. For transferability, merely presenting findings to specialists is not sufficient; transferability is usually supported through thick description of the context, participants, and research process. Dependability requires an audit trail, documentation of coding decisions, and methodological consistency, not only inter-coder agreement. Confirmability similarly requires evidence that findings were grounded in the data, such as reflexive notes, audit records, and representative quotations. The authors should revise this paragraph to align each procedure accurately with the corresponding trustworthiness criterion and report concrete evidence of its implementation.

Authors revised the manuscript and uploaded the new document.

2. Revised

Editor’s decision after revisions: Accepted.

Editor in Chief’s decision: Accepted.