

ORIGINAL ARTICLE

Environmental Etiquette Education Model Validity from the Experts' Point of View

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ABSTRACT

The aim of this research was to validate an educational model for environmental etiquette that was designed based on the Islamic-Iranian progress model. To this end, a descriptive survey method was employed, and the perspectives of 111 specialists were collected through purposive sampling using the snowball technique and a researcher-made questionnaire. The reliability of the tool was confirmed using Cronbach's alpha, and its validity was established through convergent and divergent validity tests, as well as the Fornell-Larcker criterion. The results were analyzed using descriptive and inferential statistics. After examining the fit of the measurement models, the fit of the confirmatory factor analysis model was assessed, and the proposed model was presented using structural equation modeling techniques and SmartPLS software. The overall model fit was evaluated using the GOF criterion, and the comprehensive validity of the model from the specialists' perspective was also examined. Ultimately, the validity of the model and its comprehensive validity from the specialists' viewpoint were confirmed.

KEYWORDS

Education, Etiquette, Model, Environment.



آموزش محیط‌زیست و توسعه پایدار

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«مقاله پژوهشی»

اعتبار الگوی آموزش ادب محیط زیستی از دیدگاه متخصصان

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چکیده

هدف از این پژوهش اعتباریابی الگوی آموزش ادب محیط زیستی بود که براساس دیدگاه الگوی اسلامی ایرانی پیشرفت طراحی شده است. به این منظور از روش توصیفی پیمایشی استفاده شد و دیدگاه تعداد ۱۱۱ نفر از متخصصان بصورت نمونه‌گیری هدفمند، با تکنیک گلوله برفی و به وسیله پرسشنامه محقق ساخته دریافت شد. پایایی ابزار با آلفای کرونباخ و روایی آن با استفاده از آزمون‌های روایی همگرا و واگرا و فورنل و لارکر تایید شد. نتایج حاصل با استفاده از امار توصیفی و استنباطی مورد تجزیه و تحلیل قرار گرفت. پس از بررسی برازش مدل‌های اندازه‌گیری، به بررسی برازش مدل تحلیل عاملی تأییدی پژوهش پرداخته شد و مدل مورد نظر با تکنیک مدل‌سازی معادلات ساختاری و استفاده از نرم‌افزار SmartPls ارائه گردید. برازش مدل کلی با استفاده از معیار GOF و همچنین بررسی اعتبار جامعیت الگو از دیدگاه متخصصان نیز انجام شد. در نهایت اعتبار الگو و نیز اعتبار جامعیت الگو از دیدگاه متخصصان مورد تأیید قرار گرفت.

واژه‌های کلیدی

آموزش، ادب، الگو، محیط زیست.

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Introduction

Religious teachings and faith strengthen supportive behaviors towards the environment; thus, promoting Islamic environmental ethics is an effective measure for environmental protection (Rice, 2006). Numerous studies have confirmed this, including the work of Zemo and Nigus, who emphasized that religion plays a significant role in promoting pro-environmental behaviors (Zemo & Nigus, 2020). Official institutions, such as educational systems and media outlets that are used to raise environmental awareness, should leverage religion as a tool to enhance pro-environmental behaviors and cultivate sustainable communities (Abdullah & Keshminder, 2020). The attitudes and behaviors shaped through Islamic education create a model of environmental ethics that directly impacts learners' interactions with the environment, thereby providing a framework for environmental education in schools (Fua et al., 2018). Kurniawan's research in 2021 demonstrated that religious-based environmental education is more effective than non-religious approaches (Kurniawan & Syifauddin, 2021).

On the other hand, studies show that model-based environmental education can enhance attitudes, knowledge, and environmental self-efficacy, as well as empower community members and promote sustainable practices, thereby strengthening pro-environmental behaviors. For instance, Prince (2016) drew on social learning theory and proposed a model for learning that includes modeling, guidance, and sustainable practice by educators in outdoor settings, using outdoor experiences to foster pro-environmental behaviors. Another study indicated that participation in guided activities of environmental education programs can effectively improve students' attitudes and knowledge regarding environmental stewardship (Schmits & Rocha, 2018). Given that model-based approaches in environmental education are a powerful tool for fostering green behaviors among citizens (Varela-Candamio et al., 2018), using models as a strategy to encourage pro-environmental behaviors is essential (Sussman et al., 2013).

In addition to the emphases found in Article

50 of the Constitution and higher documents such as the General Policies Document for Environmental Protection, prominent religious and political leaders in the Islamic Republic, such as Ayatollah Khamenei, the leader of the Islamic Revolution, and Ayatollah Javadi Amoli, a Shia source of emulation, have always stressed the importance of the environment as the foundation of all human activities and the progress of societies. Their divine and Islamic orientation in their positions and statements has always been clearly evident (Yazdi, 2023; Yazdi & Medadi, 2022).

Given this necessity, two studies titled "Qualitative Study of the Components of the Environmental Etiquette Education Model from the Perspective of the Islamic-Iranian Progress Model" (Alizadeh Shooshtari et al., 2023) and "The Environmental Etiquette Model and Explanation of Environmental Education Goals Based on the Islamic Perspective of Earth as a Mother" (Alizadeh Shooshtari et al., 2019) were conducted, which designed an environmental etiquette education model based on the Islamic-Iranian progress perspective. The components of this educational model include foundations, principles, message of the model, goals, teaching and learning components, roles of the learner and teacher, learning environment and context, and evaluation. This model also addresses indicators such as "attention to the concept of guidance," "management of the developmental infrastructure of education and learning," "consideration of the three-dimensional nature of the environment," "etiquette towards the environment," "Islamic view of the Earth as a mother for humans," "consideration of the intellectual capacity of the audience in communication and education," and "assessment and evaluation without grading criteria" (Alizadeh Shooshtari et al., 2023).

The foundation of the concept of environmental etiquette involves the examination of the nature and differentiation of aspects often recognized as instances of environmental ethics. In many cases, such as respecting the rights of other living beings or showing respect for the environment, there are instances that should be observed in human behavior to determine whether an individual

adheres to environmental ethics. What is often recognized as environmental ethics is "a specific behavior with particular manners in an individual," which, when analyzed, can reveal their inner state and feelings towards the environment. Thus, what becomes significant is not only the internal and spiritual states—termed ethics—in relation to the environment, but also the manners that individuals observe in their behavior towards the environment. Therefore, from the totality of the recommended manners in Islam, the concept of environmental etiquette has been extracted (Alizadeh Shooshtari et al., 2019).

The foundations and principles of the environmental etiquette education model are derived from the Islamic-Iranian foundational model document. In terms of theology, it advocates for God-centeredness, monotheism, divine justice, the expansiveness of the Almighty God, and absolute and unique sovereignty over existence. From a worldview perspective, it holds that existence has a monotheistic essence, endowed with both the unseen and the seen, and acknowledges the governance of a causal system, considering the material world as subordinate to the metaphysical realm. Anthropologically, it views the recognition and worship of the Creator and the elevation to the status of God's vicegerent on Earth as the purpose of human creation. According to the foundational principles of the document and the environmental etiquette education model, society serves as a platform for interaction and participation to meet human needs and nurture their talents. Values arise from reality and possess stable, absolute, and universal principles, and religion is presented as a comprehensive system in terms of cognitive and livelihood aspects for the perfection of humanity, with Islam being a complete, universal religion aligned with the laws of existence and human nature. Additionally, attention to "the concept of guidance," "management of the developmental infrastructure of education and learning," "consideration of the three-dimensional nature of the environment," "etiquette towards the environment as the mother of humanity," "consideration of the intellectual capacity of the audience in communication and education,"

and "assessment and evaluation without grading criteria" are very important and foundational elements in the environmental etiquette education model (Alizadeh Shooshtari et al., 2023). Therefore, utilizing Islamic teachings as the basis for designing educational models, especially in relation to the environment, will facilitate and expedite the achievement of the significant goal of reforming human behavior towards the environment.

Considering the necessity of environmental education and the religious perspective in it, and given the design of the "Environmental Etiquette Education Model" based on Islamic viewpoints, the aim of this research was to conduct an internal validation of the mentioned model, assessing its credibility from the perspective of specialists.

Research Methodology

To achieve the goal of validating the proposed model, the components of the model, derived from a study titled "Qualitative Study of the Components of the Environmental Etiquette Education Model Based on the Islamic-Iranian Progress Model" (Alizadeh Shooshtari et al., 2023), were employed using a descriptive survey method in the current research. The statistical population consisted of experts from religious and academic fields, including Islamic sciences, jurisprudence and law, educational sciences, and environmental education. Experts were selected purposefully based on their expertise, educational background, research experience, or professional relevance, specifically from individuals holding at least a master's degree, doctorate, or levels three and four in religious studies. A total of 111 experts were identified and selected using a purposive sampling method and snowball technique. The data collection instrument was a researcher-developed questionnaire based on the qualitative studies of the model (Alizadeh Shooshtari et al., 2023). The reliability of the instrument was confirmed with a Cronbach's alpha above 0.7. The validity of the questionnaire was established through the distribution of a validity assessment questionnaire among specialists and the use of convergent and divergent validity tests, as well

as the Fornell-Larcker criterion. The results were analyzed using descriptive and inferential statistical methods, and the model was presented using structural equation modeling techniques through SmartPLS software.

Research Findings

A researcher-developed validation questionnaire was utilized to assess the validity of the proposed environmental etiquette education model. The validity of the questionnaire was evaluated through its

distribution among 15 specialists, resulting in 13 complete responses (response rate of 87%). After examining the fit of the measurement models, the fit of the confirmatory factor analysis model was assessed. The overall model fit was evaluated using the GOF criterion, and the comprehensive validity of the model was also examined.

Investigation of Questionnaire Validity

Information regarding the composition and characteristics of the specialists in the validity assessment expert group is presented in Table 1.

Table 1. Composition and Characteristics of the Members of the Expert Group for Questionnaire Validity Assessment

| Level of Education | | Gender | | Number | Field of Study |
|--------------------|---------|--------|--------|--------|-------------------------------|
| Ph.D | Masters | Male | Female | | |
| 6 | 0 | 4 | 2 | 6 | Environmental Education |
| 0 | 1 | 0 | 1 | 1 | Curriculum |
| 0 | 2 | 0 | 2 | 2 | Educational Science |
| 1 | 3 | 3 | 1 | 4 | Islamic and seminary sciences |
| 7 | 6 | 7 | 6 | 13 | Total |

The judgments of the members of the validity assessment group were quantified and analyzed using Microsoft Excel to calculate the Content Validity Ratio (CVR) (Lawshe, 1975). The CVR was calculated using the following equation 1:

Equation 1)

$$CVR = \frac{n_e - n/2}{n/2}$$

n_e : Number of panel members who rated the item as "essential."

$n/2$: Total number of group members divided by 2.

Based on Table 2, the minimum acceptable CVR value was determined according to the number of participants in the validation process.

Table 2. Minimum CVR Values for Different Numbers of Validity Assessment Group Members (Hassanzadeh Rangi, 2012)

| Minimum acceptable CVR values | Number of group members |
|-------------------------------|-------------------------|
| 0.99 | 5 |
| 0.99 | 6 |
| 0.99 | 7 |
| 0.85 | 8 |
| 0.78 | 9 |
| 0.62 | 10 |
| 0.59 | 11 |
| 0.56 | 12 |
| 0.54 | 13 |
| 0.51 | 14 |
| 0.49 | 15 |
| 0.42 | 20 |
| 0.37 | 25 |
| 0.33 | 30 |
| 0.31 | 35 |
| 0.29 | 40 |

Considering the number of complete responses received from specialists regarding the questionnaire's validity, the minimum acceptable CVR value for each question was set

at 0.54. Table 3 presents the results of the questionnaire's validity assessment, including CVR and the average numerical judgments of the specialists.

Table 3. CVR Values, Average Numerical Judgments, and Acceptance or Rejection Results of the Environmental Etiquette Education Model Validation Questionnaire Items

| The result of the validity assessment | Numerical average of judgments | CVR | Item | Number |
|---------------------------------------|--------------------------------|------|--|--------|
| Reception | 1.69 | 0.69 | The basics of the environmental education model derived from the Iranian Islamic model of progress | |
| Reception | 1.77 | 0.69 | The necessity of paying attention to the principles of the Iranian Islamic model of progress in environmental education | |
| Reception | 1.92 | 0.69 | The necessity of paying attention to the foundations and theological principles of the Iranian Islamic model of progress in the design of the environmental education model | |
| Reception | 1.85 | 0.69 | The necessity of paying attention to the worldview principles and foundations of the Iranian Islamic model of progress in the design of the environmental education model | |
| Reception | 1.85 | 0.69 | The necessity of paying attention to the foundations and anthropological principles of the Iranian Islamic model of progress in the design of the environmental education model | |
| Reception | 1.85 | 0.69 | The necessity of paying attention to the foundations and sociological principles of the Iranian Islamic model of progress in the design of the environmental education model | 1 |
| Reception | 1.85 | 0.69 | The necessity of paying attention to the fundamentals and cognitive value principles of the Iranian Islamic model of progress in the design of the environmental education model | |
| Reception | 1.77 | 0.69 | The necessity of paying attention to the foundations and theological principles of the Iranian Islamic model of progress in the design of the environmental education model | |
| Reception | 1.77 | 0.54 | The necessity of paying attention to the foundations and epistemological principles of the Iranian Islamic model of progress in the design of the environmental education model | |
| Reception | 1.62 | 0.38 | The necessity of paying attention to the "basic role of the family" and the "developmental foundation of education and learning" in the design of the model of environmental education | |

| The result of the validity assessment | Numerical average of judgments | CVR | Item | Number |
|---------------------------------------|--------------------------------|------|---|--------|
| Reception | 2 | 0.85 | The necessity of paying attention to the management of learner tendencies in environmental education | |
| Reception | 1.92 | 0.85 | The necessity of paying attention to etiquette as a central technique of managing tendencies | 2 |
| Reception | 2 | 0.99 | The necessity of paying attention to the duty of man in observing the manners of dealing with the environment as the mother of humans | |
| Reception | 1.85 | 0.69 | The necessity of paying attention to the facilitator's role for children and young people | |
| Reception | 1.92 | 0.85 | The necessity of paying attention to the role of preparation, explanation, and refinement of the teacher for the adolescent and adult audience | 3 |
| Reception | 1.77 | 0.54 | The necessity of paying attention to the validity of the authority role of the teacher in environmental education | |
| Reception | 1.77 | 0.69 | The necessity of paying attention to the organization from the perspective of the Iranian Islamic model of progress in teaching and learning environmental education | |
| Reception | 1.92 | 0.85 | The necessity of paying attention to the concept of guidance in environmental education | |
| Reception | 1.77 | 0.54 | The necessity of paying attention to practical-explanatory-critical content education, based on the perspective of the Iranian Islamic model of progress in environmental education | |
| Reception | 1.77 | 0.69 | The necessity of paying attention to religious orientation and divine orientation in environmental education | |
| Reception | 1.92 | 0.85 | The necessity of paying attention to the intellectual capacity, ability and readiness of the learner, discounting and tolerance and designing alternatives in environmental education | 4 |
| Reception | 85.1 | 0.69 | The necessity of paying attention to lifelong learning | |
| Reception | 1.85 | 0.69 | The necessity of paying attention to intellectual persuasion, tendency and acceptance of the heart, gentleness and gradualness in environmental education based on the perspective of the Iranian Islamic model of progress | |
| Reception | 2 | 0.99 | The necessity of paying attention to improving the learner's insight in environmental education | |
| Reception | 1.85 | 0.69 | The necessity of paying attention to the role of environmental education in theology | |

| The result of the validity assessment | Numerical average of judgments | CVR | Item | Number |
|---------------------------------------|--------------------------------|------|--|--------|
| Reception | 1.92 | 0.85 | The necessity of paying attention to the cultivation of reasoning capacity through connecting the environment with the creator | |
| Reception | 2 | 0.99 | The necessity of paying attention to the preparation and growth of the audience, intellectual capacity and individual differences in the process of environmental learning and education | |
| Reception | 1.85 | 0.69 | The necessity of paying attention to the desires and needs of the learner in environmental education | |
| Reception | 1.77 | 0.54 | The necessity of paying attention to the management of the learner's tendencies with the focus on etiquette towards the environment | 5 |
| Reception | 1.69 | 0.54 | The necessity of institutionalizing divine intention in managing desires and respecting environmental rights | |
| Reception | 1.31 | 0.23 | The necessity of paying attention to the importance of orderly management of inclinations and etiquette towards the environment | |
| Reception | 1.77 | 0.69 | The necessity of measuring the levels of intellectual capacity of the learner as an initial measure in environmental education | |
| Reception | 1.85 | 0.69 | The necessity of positivity in student evaluation in environmental education | 6 |
| Reception | 1.77 | 0.54 | The necessity of measuring learning without grade criteria and based on the amount of effort of the learner in environmental education | |
| Reception | 1.85 | 0.69 | Acquiring knowledge, values and concepts, understanding and criticism through environmental education | |
| Reception | 1.85 | 0.69 | Acquiring skills and internalizing behaviors through environmental education | |
| Reception | 1.92 | 0.85 | Improving and improving attitudes and insights through environmental education | |
| Reception | 1.92 | 0.85 | Improving understanding of communication and traditions related to the environment through environmental education | |
| Reception | 2 | 0.99 | Achieving a good life, sustainability, security and justice through environmental education | 7 |
| Reception | 2 | 0.99 | Creating commitment, responsibility, cooperative behavior seeking protection and responsible exploitation through environmental education | |
| Reception | 1.77 | 0.69 | Strengthening Monotheism and Belief in the Unseen, considering the three-dimensional nature of the environment through environmental education | |

| The result of the validity assessment | Numerical average of judgments | CVR | Item | Number |
|---------------------------------------|--------------------------------|------|--|--------|
| Reception | 2 | 0.99 | Creating and strengthening environmental ethics, character and etiquette and improving lifestyle through environmental education | |
| Reception | 1.85 | 0.69 | Creation and expansion of environmental demands (enjoining the good and forbidding environmental evil) and intergenerational and intergenerational justice through environmental education | |
| Reception | 1.85 | 0.69 | Strengthening and flourishing creativity and aesthetics through environmental education | |
| Reception | 1.92 | 0.85 | To what extent is the presented model comprehensive in terms of its constituent elements? | |
| Reception | 1.85 | 0.69 | How appropriate is the presented model in explaining the relationships between components? | |
| Reception | 2 | 0.99 | What is the applicability of the model presented in environmental education by educational planners and policymakers? | |
| Reception | 1.77 | 0.54 | To what extent do you evaluate the comprehensibility of the presented model? | |
| Reception | 1.92 | 0.85 | To what extent is the scientific comprehensiveness of the presented model? | |
| Reception | 1.85 | 0.69 | To what extent is the provided model capable of providing feedback? | 8 |
| Reception | 1.85 | 0.69 | To what extent is the capability of the presented model to improve the process of environmental education? | |
| Reception | 1.85 | 0.69 | What is the degree of compliance of the provided model with the components and elements of environmental education? | |
| Reception | 1.85 | 0.69 | To what extent has the presented model specified operational measures for environmental education in stages? | |
| Reception | 2 | 0.99 | To what extent do you consider the presented model suitable for environmental education from the point of view of the Iranian Islamic development model? | |
| Reception | 1.69 | 0.69 | In general, to what extent does environmental education in the country suffer from policy deficiencies? | |
| Reception | 1.77 | 0.69 | To what extent have policy deficiencies affected environmental education in the country? | |
| Reception | 1.69 | 0.54 | In general, to what extent does environmental education in the country suffer from legislative deficiencies? | 9 |
| Reception | 1.77 | 0.69 | To what extent have the shortcomings of legislation affected environmental education in the country? | |
| Reception | 1.69 | 0.69 | To what extent does environmental education in the country suffer from educational defects (planning, etc.)? | |

| The result of the validity assessment | Numerical average of judgments | CVR | Item | Number |
|---------------------------------------|--------------------------------|------|--|--------|
| Reception | 1.77 | 0.69 | To what extent do educational deficiencies affect environmental education in the country? | |
| Reception | 1.77 | 0.69 | To what extent are there contradictions between the existing environmental education approaches in the country and local principles? | |
| Reception | 1.69 | 0.69 | To what extent is the current state of environmental education in the country affected by the contradiction of the existing approaches with local principles and principles? | |
| Reception | 1.69 | 0.69 | To what extent is environmental education in the country weak in infrastructure? | |
| Reception | 1.69 | 0.54 | To what extent has the weak infrastructure affected environmental education in the country? | |
| Reception | 1.62 | 0.54 | At what level do you think Iranian society is in terms of the level of culture and general environmental awareness? | |
| Reception | 1.54 | 0.54 | To what extent has environmental education been effective in improving the level of public environmental culture and awareness? | |
| Reception | 1.62 | 0.54 | To what extent are the efforts made in the country (policy, planning, legislation, implementation) successful in creating the infrastructure needed for environmental education? | |
| Reception | 1.62 | 0.54 | How do you estimate the result of effective attention to environmental education in upstream documents, general policies and development programs of the country? | |
| Reception | 1.69 | 0.54 | How do you estimate the positive trend of promoting the environment-oriented approach in the country? | |

According to the validity assessment results, except for items 1-10 and 5-5, the CVR index for all items was above 0.54. For item 1-10, despite a CVR index of 0.38, it was accepted due to its high average numerical judgment. However, item 5-5, with a CVR index of 0.23 and an average judgment of 1.31, was rejected. Consequently, the Content Validity Index (CVI) for the environmental etiquette education model validation questionnaire was calculated using the following equation 2 (Hassanzadeh Rangi, 2012): Equation 2)

$$CVI = \frac{\sum_n^1 CVR}{Retained\ Numbers}$$

- CVI: Content Validity Index
- CVR: Linear transformation of the group members who selected "the item is essential."
- Retained Numbers: Number of retained items.

Given the removal of one item, with 68 items remaining, the content validity index for the questionnaire was calculated to be 0.71, which is an acceptable value. Additionally, to assess data adequacy and construct validity (the feasibility of conducting factor analysis), KMO and Bartlett's tests were employed, as shown in Table 4.

Table 4. Results of KMO and Bartlett's Tests

| KMO | Bartlett's level of significance | Total items (1 to 44) |
|-------|----------------------------------|-----------------------|
| 0.898 | 0.001 | |

As shown in Table 4, the KMO value is greater than 0.70, and the significance level of Bartlett's test is below 0.05. Therefore, the construct validity of the questionnaire is

confirmed, indicating that the research data is suitable for factor analysis. Table 5 presents the results of the sampling adequacy test.

Table 5. Results of the Sampling Adequacy Test

| KMO | Bartlett's level of significance | Number of items | Component |
|-------|----------------------------------|-----------------|---------------------------------------|
| 0.926 | 0.0001 | 10 | Basics and principles |
| 0.747 | 0.001 | 3 | Message of Model |
| 0.718 | 0.001 | 3 | The role of the teacher |
| 0.877 | 0.001 | 9 | Teaching and learning |
| 0.700 | 0.001 | 2 | Education environment and context |
| 0.765 | 0.001 | 4 | The role of the learner |
| 0.706 | 0.001 | 3 | Assessment |
| 0.921 | 0.001 | 10 | Objectives of environmental education |

According to Table 5, with a significance level of 0.001, since the KMO value for all dimensions of the current status is greater than 0.70, the construct validity of the questionnaire

is confirmed. Table 6 shows the components of the environmental etiquette education model along with their factor loadings.

Table 6. Components of the Environmental Education Model and the factor load of each of them

| Confirmatory factor loadings | Number of items | Component |
|------------------------------|-----------------|---------------------------------------|
| 0.850 | 10 | Basics and principles |
| 0.712 | 3 | Message of Model |
| 0.766 | 3 | The role of the teacher |
| 0.950 | 9 | Teaching and learning |
| 0.732 | 2 | Education environment and context |
| 0.822 | 4 | The role of the learner |
| 0.742 | 3 | Assessment |
| 0.891 | 10 | Objectives of environmental education |

To determine the validity and appropriateness of the designed model and to assess the fit of the measurement model, convergent validity (AVE), discriminant

validity (Fornell and Larcker), composite reliability (CR), and Cronbach's alpha were used, with results presented in Table 7.

Table 7. Results of Convergent Validity, Composite Reliability, and Cronbach's Alpha Tests

| Cronbach's alpha | Composite reliability | AVE | Component |
|------------------|-----------------------|-------|---------------------------------------|
| 0.957 | 0.964 | 0.728 | Basics and principles |
| 0.663 | 0.816 | 0.598 | Message of Model |
| 0.762 | 0.863 | 0.679 | The role of the teacher |
| 0.885 | 0.908 | 0.529 | Teaching and learning |
| 0.665 | 0.817 | 0.692 | Education environment and context |
| 0.841 | 0.894 | 0.679 | The role of the learner |
| 0.821 | 0.893 | 0.736 | Assessment |
| 0.932 | 0.942 | 0.620 | Objectives of environmental education |

The results indicate that the AVE (Average Variance Extracted) for all components of the

environmental education model is above 0.50. Given that the acceptable value for Cronbach's

alpha is 0.70, for composite reliability is 0.70, and for AVE is 0.50, and all criteria have appropriate values in the factor loading assessment, the convergent validity of the model and the suitability of the fit of the measurement models are confirmed. The highest AVE index belongs to the component

"Evaluation" with a value of 0.736, while the lowest corresponds to the component "Teaching and Learning" with a value of 0.529.

The Fornell and Larcker matrix for examining discriminant validity is illustrated in Table 8.

Table 8. Results of Discriminant Validity Test (Fornell and Larcker Criterion) to Determine Model Quality

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | Variable | Number |
|-------|-------|-------|-------|-------|-------|-------|-------|---------------------------------------|--------|
| | | | | | | | 0.853 | Basics and principles | 1 |
| | | | | | | 0.773 | 0.424 | Message of Model | 2 |
| | | | | | 0.824 | 0.717 | 0.490 | The role of the teacher | 3 |
| | | | | 0.728 | 0.692 | 0.678 | 0.719 | Teaching and learning | 4 |
| | | | 0.832 | 0.698 | 0.543 | 0.488 | 0.582 | Education environment and context | 5 |
| | | 0.824 | 0.585 | 0.722 | 0.716 | 0.638 | 0.520 | The role of the learner | 6 |
| | 0.858 | 0.782 | 0.460 | 0.658 | 0.679 | 0.603 | 0.429 | Assessment | 7 |
| 0.787 | 0.725 | 0.784 | 0.650 | 0.725 | 0.709 | 0.678 | 0.606 | Objectives of environmental education | 8 |

* Note: The numbers on the correlation matrix are the square root of the average variance extracted.

According to Table 8, the square root of the extracted mean variance of all research variables is more than their correlation with other variables. Therefore, the criteria for investigating the divergent validity of research variables is established.

Fit of the Confirmatory Factor Analysis Model

To assess the fit of the confirmatory factor analysis model, the significance coefficients (T) and the adjusted R-squared (R²) and Q² criteria were used. Table 9 presents the results of the confirmatory factor analysis model fit.

Table 9. Results of Confirmatory Factor Analysis Model Fit

| Q ² | | R ² | t-value | Component |
|----------------|--------|----------------|---------|---------------------------------------|
| CV Com | CV Red | | | |
| 0.621 | 0.477 | 0.723 | 15.67 | Basics and principles |
| 0.217 | 0.258 | 0.508 | 4.55 | Message of Model |
| 0.353 | 0.363 | 0.587 | 5.88 | The role of the teacher |
| 0.391 | 0.429 | 0.902 | 29.51 | Teaching and learning |
| 0.141 | 0.331 | 0.536 | 5.99 | Education environment and context |
| 0.445 | 0.416 | 0.676 | 9.60 | The role of the learner |
| 0.440 | 0.379 | 0.551 | 5.92 | Assessment |
| 0.494 | 0.445 | 0.794 | 12.90 | Objectives of environmental education |

As shown in Table 9, the positive values of the communalities for all variables in this study indicate a suitable and acceptable quality of the measurement and structural model.

Overall Model Fit

GOF Criterion

The overall model fit of the research was assessed using the GOF criterion, which pertains to the overall section of the confirmatory factor analysis models. This

means that by examining the fit of the measurement section and the confirmatory factor analysis section of the overall research model, the fit of the entire model can also be controlled. The value of this criterion ranges from zero to one, with values close to one indicating good model quality. This criterion is calculated using the following equation 3.

Equation 3)

$$GOF = \sqrt{COMMUNALITY * R^2}$$

Where commonalities indicate the average shared values of each construct, and R^2 represents the average values of the coefficient

of determination for the endogenous constructs of the model. The overall model fit results are shown in Table 10.

Table 10. Overall Research Model Fit

| R^2 | Communality | Component |
|-------|-------------|---------------------------------------|
| 0.723 | 0.728 | Basics and principles |
| 0.508 | 0.598 | Message of Model |
| 0.587 | 0.679 | The role of the teacher |
| 0.902 | 0.529 | Teaching and learning |
| 0.536 | 0.692 | Education environment and context |
| 0.676 | 0.679 | The role of the learner |
| 0.551 | 0.736 | Assessment |
| 0.794 | 0.620 | Objectives of environmental education |
| 0.660 | 0.658 | Mean |

Thus, the calculated GOF value is 0.659. Considering the values of 0.01, 0.25, and 0.36 as weak, moderate, and strong for GOF, the result of 0.659 indicates a strong model fit.

Figure 1 displays the results of the confirmatory factor analysis of the components, while Figure 2 shows the standardized measurement model of the components.

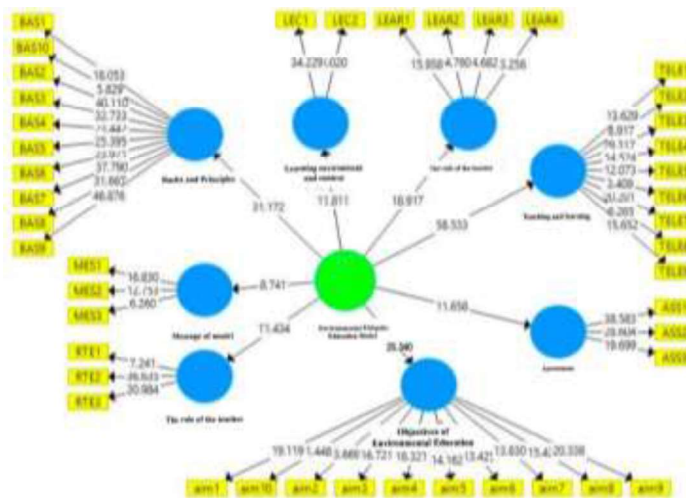


Figure 1. Confirmatory Factor Analysis of Components with Bootstrap Procedure

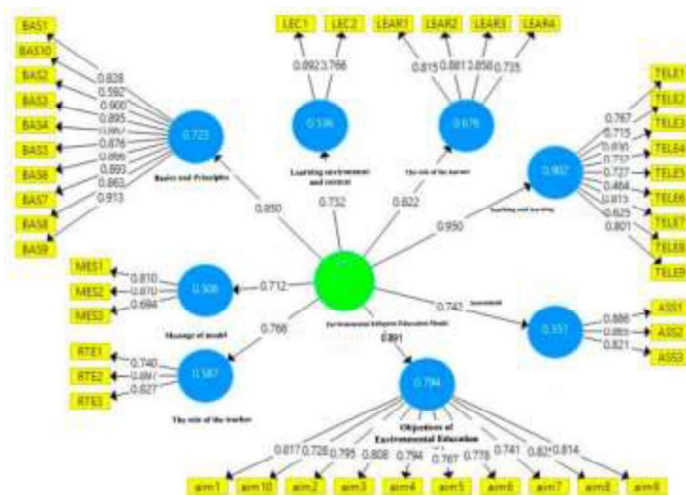


Figure 2. Standardized Measurement Model of Components

Based on the studies conducted in this research and the findings mentioned above, Figure 3 illustrates the environmental etiquette

education model from the perspective of the Islamic-Iranian Progress Model.

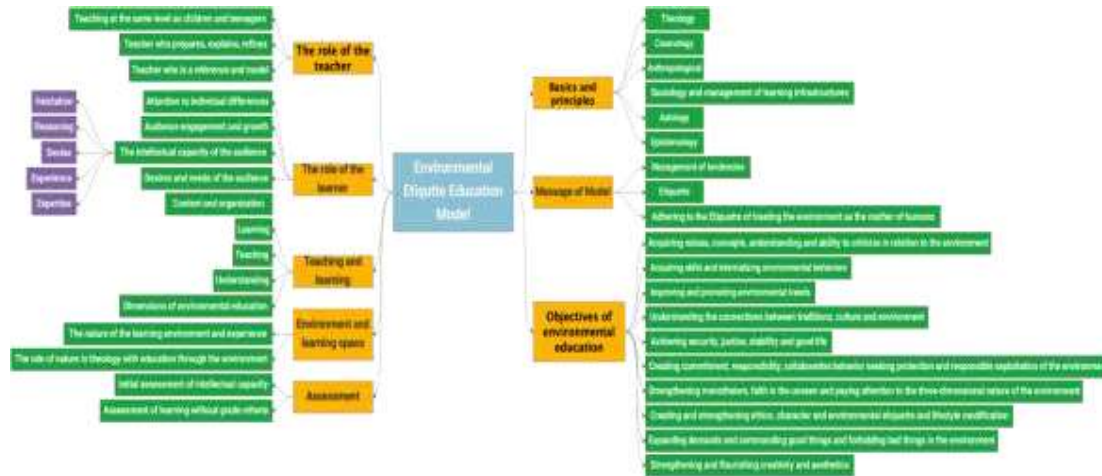


Figure 3. Environmental Etiquette Education Model from the Perspective of the Islamic-Iranian Progress Model

Assessing the Comprehensive Validity of the Environmental Etiquette Education Model

To address this question, a questionnaire was designed to assess the model's degree of fit

using a 5-point scale and was distributed to 111 specialists in this field. The collected data were then evaluated using a one-sample t-test, with results presented in Tables 11 and 12.

Table 11. Descriptive Indices of the Proposed Model from the Perspective of Specialists

| Standard error of the mean | Standard deviation | Mean | Number people (N-1) | Question |
|----------------------------|--------------------|------|---------------------|----------|
| 0.096 | 1.01 | 4.02 | 110 | Q1 |
| 0.104 | 1.09 | 3.93 | 110 | Q2 |
| 0.104 | 1.10 | 3.89 | 110 | Q3 |
| 0.108 | 1.14 | 3.82 | 110 | Q4 |
| 0.103 | 1.09 | 3.76 | 110 | Q5 |
| 0.105 | 1.10 | 3.72 | 110 | Q6 |
| 0.106 | 1.12 | 3.83 | 110 | Q7 |
| 0.110 | 1.16 | 3.74 | 110 | Q8 |
| 0.110 | 1.15 | 3.65 | 110 | Q9 |
| 0.112 | 1.18 | 3.73 | 110 | Q10 |

According to the results of descriptive statistics, the proposed model in the section "Components and Elements" has an average of 4.02, in the section "Explanation of Relationships Between Components," an average of 3.93, in the section "Practicality of the Model" an average of 3.89, in the section "Model Comprehensibility" an average of 3.82, in the section "Scientific Comprehensiveness of the Model" an average of 3.76, in the section "Feedback Capabilities of the Proposed Model" an average of 3.72, in the section "Improvement

of Environmental Education Processes" an average of 3.83, in the section "Alignment of the Proposed Model with Environmental Education Components" an average of 3.74, in the section "Phrasing of Operational Actions for Environmental Education" an average of 3.65, and in the section "Relevance of the Proposed Model for Environmental Education from the Perspective of the Islamic-Iranian Progress Model" an average of 3.73 out of 5, indicating high validity.

Table 12. Results of One-Sample T-Test to Assess the Fit of the Proposed Model from the Perspective of Specialists

| Expected average = 3 | | | | |
|-----------------------|--------------------|---------|-----------------|----------|
| Level of significance | Degrees of freedom | Value t | Mean difference | Question |
| 0.001 | 110 | 10.631 | 1.02 | Q1 |
| 0.001 | 110 | 8.944 | 0.923 | Q2 |
| 0.001 | 110 | 8.555 | 0.892 | Q3 |
| 0.001 | 110 | 7.591 | 0.820 | Q4 |
| 0.001 | 110 | 7.322 | 0.757 | Q5 |
| 0.001 | 110 | 6.871 | 0.721 | Q6 |
| 0.001 | 110 | 7.803 | 0.829 | Q7 |
| 0.001 | 110 | 6.723 | 0.739 | Q8 |
| 0.001 | 110 | 5.946 | 0.649 | Q9 |
| 0.001 | 110 | 6.500 | 0.730 | Q10 |

The results in the above table indicate that the mean difference of the proposed model in all sections is statistically significant at the 1% error level ($p < 0.01$). Therefore, the proposed model in the sections "Components and Elements," "Explanation of Relationships Between Components," "Practicality of the Model," "Model Comprehensibility," "Scientific Comprehensiveness of the Model," "Feedback Capabilities of the Proposed Model," "Improvement of Environmental Education Processes," "Alignment of the Proposed Model with Environmental Education Components," "Phrasing of Operational Actions for Environmental Education," and "Relevance of the Proposed Model for Environmental Education from the Perspective of the Islamic-Iranian Progress Model" is confirmed by specialists with 99% confidence.

Conclusion

Based on the studies conducted in designing the environmental etiquette education model according to the Islamic-Iranian Progress Model (Alizadeh Shooshtari et al., 2023), and considering the results from Tables 4 to 10, which demonstrate favorable results from the KMO and Bartlett's test, confirmation of the construct validity of the questionnaire, suitable factor loadings of the model components, as well as the validity and fit of the model according to the convergent validity (AVE), discriminant validity (Fornell and Larcker), composite reliability (CR), Cronbach's alpha, and the satisfactory results of the model fit assessment through confirmatory factor

analysis using significance coefficients (T), R^2 , and Q^2 , along with the overall model fit results measured by the GOF criterion, all components were validated. Consequently, the optimal environmental education model from the perspective of the Islamic-Iranian Progress Model includes components such as "Foundations and Principles Aligned with the Islamic-Iranian Progress Model," "Main Message of the Model in accordance with the Ideals of the Islamic-Iranian Progress Model," "Goals Achieving the Ideals of the Islamic-Iranian Progress Model," "Attention to Teaching and Learning from the Islamic Perspective and the Islamic-Iranian Progress Model," "Importance of the Learning Environment, Especially Utilizing Nature," "Focus on the Learner and Their Characteristics from the Perspective of the Islamic-Iranian Progress Model," "Significance of the Teacher's Role from the Islamic Perspective and the Islamic-Iranian Progress Model," and "Evaluation Based on the Perspective of the Islamic-Iranian Progress Model."

Fanidpoor et al. in their research identified objectives, learning environments and contexts, content, learning strategies, teaching methods, and evaluation as components of a religiously-based educational design model (Fanidpoor et al., 2019), which aligns with the results of this study. However, they did not mention the foundations and principles, the model's message, and the roles of the teacher and learner, perhaps considering these components as subsets of other shaping components of the model. Although attention to the philosophical

underpinnings of an educational model, often crystallized in its foundations and principles, is necessary as an independent component, this has also been confirmed in this research. Mohammadi et al. (2018) identified four components of their educational model: instructor, content, systems, and culture. Only the instructor component aligns with the role of the teacher in this research, while the other three components—content, systems, and culture—differ from the findings of this study. Mohammadi Ostadkelayeh et al. (2018), Soleymanpour Omran et al. (2013), and Saleh Omran et al. (2017) also introduced four components—objectives, content, teaching methods, and evaluation—as part of their environmental education model for preschool, which, except for recognizing content as an independent component, aligns with the results of this research. Abdollahrash et al. (2017) presented a model for environmental character education, which shares some objectives with the model derived from the current study. However, their focus on a God-centered and religious approach, along with the Islamic-Iranian Progress Model, was not emphasized by other researchers, making it inconsistent with this study. In contrast, Shahvali and Ghasemi (2017) provided an extensive discussion of the ontological, epistemological, methodological, anthropological, and axiological foundations in their introduction of a unified paradigm for natural resource and environmental conservation education. They also considered the ultimate goal of environmental education to be the "realization of human perfection." The emphasis on target groups (learners), teaching methods and strategies, and content in their research aligns closely with the current study's perspective and findings. Ghaemi et al. (2016) have also referred to "needs assessment, macro and micro goals, practical strategies for attitude change, content, and methods of intellectual stimulation". Although the overall perspective of their research differs regarding the Islamic-Iranian Progress Model, their focus on attitude change and the use of thought-stimulating strategies resonates with the concepts embedded in the "guidance" and "expression" components of the current study.

Based on the results from Tables 4 to 6, the

teaching and learning component had the highest confirmatory factor loading (0.95), while the model's message had the lowest confirmatory factor loading (0.712). The confirmatory factor loadings for the remaining components were between these two values, indicating that all components had appropriate confirmatory factor loadings.

As shown in Table 7, the average extracted variance for all components exceeded 0.5, Cronbach's alpha for all components was above 0.7, and the composite reliability index for all examined components was also above 0.7. These findings indicate the convergent validity of the model and demonstrate the good fit of the measurement model.

The quality of the model was confirmed through the establishment of the discriminant validity index of the variables, as indicated in Table 8. Table 9 also confirmed the acceptable quality of the measurement and structural models of the research, given the positive values of shared validity for all variables.

Calculations from Table 10 and Equation 3 yielded a GOF index value of 0.659, indicating a strong fit for the model. Consequently, the environmental education model from the perspective of the Islamic-Iranian Progress Model was fully validated in terms of confirmatory factor analysis.

The analysis of data collected using the comprehensive validity questionnaire, presented in Tables 11 and 12, showed that the average responses given by participants for all questions were above 3. The highest observed average, at 4.02, was related to "components and elements of the model," while the lowest observed average, at 3.65, pertained to "staging operational actions for environmental education." Consequently, given the significant difference between the average of the proposed model and the expected average of 3 at the 1% level ($p < 0.01$), the environmental etiquette education model from the perspective of the Islamic-Iranian Progress Model was validated with 99% confidence based on expert opinions.

As Iran is a developing country, the risks of neglecting the protection of natural and human resources during its progress threaten the country's future. Therefore, it is essential for the Islamic Republic of Iran, as the governing

system, to adopt a model for guiding the country's advancement that aligns with Islamic principles and Iranian characteristics. This model should promote economic, social, cultural, and spiritual progress while also protecting and enhancing human and natural resources to ensure future generations have access to the resources they need for continuous growth and development. Education focused on the protection of resources and responsible utilization is a crucial infrastructure for ensuring the continuity of the country's progress, commonly referred to as environmental education. To guarantee environmental protection, it is necessary that the education provided for this purpose aligns with the country's progress model and remains consistent over the years, regardless of political changes in governments and parliaments, to avoid negligence in responsible implementation. In essence, education and environmental education are among the governance issues, and policy making, strategy selection and planning for it should be considered in higher-level documents such as

the Iranian Islamic model of progress.

The need to reassess the foundations and principles of Islamic-Iranian thought in establishing community management structures, including education, is evident in this research. The necessity for coordination among different sectors of these management structures and existing approaches to achieve maximum success and progress further emphasizes the need for a comprehensive progress model called the Islamic-Iranian Progress Model. From the perspective of this comprehensive progress model, the environmental education model should be an integral part of the process.

Given the validation of the environmental education model from the perspective of the Islamic-Iranian Progress Model by a group of experts, including specialists in religious sciences, education, and environmental education, researchers are encouraged to examine the practical outcomes of environmental education for various audiences using this model.

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