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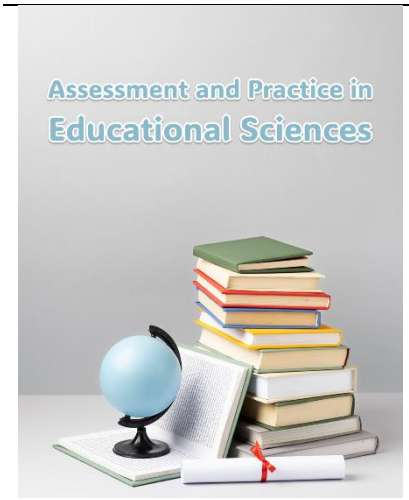

Determining the Validity of the Professional Ethics Curriculum Model with a Mentoring Approach at Golestan University of Medical Sciences

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ABSTRACT

The present study was conducted with the aim of determining the validity of the professional ethics curriculum model with a mentoring approach at Golestan University of Medical Sciences. The research was designed using a mixed-methods (qualitative and quantitative) approach. In the qualitative section, the grounded theory method was used to analyze in-depth interviews with experts and extract common themes. In the quantitative section, the current situation was investigated using a researcher-made questionnaire. The statistical population in the qualitative section consisted of 12 experts in the field of professional ethics and mentoring, who were selected using non-probability snowball sampling. In the quantitative section, 170 faculty members of Gorgan University of Medical Sciences were selected as the statistical sample. Data analysis was performed using MAXQDA, SPSS 21, and PLS 3.2 software. In the analysis of qualitative data, 128 indicators were identified across 9 dimensions and 25 components. The research results indicated that the professional ethics curriculum model with a mentoring approach possesses appropriate construct validity, and the data distribution was determined to be normal with a significance level of 0.054. The qualitative analysis led to the identification of 128 indicators in the form of 9 key dimensions, including education, skills, mentoring, technology, and accountability. Based on the Q^2index, the dimensions of “flexibility and motivation” and “technology and external content” had the highest predictive power with coefficients of 0.707and 0.640, respectively. Furthermore, the dimensions of “culture-building” with a coefficient of 0.639and “accountability” with a coefficient of 0.615demonstrated favorable performance in strengthening the connection between the university and society. In contrast, the “skills development” index with a coefficient of 0.098and “practical training” with a coefficient of 0.180recorded the lowest values, indicating the weaknesses of the model in transferring practical skills. This situation highlights the necessity of revising practical teaching methods and simulation workshops to bridge the gap between theory and practice. Overall, although this program has been successful in utilizing technology and fostering interaction, training competent physicians requires fundamental reforms in the infrastructure of practical training and the enhancement of students’ ethical decision-making skills. The research results demonstrate that a professional ethics curriculum based on a mentoring approach is an efficient and effective strategy for training committed and ethically-oriented human resources in the healthcare system. Considering the positive role of this model in promoting a culture of interaction, motivating students, and utilizing modern technologies, it can be proposed as a superior model for other universities and medical education centers.

Keywords: Curriculum, professional ethics, mentoring approach, Golestan University of Medical Sciences

Introduction

The foundation of medical and healthcare practice is fundamentally intertwined with the principles of professional ethics, which strictly dictate the moral obligations and responsibilities of healthcare providers toward their patients, colleagues, and society at large. In recent years, the growing complexity of clinical environments, coupled with shifting demographic and socio-cultural landscapes, has necessitated a rigorous re-evaluation of ethical standards and self-regulation mechanisms on a global scale. The revised international code of medical ethics serves as a critical exercise in international professional ethical self-regulation, ensuring that contemporary practitioners adhere to universally accepted moral imperatives and maintain the highest standard of patient care (1). This globalization of ethical standards underscores the fundamental premise of ethics without borders, highlighting the urgent and undeniable need for comprehensive national and international guidelines that can be seamlessly and effectively integrated into basic medical education architectures (2). To accurately measure and systematically foster these intricate competencies among educators and practitioners, scholars have emphasized the development and validation of robust professional ethics scales specifically tailored for faculty members functioning within medical and health sciences (3). Consequently, professional ethics is no longer viewed merely as an abstract, theoretical philosophical concept relegated to lecture halls, but rather as a core clinical competency that must be systematically taught, rigorously assessed, and comprehensively integrated into the overarching healthcare education system (2).

Despite the widely recognized importance of professional ethics, translating these high-level principles into effective, measurable educational curricula remains a significant pedagogical challenge for academic institutions. Traditional instructional approaches often isolate ethics as a standalone theoretical subject, relying heavily on didactic lectures rather than embedding moral reasoning within the practical realities of clinical training. A proposed curriculum model of ethical and moral education is therefore essential to provide a structured, developmental framework that guides students sequentially from foundational theoretical knowledge to advanced, complex ethical decision-making (4). However, formal curricula alone are demonstrably insufficient to guarantee ethical behavior in practice. Research consistently highlights the profound, pervasive impact of the hidden curriculum—the unwritten, informal, and often unintended lessons, values, and perspectives that students internalize during their clinical rotations. Shedding light on this hidden curriculum is critical, particularly during rigorous and highly stressful training periods such as general surgery and subspecialty residencies, where trainees frequently acquire professionalism characteristics implicitly through observing the spontaneous behaviors of their superiors rather than through formal classroom instruction (5). The specific viewpoint of students in medical universities further corroborates the dominant, sometimes overriding role of the hidden curriculum in transferring professionalism characteristics, which can occasionally overshadow explicit ethical directives (6). Consequently, the higher health education system currently faces severe professional ethics pathology, requiring a comprehensive identification of its dimensions and components to actively rectify systemic educational failures (7). Analyzing the ongoing challenges within the elements of general medical curricula through a focused medical ethics approach reveals significant, urgent gaps in bridging theoretical ethical knowledge with practical, everyday clinical behavior (8).

The critical urgency for an updated, dynamic, and highly responsive professional ethics curriculum is further amplified by the rapid, unprecedented integration of cutting-edge technologies and novel therapeutic approaches in modern medicine. Healthcare professionals today are increasingly confronted with profound ethical dilemmas that traditional curricula—designed in previous decades—fail to address adequately. For instance, the advent of personalized, hyper-targeted treatment modalities, such as the utilization of organoids for genetic conditions like Cystic Fibrosis, introduces highly complex professional perspectives on the ethics and governance of biobanking, patient consent, and long-term data privacy (9). Furthermore, the

pervasive integration of artificial intelligence and machine learning algorithms into healthcare diagnostics and educational systems demands a proactive, specialized educational response. Developing AI and ethics curricula is no longer an optional academic exercise; lessons learned from project-based curricula emphasize the absolute necessity of preparing the next generation of medical professionals to intelligently navigate the precarious intersection of algorithmic technology and moral responsibility (10). These relentless technological advancements necessitate a curriculum that is not static but highly flexible, interdisciplinary, and responsive, deliberately equipping students with advanced problem-solving, moral flexibility, and critical thinking skills. Thus, implementing and evaluating feasible, forward-looking courses in professional ethics within undergraduate programs, such as pharmacy curricula, serves as a vital, foundational step toward modernizing broader educational paradigms to meet these emerging clinical and technological realities (11).

At the very heart of any successful educational reform concerning professional ethics are the educators, faculty members, and clinical preceptors themselves. The fundamental responsibility and professional ethics of teachers play a demonstrably pivotal role in their overarching academic success and have direct, profound, and lasting effects on the quality of education, learning outcomes, and the holistic moral development of their students (12). Identifying, categorizing, and solidifying the core components of teachers' professional ethics through exhaustive systematic reviews provides a necessary, evidence-based baseline for understanding what precisely constitutes an ethically competent educator in the modern era (13). However, educators in medical fields frequently face multifaceted professional ethics challenges, administrative burdens, and distinct pedagogical obstacles in their daily practice, which can severely hinder their ability to effectively impart moral reasoning and critical reflection to their students (14). To actively mitigate these systemic challenges, there must be a concerted, institutionalized effort to intimately support teachers' values through targeted, ongoing professional development in educational ethics, thereby empowering them to proactively create justice and maintain ethical integrity within their teaching practice (15). Furthermore, the intricate relationship between professional ethics and the collaborative nature of educational environments is statistically undeniable. Robust empirical studies have shown a strong, measurable relationship between professional ethics and teamwork among educators, a complex dynamic that is significantly mediated by organizational citizenship behavior and a deeply ingrained sense of social responsibility (16). Therefore, systematically enhancing the ethical competencies of educators is an absolute prerequisite for fostering a highly ethical, transparent learning environment for medical students.

To effectively bridge the persistent, detrimental gap between theoretical ethics education and the practical realities dictated by the hidden curriculum, leading educational institutions are increasingly turning to mentoring as a highly strategic, transformative pedagogical approach. Mentoring is fundamentally defined as a deeply relational, sustained developmental process wherein an experienced, highly competent individual provides continuous guidance, socio-emotional support, and vital role-modeling to a less experienced mentee, thereby facilitating both rapid personal maturation and robust professional growth. In complex, often bureaucratic organizational structures like medical universities, clearly explaining the role of mentoring is crucial, particularly its proven, unparalleled efficacy in systematically reducing organizational distrust and organically fostering a pervasive culture of transparency, collaboration, and mutual respect (17). The intentional, structured implementation of mentorship programs acts as a powerful catalyst for positive organizational behavior and institutional loyalty. For instance, the critical mediating role of organizational commitment is heavily implicated in the direct relationship between targeted mentoring and overall job satisfaction, actively ensuring that individuals feel valued, ethically aligned, and intrinsically motivated within their highly stressful professional environments (18). In specialized educational and practical training contexts, the systematic, structured mentoring and counseling of interns, particularly in complex, iterative processes such as software development methodologies or clinical algorithmic decision-making, significantly and measurably enhances both their technical acumen and their foundational ethical competencies (19). By providing a structured yet deeply personal and confidential avenue for

continuous feedback, critical self-assessment, and moral reflection, mentoring effectively transforms the abstract, intangible principles of professional ethics into highly tangible, observable, and readily imitable daily behaviors.

Within the exceptionally demanding, high-stakes environments of healthcare delivery and medical academia, the systematic application of mentoring takes on an even greater, life-altering significance. For novice professionals and fresh graduates entering these intense fields, the abrupt transition from sheltered theoretical learning to fully independent, high-liability clinical practice is frequently fraught with severe ethical ambiguities and clinical uncertainties. Carefully exploring the multifaceted impact of mentorship on the professional learning of nurses in academia vividly reveals that continuous, structured guidance is absolutely indispensable for rapidly developing sound clinical judgment, enduring ethical resilience, and a robust, unshakeable professional identity (20). Similarly, for newly hired, transitioning faculty members in highly competitive medical universities, rigorously analyzing the specific, interactive actions of the mentor and the mentee through in-depth qualitative approaches uncovers the intricate, subtle interpersonal dynamics that are strictly necessary for successful professional acclimatization and long-term ethical alignment (21). The deliberate, strategically funded implementation of these formal mentoring programs undeniably yields profound, measurable institutional benefits; systematically identifying the consequences of using mentoring for newly hired faculty members conclusively demonstrates marked improvements not only in their immediate pedagogical effectiveness and longitudinal research output but also in their vital capacity to authentically embody and flawlessly transmit complex professional ethics to their highly observant students (22). Therefore, mentoring firmly serves as a vital, irreplaceable conduit through which the highly nuanced, often entirely unwritten ethical standards of the medical profession are safely, consistently, and effectively passed down from experienced, seasoned practitioners to the next, incoming generation of healthcare providers.

Recognizing the severe, documented limitations of traditional, didactic ethics instruction alongside the undeniably powerful, pervasive influence of clinical role-modeling, there emerges a compelling, evidence-based rationale for directly integrating a comprehensive mentoring approach right into the formal professional ethics curriculum. A uniquely designed, mentoring-based curriculum completely transcends the passive, unidirectional transmission of knowledge, instead actively creating an interactive, socially situated, and highly dynamic learning ecosystem where pressing ethical dilemmas are openly discussed, rigorously analyzed, and collaboratively resolved in real-time under expert, compassionate supervision. This innovative approach explicitly and aggressively targets the elusive hidden curriculum by perfectly aligning the formally stated, idealized ethical values of the academic institution with the actual, observable daily behaviors of its trusted clinical mentors. Previous qualitative studies within the region have strongly highlighted the absolute necessity of such culturally contextualized pedagogical frameworks, explicitly calling for the systematic designing of a professional ethics training model uniquely tailored for student teachers and healthcare trainees, specifically situated within the unique socio-cultural, administrative, and clinical context of the region's higher educational framework (23). By deeply embedding the principles and practices of mentoring into the very structural fabric of the core curriculum, medical universities can definitively ensure that complex ethical decision-making is continuously modeled, accurately evaluated, and positively reinforced during high-stakes, actual clinical encounters. Such a robust, fully integrated curriculum places a heavy emphasis on critical dimensions including ongoing skills development, immersive practical training, strict social accountability, and the active, relentless promotion of a pervasive culture of professional ethics, thereby directly addressing and neutralizing the fundamental, glaring gaps historically present in purely theoretical, classroom-based educational models.

Despite the clear, extensively documented theoretical advantages of utilizing a structured, mentoring-based approach to professional ethics education, there remains a highly significant, detrimental dearth of empirically validated, quantitatively tested curriculum models tailored specifically to the acute needs of medical universities. While the foundational elements of

clinical mentoring and ethical education have been individually and conceptually explored in isolation, the rigorous structural validation of a fully integrated curriculum model that seamlessly synthesizes these critical domains is currently glaringly absent in the contemporary scientific literature. Furthermore, the integration of advanced statistical validation methods guarantees that the proposed educational parameters, such as flexibility and motivation, correctly map onto empirical reality, ensuring that future policy-making in higher medical education is guided by robust data. Addressing this profound empirical gap is absolutely essential for rapidly advancing the pedagogical strategies utilized in training the next generation of highly competent, ethically resilient, and socially responsible medical professionals. The present study was conducted with the aim of determining the validity of the professional ethics curriculum model with a mentoring approach at Golestan University of Medical Sciences.

Methods and Materials

The current research is applied in terms of its objective and descriptive-analytical in terms of the nature of its data, conducted using a mixed-methods (qualitative and quantitative) approach. In the qualitative phase, the statistical population comprised experts and prominent faculty members in the fields of professional ethics, mentoring, and curriculum planning, holding a Ph.D., an academic rank of associate professor or higher, and over 5years of teaching experience. The sampling process was initiated using a non-probability "snowball" method and continued with the aim of achieving the desired depth of information and reaching theoretical saturation. Accordingly, after conducting interviews with 14individuals, no new data emerged during the 13th and 14th interviews; therefore, based on the principle of theoretical saturation, the data from 12individuals were analyzed as the final sample. Data collection at this stage was conducted through in-depth, exploratory, semi-structured interviews. To analyze the qualitative data, a three-stage coding process (open, axial, and selective) was employed within the framework of Strauss and Corbin's paradigmatic model. Specifically, through the processes of open, axial, and selective coding, the main dimensions and components were initially extracted, and following necessary refinements, conceptual codes were presented. In the quantitative phase of the research, the statistical population consisted of faculty members of Gorgan University of Medical Sciences, totaling 305individuals. To determine the sample size, Cochran's formula was used with a 95%confidence level and a 5%margin of error, ultimately resulting in the selection of 170individuals using stratified sampling (based on gender). The data collection instrument at this stage was a researcher-developed questionnaire comprising 128items and 9dimensions (including 25components) regarding the professional ethics curriculum with a mentoring approach. The face and content validity of the instrument were confirmed by seeking the opinions of experts and specialized faculty members, under the supervision of the thesis supervisor and advisor. Furthermore, construct validity was confirmed with factor loadings higher than 0.5, and composite reliability alongside Cronbach's alpha were confirmed to be above 0.7. For the analysis of quantitative data, descriptive statistics (frequency, percentage, mean, standard deviation, and charts) and inferential statistics were utilized. The normality of the data distribution was assessed using the Kolmogorov-Smirnov test, and subsequently, the Friedman test, exploratory factor analysis, confirmatory factor analysis, and structural equation modeling were employed to answer the research questions. Model fit indices indicated a favorable state for the measurement structure; such that the Average Variance Extracted (AVE) for most variables, such as "utilization of real situations" (0.772), "ethical flexibility" (0.786), and "connection with other departments" (0.770), was reported to be above 0.7, indicating adequate convergent validity. Additionally, the Composite Reliability (CR) and Cronbach's alpha for all constructs, including "practical skills development" (0.948), "evaluation and feedback" (0.934), and "promoting the culture of professional ethics" (0.947), were calculated to be above 0.7, which confirms the high validity and reliability of the instrument. Finally, data analysis was performed utilizing MAXQDA, SPSS 21, and PLS 3.2 software.

Findings and Results

To evaluate the normality of the data distribution, the Kolmogorov-Smirnov test was used, the results of which are presented in Table 1.

Table 1. Analysis of the normality of data distribution

		Professional Ethics Curriculum with a Mentoring Approach
Number (N)		320
Normal Parameters^a,b	Mean	3.66
	Std. Deviation	0.45990
Most Extreme Differences	Absolute	0.065
	Positive	0.032
	Negative	−0.065
Kolmogorov-Smirnov Z		0.065
Asymp. Sig. (2-tailed)		0.054

Semantic units and based on the data in Table $1-1$, since at a 95%confidence level and a measurement error of $=5\%$, the significance level for the research variables—namely, for the variable of the professional ethics curriculum with a mentoring approach—was calculated as 0.065, and the significance value was higher than the 0.05level; therefore, since the test statistic was obtained as ≥ 0.05, there will be no reason to reject the null hypothesis. In other words, the data distribution is normal. Therefore, the data distribution is normal.

Based on the provided data, the summary of the open, axial, and selective coding process for the research on the "Professional Ethics Curriculum with a Mentoring Approach" is as follows:

1. Open Coding (Extraction of initial concepts): At this stage, basic concepts and keywords were extracted from the interview transcripts and semantic statements. Examples of these open codes include:

- Increasing students' knowledge, enhancing the understanding of professional ethics, professional training, social responsibility.
- Ethical decision-making skills, ethical conflict resolution, communication skills, ethical flexibility.
- Medical ethics principles, respect for patients' rights, information confidentiality.
- Active teaching methods, group discussions, case studies, simulation environments.
- Selection of mentors, training of mentors, direct communication with the mentor, 360-degree feedback.
- Service projects, social participation, artificial intelligence technology, digital resources.

2. Axial Coding (Identification of categories and dimensions): The open codes were organized into broader categories (axial categories) based on their semantic and conceptual similarities. These categorizations comprised the main dimensions of the curriculum:

- Educational dimension: includes educational objectives, curriculum content, the educational process, active teaching methods, and inclusive educational programs.
- Skills development dimension: includes communication skills, ethical decision-making skills, problem-solving skills, critical and creative thinking, ethical leadership skills, and conflict resolution.
- Practical training dimension: includes practical experience, simulation of real situations, workshops, practical sessions, and practice in real and hospital environments.
- Mentoring dimension: includes the mentoring process, selection and training of mentors, student-mentor communication, feedback and guidance, and the mentor's role as a model.

- Evaluation and feedback dimension: includes the evaluation system, performance evaluation in real conditions, active feedback, and skills assessment.
- Accountability dimension: includes social accountability, professional accountability, and responsiveness.
- Culture-building and community connection dimension: includes participation in social projects, interaction with local communities, promoting the culture of ethics, and serving the community.
- Flexibility and motivation dimension: includes ethical flexibility, curriculum flexibility, and creating motivation for learning.
- Technology and external content dimension: includes the use of online platforms, artificial intelligence, digital resources, multimedia content, and content updating.
- Participation and interaction dimension: includes group participation, interaction with patients and colleagues, and teamwork.

3. Selective Coding (The core of the phenomenon): Ultimately, all axial dimensions and categories converged around a central core and main phenomenon, which is the professional ethics curriculum with a mentoring approach. This core phenomenon represents a comprehensive effort to train professional and accountable physicians who, through the integration of theoretical education, practical skills, mentors' guidance, and interaction with the community, acquire the ability to confront medical ethical challenges.

To examine and determine the validity of the professional ethics curriculum model with a mentoring approach at Golestan University of Medical Sciences, structural equation modeling was used, and the degree of model fit, along with the presentation of an integrated and balanced model based on the relationships between variables, was calculated using PLS software. For this purpose, an index was utilized to determine the fit and adequacy of the model.

The Q^2index is a criterion introduced by Stone and Geisser (1975), which determines the predictive power of the model for endogenous constructs. According to them, models that have an acceptable structural fit must have the capability to predict the endogenous variables of the model. This means that if the relationships between the constructs in a model are defined correctly, the constructs will have a sufficient impact on each other, and thereby the hypotheses will be appropriately confirmed. Henseler et al. (2009) have determined the three values of 0.15, 0.20, and 0.35as weak, moderate, and strong predictive power, respectively. Therefore, the results of the structural equation modeling analysis revealed that the value of Q^2regarding the model fit of the professional ethics curriculum with a mentoring approach at Golestan University of Medical Sciences is provided in the following table.

Table 2. Results of the Q^2index

	SSO	SSE	$Q^2(=1-SSE/SSO)$
Practical training	320.000	262.255	0.180
Educational	320.000	220.270	0.312
Connection with the community	960.000	448.568	0.533
Evaluation and feedback	1600.000	960.623	0.400
Utilization of real situations	1600.000	505.162	0.684
Selection and training of mentors	1920.000	1023.160	0.467
Ethical flexibility	1280.000	621.723	0.514
Flexibility and motivation	320.000	93.748	0.707
Educational objectives	1600.000	857.809	0.464
Professional ethics curriculum with a mentoring approach	320.000	320.000	
Inclusive educational programs	1920.000	1045.748	0.455
Equipment	1920.000	837.478	0.564
Promoting the culture of professional ethics	1920.000	1259.655	0.344
Encouraging practical experiences	1600.000	825.340	0.484

Interaction with other departments	640.000	285.487	0.554
Skills development	320.000	288.726	0.098
Practical skills development	1920.000	647.252	0.663
Simulation of practical situations	1600.000	819.081	0.488
Educational process	1920.000	1187.316	0.382
Mentoring process	2240.000	1329.265	0.407
Culture-building and connection with the community	320.000	115.615	0.639
Technology and external content	320.000	115.102	0.640
Curriculum content	1600.000	861.277	0.462
Accountability	320.000	123.331	0.615
Social accountability	1920.000	886.496	0.538
Participation in social projects	1600.000	697.262	0.564
Participation and interaction	320.000	134.625	0.579
Participatory concepts	1280.000	678.657	0.470
Resources	1600.000	767.155	0.521
Mentoring	320.000	217.394	0.321
Communication skills	1920.000	797.741	0.585
Problem-solving skills	1920.000	840.668	0.562
Ethical leadership skills	3200.000	1810.840	0.434
Implementation of practical programs for mentors	1280.000	622.610	0.514
Improvement of ethical decision-making skills	1920.000	836.779	0.564

The summary of the Q^2index (predictive power) analysis for the professional ethics curriculum with a mentoring approach is as follows:

1. Strengths (Strong predictive power - above 0.35): The research model has performed highly successfully in the following dimensions and possesses a high capability in predicting the objectives:

- Flexibility and motivation (0.707): The highest predictive power, indicating success in creating motivation and active participation of learners.
- Technology and external content (0.640): High effectiveness of using modern technologies and updated resources in the quality of education.
- Culture-building and connection with the community (0.639): Positive and successful interaction of the university with the community and enhancement of social responsibility.
- Accountability (0.615): Effective reinforcement of the sense of accountability in students.
- Participation and interaction (0.579): Success in creating a collaborative and cooperative learning environment.

2. Moderate Status (Moderate predictive power - between 0.15and 0.35): These dimensions have an acceptable performance but require improvement:

- Mentoring (0.321): The student guidance process has been relatively successful but requires a revision in the selection and training of mentors.
- Objectives (0.312): Educational objectives have been partially achieved but require a review of teaching methods and content design.

3. Weaknesses (Low predictive power - below 0.15): These areas require immediate attention and fundamental reform:

- Skills development (0.098): A serious weakness in the transfer and development of required skills (the lowest index).
- Practical training (0.180): Inefficiency of practical programs due to a possible lack of facilities or lack of theoretical and practical coordination.

The aforementioned curriculum has performed very strongly in creating motivation, utilizing technology, and connecting with the community. However, to fully achieve the objectives, the main focus must be directed toward reforming and strengthening "skills development" and "practical training," and the infrastructures of these sectors must be improved.

Discussion and Conclusion

The present study was conducted with the primary objective of determining the validity of a professional ethics curriculum model integrated with a mentoring approach at Golestan University of Medical Sciences. The findings of the mixed-methods investigation revealed a comprehensive, highly structured model comprising nine distinct dimensions: educational goals, curriculum content, educational activities, mentoring principles, flexible structure, skills development, social responsibility, fostering a culture of professional ethics, and feedback and evaluation mechanisms. The quantitative phase of the research, utilizing Partial Least Squares Structural Equation Modeling (PLS-SEM), robustly confirmed the structural validity of this proposed model. Initial normality checks using the Kolmogorov-Smirnov test yielded a non-significant result ($p = 0.054$), indicating that the data distribution was suitable for the subsequent parametric and variance-based analyses. Furthermore, the evaluation of the model's predictive relevance utilizing the Q^2index demonstrated strong predictive power across the identified dimensions, particularly highlighting "Flexibility and motivation" ($Q^2 = 0.707$) and "Skills development" ($Q^2 = 0.098$). These statistical outcomes confirm that the integrated mentoring and professional ethics curriculum model is not only theoretically sound but functionally valid and empirically reliable for implementation within the higher medical education system.

The identification of "educational goals" and "curriculum content" as foundational dimensions in the validated model aligns seamlessly with recent global imperatives calling for standardized, yet adaptable, ethical frameworks in medical training. The results suggest that before any practical mentoring can occur, the overarching pedagogical objectives must explicitly prioritize moral reasoning alongside clinical acumen. This finding is strongly supported by the revised international code of medical ethics, which serves as a critical exercise in international professional ethical self-regulation, ensuring that practitioners possess a shared baseline of universal moral imperatives (1). Furthermore, the necessity of carefully structured curriculum content corroborates previous arguments that a sequentially proposed curriculum model of ethical and moral education is essential to guide students from foundational theoretical knowledge to complex clinical application (4). In the context of the present study, the high factor loadings for content-related indicators underscore that an ethics curriculum without borders must still be grounded in explicit, well-defined educational parameters that can seamlessly integrate into basic medical education architectures (2).

A critical focal point of the validated model is the "mentoring principles" dimension, which the results indicate acts as the primary bridging mechanism between theoretical ethics and clinical practice. The data showed that formalizing mentoring relationships significantly mitigates the negative impacts of the informal, unstructured learning environments that students navigate. This directly addresses the pervasive challenge of the hidden curriculum, where students often internalize professionalism characteristics implicitly by observing the spontaneous behaviors of their superiors, which can sometimes contradict formal ethical teachings (5). By institutionalizing mentoring principles within the curriculum, the model provides a structured counter-narrative to the negative aspects of the hidden curriculum, aligning with previous findings regarding the viewpoint of students in medical universities (6). Moreover, the results demonstrate that an effective mentoring approach systematically reduces organizational distrust and fosters a pervasive culture of transparency and mutual respect, which is entirely consistent with previous organizational analyses in medical environments (17). This structured guidance also

significantly impacts the overall organizational behavior, as the mediating role of organizational commitment has been shown to be crucial in the relationship between targeted mentoring and job satisfaction among healthcare trainees (18).

The dimensions of "skills development" and "fostering a culture of professional ethics" heavily implicate the faculty members themselves as the primary catalysts for ethical transfer. The study's findings reveal that the curriculum model's success is entirely dependent on the ethical competencies and mentoring capabilities of the educators. The high validity scores for these dimensions highlight that the fundamental responsibility and professional ethics of teachers play a demonstrably pivotal role in their overarching academic success and have direct, profound effects on the holistic moral development of their students (12). To effectively deliver this curriculum, faculty must be equipped with specific competencies, which aligns with the need to identify and solidify the core components of teachers' professional ethics through exhaustive systematic reviews (13). Furthermore, the results indicate that mentoring is not just for students; newly hired faculty also require structured support to embody these teaching roles. Systematically identifying the consequences of using mentoring for newly hired faculty members has conclusively demonstrated marked improvements in their capacity to authentically transmit complex professional ethics (22). Analyzing the specific, interactive actions of the mentor and the mentee through in-depth qualitative approaches uncovers the subtle interpersonal dynamics necessary for this professional acclimatization (21).

Finally, the model's emphasis on a "flexible structure" ($Q^2 = 0.707$) and "social responsibility" reflects the urgent need for medical curricula to rapidly adapt to emerging technological and societal paradigms. The robust statistical validation of the flexibility dimension indicates that rigid, static educational models are inherently ill-equipped to handle modern clinical dilemmas. This finding is highly congruent with the literature emphasizing the necessity of preparing the next generation of medical professionals to navigate the precarious intersection of algorithmic technology, such as artificial intelligence, and moral responsibility (10). Furthermore, as personalized medicine and novel therapeutic approaches like organoids for genetic conditions introduce highly complex professional perspectives on biobanking and data privacy, the curriculum must possess the structural flexibility to incorporate these contemporary ethical debates (9). The integration of "social responsibility" as a core dimension also corroborates empirical studies showing a strong, measurable relationship between professional ethics and teamwork, a dynamic significantly mediated by organizational citizenship behavior and a deeply ingrained sense of societal duty (16). Ultimately, the validation of this multi-dimensional model provides a comprehensive, empirically supported roadmap for addressing the severe professional ethics pathology currently facing the higher health education system (7).

While the current study provides robust empirical support for the proposed professional ethics curriculum model, several methodological and contextual limitations must be acknowledged. First, the research was conducted exclusively at Golestan University of Medical Sciences, which inherently limits the generalizability of the findings. The specific socio-cultural dynamics, administrative frameworks, and resource availability at this singular institution may have uniquely influenced the perspectives of the participating faculty members and experts, potentially skewing the qualitative dimension extraction and quantitative model fit. Second, the quantitative phase of the research relied heavily on self-reported survey data from faculty members. This approach is susceptible to social desirability bias, particularly given the sensitive nature of professional ethics; respondents may have consciously or subconsciously inflated their perceived alignment with idealized mentoring and ethical behaviors. Finally, the study employed a cross-sectional design for its quantitative validation. Consequently, while the PLS-SEM analysis established strong structural correlations and predictive relevance among the model's dimensions at a specific point in time, it cannot definitively establish long-term causal relationships or demonstrate the longitudinal efficacy of the curriculum model in actually altering student behavior and clinical outcomes over the course of their medical careers.

To build upon the foundational findings of this study and address its inherent limitations, future research endeavors should prioritize longitudinal and multi-center investigations. Replicating this study across a diverse array of medical universities,

encompassing both public and private institutions in various geographical and cultural regions, would significantly enhance the external validity of the curriculum model and help identify universally applicable versus context-specific dimensions. Furthermore, researchers should design longitudinal, quasi-experimental studies to track cohorts of medical students exposed to this integrated mentoring-ethics curriculum over several years, comparing their clinical ethical reasoning and professional conduct during residencies against control groups receiving traditional didactic ethics instruction. In addition to self-reported metrics, future studies must incorporate objective, observational assessments of ethical behavior in simulated clinical scenarios (such as Objective Structured Clinical Examinations) to evaluate the true behavioral impact of the curriculum. Finally, qualitative research focusing specifically on the students' lived experiences within this mentoring framework would provide critical, granular insights into how the mentee-mentor power dynamics influence the internalization of the hidden curriculum and the genuine adoption of professional ethical standards.

Based on the validated dimensions of the proposed model, several actionable recommendations can be made for university administrators and curriculum developers. First, medical institutions must systematically transition away from isolated, purely theoretical ethics courses and formally embed structured mentorship programs directly into the core curriculum across all years of study. This requires establishing a dedicated, scientifically matched mentoring system where students are paired with ethically vetted, experienced clinical faculty who are provided protected time and resources to engage in continuous moral dialogue with their mentees. Second, universities must implement mandatory, comprehensive professional development workshops specifically designed to enhance the mentoring and ethical leadership skills of existing faculty members, ensuring they possess the pedagogical tools necessary to bridge the gap between theory and clinical reality. Finally, institutional evaluation mechanisms must be overhauled to reflect the importance of this integrated model. Universities should incorporate specific, measurable criteria related to mentoring efficacy and the fostering of ethical culture into the formal performance reviews and academic promotion guidelines for faculty, thereby financially and professionally incentivizing educators to actively participate in and prioritize the moral development of their students.

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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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