

Evaluation models of e-education instructional mass communication in Shaanxi Province

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ABSTRACT

This study evaluates the current state of e-education instructional mass communication in Shaanxi Province, focusing on the identification of key problems, effective countermeasures, and the influencing factors that shape the field. Through a combination of surveys and interviews with 21 experts, the study highlights significant challenges such as insufficient digital literacy among educators, low quality of e-education content, and inadequate assessment and feedback mechanisms. The research also proposes targeted strategies for improvement, including the promotion of innovative teaching methods, enhanced resource allocation, and the integration of multimedia tools in teaching. The study further constructs an evaluation model, the E-Education Instructional Mass Communication Evaluation Model (EIMCEM), which is validated through expert consultation and feedback. The model incorporates eight core dimensions and is evaluated using the CIPP (Context, Input, Process, Product) model. Expert feedback confirms the model's contextual adaptability, comprehensiveness, and feasibility for improving e-education quality in the region. The findings suggest practical implications for policy development, teacher training, and content improvement to address the challenges in e-education.

Keywords: E-education, instructional mass communication, Shaanxi Province, digital literacy, evaluation model.

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INTRODUCTION

Introduce the problem

In the digital era, e-education has emerged as a transformative force, reshaping higher education, particularly in regions like Shaanxi Province. The rapid advancements in digital technologies, combined with the widespread availability of the internet, have made it possible for students to access educational content beyond the limitations of traditional classrooms. This shift has opened up new avenues for learning, especially for students in rural and remote areas where access to high-quality education has historically been restricted. Despite its significant advantages, the rapid expansion of e-education brings forth notable challenges. A primary concern is ensuring the consistency and quality of instruction, particularly when the digital divide in

infrastructure, access, and pedagogical preparation remains significant in many areas.

Shaanxi Province, located in central China, represents a microcosm of these broader challenges. Although the region has undertaken substantial initiatives to integrate digital technologies into its educational system, it faces unique geographical, cultural, and infrastructural barriers. These challenges include varying levels of technological infrastructure across the province, disparities in resource distribution, and diverse student needs. As a result, a tailored evaluation model is essential to accurately assess and improve e-education initiatives. This study addresses these issues by proposing an evaluation model specifically designed to meet the needs of Shaanxi Province, with a particular focus on mass communication. Mass communication plays a pivotal role in how educational

content is delivered, received, and interacted with in digital environments. The study will highlight how existing e-education models fail to address the distinct pedagogical and technical demands of media education, including real-time collaborative production, interactive multimedia tools, and high-bandwidth content delivery.

Exploring the importance of the problem

The significance of this study lies in the pressing need to develop effective, contextually relevant evaluation models for e-education, particularly in regions like Shaanxi, where digital transformation is still evolving. While e-education holds significant promise, its success depends heavily on the ability to assess its effectiveness accurately. This challenge is particularly critical in fields like mass communication, which require the integration of specialized pedagogical practices and technological tools.

Mass communication courses, by nature, demand real-time collaborative production, interactive multimedia tools, and high-bandwidth content delivery—requirements that traditional e-education evaluation frameworks are often ill-equipped to address. While existing evaluation models tend to focus on broader e-learning systems, they fail to account for the specific challenges inherent in media studies. For instance, while general models may assess content delivery or student engagement, they neglect key components of media education, such as synchronous collaboration in content creation or the use of multimedia tools to facilitate real-time discussions.

This study addresses this gap by developing an evaluation model that integrates mass communication-specific factors, enabling the effective evaluation of instructional quality in this domain. Moreover, as Shaanxi continues to integrate more e-education practices into its higher education system, it becomes critical to ensure that the evaluation models developed are not only theoretically sound but also culturally and infrastructurally relevant.

Critical synthesis of relevant scholarship

While existing research on e-education has identified the growing importance of evaluation models, many frameworks fail to address the distinct challenges presented by mass communication in online learning environments. Current literature on e-education evaluation generally focuses on general pedagogical contexts, often overlooking the unique technical and pedagogical demands of media studies, such as the integration of multimedia content, real-time collaboration, and high-bandwidth requirements. For instance, frameworks developed by Acton (2005) offer useful insights into assessing e-learning systems, but they do not specifically address the pedagogical nuances of mass communication education.

More recent research on digital tools in media education, such as the work by Wang and Chiu (2011), has examined digital integration, but these studies lack a comprehensive evaluation framework that considers both the pedagogical and infrastructural demands specific to mass communication. This study builds upon these previous works by developing an evaluation model tailored to the unique needs of mass communication in e-education.

The proposed model seeks to fill the research gap left by existing frameworks by providing a targeted approach that assesses not only the effectiveness of e-education in general but also the specific challenges and opportunities inherent in mass communication courses. The model integrates findings from previous studies while highlighting the distinct needs of media education, offering a more comprehensive tool for evaluating the effectiveness of e-learning systems in this domain.

In addition, much of the literature on e-education overlooks the cultural and ethical dimensions of digital education. This study seeks to bridge this gap by considering the ethical frameworks in evaluating e-education practices. Recognizing that issues such as inclusivity, equity, and access play a critical role in shaping effective evaluation models, the study integrates these ethical considerations into the development of the proposed evaluation model. By doing so, the study not only fills a theoretical gap but also strengthens the novelty of its framework, aligning digital education with broader educational values.

State hypotheses and their correspondence to research design

The primary research question guiding this study is: How can an effective evaluation model be developed to assess the instructional quality of e-education in Shaanxi Province, with a specific focus on the role of mass communication?

To address this question, the study hypothesizes that a tailored evaluation model for e-education in mass communication will provide a more accurate and comprehensive assessment of instructional quality compared to existing general models. The research objectives are as follows:

- To critically analyze existing evaluation models for e-education instructional mass communication in Shaanxi Province.
- To design a new evaluation model tailored to the specific needs of mass communication in e-education within the context of Shaanxi.
- To evaluate the effectiveness and applicability of the proposed model through expert consultation and pilot testing.

The research design is structured to address these

hypotheses using a mixed-methods approach. The study will employ expert consultation through the Delphi method, alongside both quantitative and qualitative data analysis. The iterative development of the evaluation model will ensure that it is refined based on expert feedback, addressing the specific challenges faced by Shaanxi Province in integrating e-education in mass communication. This design aims to bridge the gap in existing evaluation models by focusing on the pedagogical and infrastructural requirements of mass communication, thereby providing a practical tool for enhancing instructional practices in the region.

METHOD

The primary objective of this study is to design and validate a comprehensive evaluation model for e-education instructional practices in mass communication within Shaanxi Province. This model aims to assist educators in identifying and addressing teaching challenges, improving instructional methods, and enhancing learning outcomes in e-education environments. To achieve these goals, the study employs a mixed-methods research design, combining qualitative and quantitative research approaches. These methods include expert consultations, interviews, questionnaires, and the Delphi method, providing a thorough understanding of the current state of e-education in Shaanxi, identifying key challenges, and developing a robust evaluation framework tailored to mass communication education. This section outlines the research design, participant selection, data collection methods, and analytical techniques used in the study.

Identify subsections

The Method section is divided into subsections to clarify the research methodology and ensure transparency and reproducibility. These subsections include descriptions of the participants, sampling procedures, data collection methods, research design, and data analysis techniques. The rationale behind the choices made in each subsection is explained to ensure that the methodology aligns with the research objectives and addresses potential biases.

Participant (subject) characteristics

Participants in this study were selected from a pool of experts in e-education, mass communication, and educational management within Shaanxi Province. Participant selection was based on their experience and expertise in these fields, with the aim of ensuring the model reflects a broad range of perspectives. The study includes three distinct groups: e-education researchers, mass communication teachers, and educational management

professionals. A total of 21 experts were chosen, consisting of nine e-education researchers, nine mass communication teachers, and three educational management professionals.

While this selection is aligned with standard Delphi study practices, the over-representation of researchers and teachers, relative to the limited number of educational management professionals, may introduce potential bias. This could skew the model toward classroom logistics rather than broader institutional sustainability or policy feasibility. Therefore, future studies should aim for a more balanced representation across all relevant stakeholder groups, including educational administrators and policymakers, to ensure that the evaluation model captures both pedagogical concerns and institutional challenges.

Participants were required to have a minimum of 10 years of experience in their respective fields. This threshold was chosen to ensure that experts possessed the necessary depth of experience to provide meaningful insights into the challenges and solutions for e-education in Shaanxi. However, further clarification of this experience threshold would strengthen the rationale for participant selection, explaining why 10 years was deemed appropriate and how it correlates with the specific expertise required to inform the evaluation model.

Sampling procedures

The study employed purposive sampling to identify participants with extensive knowledge and experience relevant to the research questions. Experts were selected from various universities and research institutions in Shaanxi Province based on their qualifications, including expertise in teaching, research, and educational management. The recruitment process involved direct contact with potential participants, informing them of the study's objectives and their role in the research.

While the sample size was determined to provide a diverse range of expert opinions, the limited number of educational management professionals (only three) calls for further examination of the sampling procedures. The over-representation of researchers and teachers may skew the findings toward pedagogical aspects over broader institutional or policy considerations. A more representative sample across all relevant stakeholder groups is necessary to ensure the model's applicability to both pedagogical practices and policy or institutional challenges.

Sample size, power, and precision

The study aimed to include 21 participants, which is consistent with the Delphi method practices. This sample size is considered sufficient for achieving expert

consensus and gathering valuable insights. However, while 21 experts are typical for Delphi studies, the sample may not be large enough to fully capture the diversity of perspectives required for a comprehensive evaluation model. The study does not aim to generalize the findings to a broader population but focuses on obtaining expert opinions to inform the development of the evaluation model. Nonetheless, the study could be strengthened by expanding the sample size and involving a greater diversity of experts, particularly those involved in educational policy, administration, and large-scale institutional decision-making.

Measures and covariates

Data were collected using several measurement instruments, including interviews, questionnaires, and the Delphi method. The interview questions were designed to gather expert opinions on the current state of e-education in mass communication, including challenges and potential solutions. The questionnaire used a Likert-scale five-point measurement to assess the effectiveness of the proposed evaluation model based on expert feedback. However, the analysis lacks internal reliability tests, such as Cronbach's alpha, which are essential for verifying the consistency of the questionnaire items. To improve the reliability of the study, future research should incorporate internal reliability tests to assess the internal consistency of the measures used.

To ensure the validity and reliability of the measurement instruments, the interview form and questionnaire were reviewed by a panel of experts, and inter-observer consistency was calculated. Although these procedures were followed, a more thorough validation process, such as a pre-test of the instruments, would ensure they effectively capture the key variables of interest.

Research design

The research design is based on a mixed-methods approach, combining qualitative and quantitative techniques to achieve the study's objectives. The research process unfolds in three stages:

Stage 1: Analyzing the current problems in e-education instructional practices through expert interviews and questionnaires.

Stage 2: Designing the evaluation model using the Delphi method, incorporating feedback from experts in multiple rounds.

Stage 3: Evaluating the effectiveness of the model using expert assessments and the CIPP (Context, Input, Process, Product) evaluation model.

While this design is rigorous, the description of "Pilot Testing" remains vague in the implementation phase. Pilot testing is mentioned in the research objectives, but specific details about how the model will be tested in real-world classroom settings in Shaanxi are lacking. To strengthen the methodology, future iterations should include a detailed explanation of the pilot testing phase, including the specific metrics used to assess the model's functionality in actual classrooms and how learning outcomes will be measured to determine the model's impact.

Experimental manipulations or interventions

This study does not include experimental manipulations or interventions. The primary focus is on gathering expert opinions through interviews, questionnaires, and the Delphi method. However, to enhance the practical relevance of the study, future research could consider incorporating observational studies of real classroom environments. These observations, along with data on student learning outcomes, would provide a more robust test of the model's effectiveness in improving educational practices.

Data collection process

Data for this study were collected through a combination of expert interviews, questionnaires, and the Delphi method. The process was carried out in three stages: first, expert interviews were conducted to gather insights on the challenges and potential solutions in e-education; second, experts completed a survey to evaluate the proposed evaluation model; and third, expert feedback was analyzed to refine and improve the model.

While the data collection process provides valuable insights, the lack of institutional field data and classroom observations in this phase is a limitation. Future studies should consider incorporating multi-institutional empirical testing and classroom learning observations to validate the model's effectiveness in real educational settings.

Data analysis and statistical methods

The data analysis for this study involved both qualitative and quantitative methods. Qualitative data from the interviews were analyzed thematically to identify key issues related to e-education in mass communication. Quantitative data from the questionnaires were analyzed using descriptive statistics, including mean and standard deviation, to assess the consistency of expert opinions.

While these methods provide useful insights, the study's reliance on expert consensus for model validation and the absence of internal reliability tests (e.g., Cronbach's alpha)

are significant limitations. To enhance the rigor of the study, future research should incorporate more robust statistical methods, including internal reliability testing and multi-institutional empirical validation of the model. Following the tradition of educational research, especially in contexts such as Islamic education and contemporary evaluative education, model validation should involve observational data from multiple institutions, classroom observations, and student learning outcome data.

RESULTS

In this study titled "Evaluation Models of E-Education Instructional Mass Communication in Shaanxi Province," three sub-studies were conducted to analyze issues,

countermeasures, and influencing factors in e-education instructional mass communication. The following sections present the results obtained from expert consultations, questionnaires, and interviews.

Recruitment

The recruitment period for the study spanned from January to March 2026. The participants, comprising 21 experts, were primarily sourced from various academic and professional fields, including e-education, mass communication, and educational management. The demographic characteristics of the experts are shown in Table 1.

Table 1. Personal information of 21 experts.

Item	Personal information	No.of people	Percentage
Gender	Male	15	71
	Female	6	29%
	Total	21	100
Position	E-education researcher	9	43
	Mass communication teacher	9	43
	Educational management professional	3	14
	Total	21	100
Work Experience	11 to 15 years	6	29
	More than 16 years	15	71
	Total	21	100
Level of Education	Master's degree	5	24
	Ph.D.	16	76
	Total	21	100
Professional Title	Professor	13	62
	Associate Professor	8	38
	Total	21	100

Statistics and data analysis

A variety of data analysis methods were used in this study, including median (Md), mode (Mo), and interquartile range (IQR), to evaluate the consistency and consensus among respondents. These analyses were performed to assess both the current problems in e-education instructional mass communication and the effectiveness of the proposed strategies. The high consensus rates (80-90%) on several items are impressive, but such uniformity

should be scrutinized more deeply. Very high agreement in Delphi rounds can sometimes signal groupthink or a lack of diversity in the initial prompts, which may limit the validity of the conclusions drawn.

A more compelling analysis would involve discussing points of disagreement or divergence in expert opinions. For example, the modifications made in the first round, such as the introduction of "bidirectional arrows" to represent relationships between dimensions and the integration of "industry-specific characteristics" should be

examined more critically. Highlighting the qualitative feedback that led to these adjustments would demonstrate a truly iterative and critical design process, showcasing the careful consideration of expert input throughout the development of the model.

Furthermore, the lack of operational model visualization hampers a full understanding of how the proposed evaluation model would function in practice. Including a visual representation of the model would improve clarity and enhance the impact of the findings.

Ancillary analyses

In addition to the primary analyses, ancillary analyses were conducted to assess subgroup differences in responses and the robustness of the proposed solutions. These results are available in the supplemental online archives. However, a brief summary of these subgroup differences should be included in the main text to provide a more nuanced view of the challenges faced in Shaanxi. For example, there may be significant differences in the opinions of e-education researchers versus educational managers, which could provide valuable insight into the broader implementation of the evaluation model. Including a summary of these differences in the main text would enhance the depth and applicability of the study's findings and better illustrate the diverse perspectives that contributed to the development of the model.

Participant flow

A total of 21 experts participated in the study. Participants were assigned to different groups based on their expertise, including e-education researchers, mass communication teachers, and educational management professionals. The primary analysis used data from all 21 participants. Table 1 shows the distribution of participants by gender, position, work experience, educational background, and professional title.

Intervention or manipulation fidelity

The study ensured that the interventions—survey administration, interviews, and expert consultations—were

delivered as planned. The fidelity of each intervention was monitored through observations of the processes and feedback from participants. However, a more detailed explanation of how the integrity of these interventions was maintained throughout the study would enhance the methodological rigor. Additionally, the absence of a reliability test for the interview and survey data limits the ability to substantiate claims about intervention fidelity. To improve future research, it would be beneficial to incorporate reliability testing, such as Cronbach's alpha, to assess the consistency of the data collected through interviews and surveys.

Baseline data

Baseline data for each expert, including their professional background and experience, were systematically recorded and presented in Table 1. This data provides the foundation for understanding the context of the findings and ensuring that expert opinions are grounded in relevant expertise. However, it would be useful to link this baseline data to specific aspects of the analysis to demonstrate how participant characteristics influenced the results. By doing so, the study could highlight the specific contributions of different expert groups (e.g., researchers, teachers, or managers) to the development of the evaluation model.

Results for part 1: Analysis of current problems, countermeasures, and influencing factors

Problems identified in e-education instructional mass communication

Through a questionnaire survey and expert interviews, the study identified several significant problems in e-education instructional mass communication in Shaanxi Province. These problems include:

- Low quality of e-education content
- Insufficient digital literacy among both teachers and students
- Imperfect assessment and feedback mechanisms

Table 2. Results for round 1: Problems in e-education instructional mass communication.

Items	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
Teaching method is outdated and lacks innovation	17 (81%)	3 (14%)	1 (5%)	0 (0%)	0 (0%)	21
Digital literacy of teachers is insufficient	18 (86%)	2 (10%)	1 (4%)	0 (0%)	0 (0%)	21
Content quality of e-education materials is low	19 (90%)	2 (10%)	0 (0%)	0 (0%)	0 (0%)	21

While the results show impressive consensus, with high agreement (80 to 90%) on several items, this unanimity should be scrutinized further. High levels of agreement in Delphi rounds can sometimes signal groupthink or a lack of diversity in initial prompts, limiting the understanding of underlying complexities. Future analyses could benefit from including more detailed accounts of any disagreements or areas of divergence, allowing for a more transparent and iterative design process.

Influencing factors

The influencing factors identified were related to several

domains:

Teaching-related: Teaching method innovation, instructor digital literacy, and teaching competence.

Learner-related: Student digital literacy, motivation, and critical thinking ability.

Content-related: E-education material quality, integration of multimedia content, and practical training.

Support-related: Resource allocation and technical support.

Table 3. Influencing factors of e-education instructional mass communication.

Items	Influencing factors
Teaching-related	Teaching method innovation Instructor e-education competence Curriculum design
Learner-related	Student digital literacy Student motivation and engagement Student critical thinking ability
Content-related	E-education material quality Integration of multimedia content Practical training content
Environment-related	Online learning platform functionality Interaction level Rural adaptability

Results for part 2: Design of the evaluation model

In Part 2, the E-Education Instructional Mass Communication Evaluation Model (EIMCEM) was designed. The model includes eight core dimensions: Teaching Input, Learner Characteristics, Instructional Content, Teaching Environment, Teaching Process, Learning Outcomes, Support System, and Policy & Evaluation. The Delphi method was employed in two rounds of expert consultation to refine and finalize the model. In the first round, three experts suggested enhancements, such as adding bidirectional arrows to represent relationships between dimensions and integrating industry-specific characteristics. These modifications were incorporated into the revised model, which received 100% consensus from all experts in the second round. The decision-making process in this phase

would be more compelling if it highlighted disagreements or specific qualitative feedback that led to these modifications.

Results for part 3: Evaluation of the evaluation model

In Part 3, the model was evaluated using the CIPP evaluation model (Context, Input, Process, Product). A total of 9 experts evaluated the effectiveness and feasibility of the EIMCEM model, and unanimous agreement was reached on its contextual adaptability, comprehensiveness of input, rationality of processes, and effectiveness of outcomes. Experts emphasized the model's local adaptability and consideration of industry-specific characteristics.

Table 4. CIPP evaluation model expert evaluation results.

CIPP evaluation	Evaluation aspect	Effective	Explanation or suggestions
Context evaluation	Background and purpose	9 (100%)	Clear background and fully captures the situation
	Design quality	9 (100%)	Effectively evaluates e-education quality

DISCUSSION

The purpose of this study was to evaluate several hypotheses regarding the challenges in e-education instructional mass communication in Shaanxi Province, with a focus on issues such as content quality, teacher digital literacy, and the adequacy of feedback and assessment mechanisms. The findings from the analyses provide valuable insights into the current state of e-education in the region and offer practical strategies for addressing the identified challenges. In this section, we explore the implications of these findings, critically assess alternative explanations, and reflect on the limitations and potential applications of the results. Additionally, this discussion will expand on the conceptual underpinnings of the study, drawing comparisons with established international frameworks and incorporating ethical considerations relevant to digital education.

Support for original hypotheses

The study aimed to evaluate several hypotheses related to challenges in e-education instructional mass communication in Shaanxi Province, specifically focusing on content quality, teacher digital literacy, and the adequacy of feedback and assessment mechanisms. The data from both the questionnaires and expert consultations overwhelmingly support the hypothesis that significant challenges exist in these areas. For example, a large proportion of experts (90%) agreed that the content quality of e-education materials is low, and many (86%) highlighted the insufficient digital literacy of teachers. These findings not only confirm the prevalence of the identified issues but also reinforce the need for a tailored evaluation model to address these challenges effectively.

While the study's findings align well with existing literature, the discussion remains somewhat cautious in its critique of the broader educational ecosystem. Although the text identifies outdated teaching methods as a core problem, it does not delve deeply into the systemic reasons behind this issue. Factors such as rigid provincial curricula, limited financial incentives for teacher innovation, and a lack of institutional support mechanisms all contribute to the persistence of outdated methods. These underlying barriers should be addressed for a more sustainable transformation of e-education practices. Furthermore, the formulation of 120 improvement strategies based on these problems, with expert

consensus on their relevance, underscores the importance of adopting a comprehensive approach to addressing these challenges. These strategies, particularly those aimed at enhancing teaching methods, digital literacy, and resource support, are essential for improving the overall effectiveness of e-education in the province. However, the study could offer a more intense academic contribution by moving beyond simply confirming existing literature (Wang, 2011) and proposing a new theoretical synthesis.

For instance, how does "Instructional Mass Communication" as a concept challenge the traditional teacher-student hierarchy in the digital age? In traditional educational settings, authority is often concentrated in the teacher, with a focus on delivering content. However, in the digital age, mass communication in education calls for more fluid, interactive, and collaborative models of learning. This shift could redefine roles, placing greater responsibility on students to engage with and co-create educational content in real-time.

Interpretation of results

Teaching methods and digital literacy

A critical finding from this study is the identification of outdated teaching methods and insufficient digital literacy among both teachers and students as major obstacles to effective e-education. As shown in Table 4, 90% of experts agreed that teaching methods in e-education lack innovation, and similarly, 86% highlighted the digital literacy gap among teachers. These results resonate with existing literature on the need for modern pedagogical approaches and digital competence in education (Pettersson, 2018). While these findings support the adoption of flipped classrooms and project-based learning as promising methods to address deficiencies, it is essential to consider the deeper, systemic issues that hinder the adoption of innovative teaching methods. The rigidity of provincial curricula and limited incentives for teachers to innovate are significant barriers that must be addressed at the institutional and policy levels. This study suggests that a more multifaceted approach to teacher training, particularly in digital literacy, is required to foster a culture of innovation. This aligns with the recommendations in the literature, which emphasize continuous professional development in digital tools and platforms to enable effective e-education delivery (Reddy, 2020). Moreover, digital literacy should not be confined to

technical proficiency alone but should also promote responsible digital citizenship, as outlined by global educational frameworks such as the OECD Digital Education Framework. This framework emphasizes ethical literacy, such as the responsible use of digital tools, which is critical for both educators and students.

Quality of instructional content

Another significant finding was the agreement among experts regarding the low quality of e-education materials, with 90% expressing concerns about the inadequacy of content. This issue may be exacerbated by the limited integration of industry-specific content, particularly in mass communication education. As noted in Table 4, strategies like integrating real-time industry cases and developing multimedia materials were highly recommended. This finding suggests that instructional content must be more closely aligned with industry demands, as well as updated regularly to reflect current trends. This insight supports the integration of case-based teaching and real-world applications into the curriculum, which would enhance both the relevance and practical value of the materials used in e-education. Furthermore, drawing comparisons to international frameworks, such as those endorsed by the OECD, reveals that these strategies align with global standards for digital education, where curriculum relevance and the integration of real-world scenarios are crucial for fostering both technical and critical skills in students.

Assessment and feedback mechanisms

The study also found that assessment and feedback mechanisms were underdeveloped, with 86% of experts agreeing on the need for improvement. This finding highlights broader issues related to formative and summative assessment processes in e-education. Experts suggested incorporating diversified assessment systems and timely feedback mechanisms, both of which are consistent with best practices in educational assessment (Vivian, 2013).

The introduction of online tools to automate grading and enhance feedback provision is a step in the right direction. These strategies are expected to support continuous learning and adjustment, fostering a more effective educational environment. Furthermore, the call for integrating peer assessments and developing feedback loops aligns with growing research advocating for collaborative and interactive assessment practices (Levano-Francia et al., 2019). From an ethical standpoint, these mechanisms should also promote transparency and fairness in the evaluation process, ensuring that all students have equal access to feedback that can help them improve their learning outcomes.

Alternative explanations

While the study's results strongly support the identified issues, some alternative explanations must be considered. For instance, the low quality of instructional content may not solely be due to inadequate resources or a lack of expertise. It could also stem from a misalignment between curriculum design and the unique needs of the region's students. Additionally, the uneven digital literacy of students may reflect broader societal and infrastructural challenges, such as access to technology in rural areas.

These alternative explanations point to the complexity of the issues at hand and suggest that solutions must be tailored not only to educational practices but also to the socio-economic and infrastructural context of Shaanxi Province. Integrating insights from the broader societal context and examining the cultural and ethical implications of digital education could provide a more comprehensive understanding of the challenges and inform the development of more inclusive and sustainable solutions.

Conclusion

The study provides a comprehensive analysis of e-education instructional mass communication in Shaanxi Province. The EIMCEM model, developed through expert consensus and feedback, offers an effective framework for evaluating e-education instructional practices. With a high consensus on the core problems and strategies, the study provides actionable insights for improving e-education content, teaching methods, and system support in the province.

Limitations and implications

Internal validity and potential bias

One limitation of this study is the potential bias in the expert sample. While the study sought to recruit a representative group of experts from diverse backgrounds, the perspectives of other stakeholders, such as students and local education administrators, were not as heavily weighted. Including these groups could provide a more holistic understanding of the challenges in e-education in Shaanxi. Additionally, the reliance on self-reported data from experts may introduce social desirability bias, where participants may overstate the severity of issues or the effectiveness of proposed solutions.

Imprecision of measures

The study's reliance on questionnaire surveys and expert consultations, while effective in gathering expert opinions, may not capture the full depth of the challenges faced in e-

education. Future research could benefit from longitudinal studies or case studies that directly observe the implementation of the proposed strategies in real-world settings. This would help validate the effectiveness of the proposed solutions and provide a more nuanced understanding of the barriers to their implementation.

External validity

The generalizability of these findings to other regions or countries may be limited. The specific socio-economic context of Shaanxi Province, with its mix of urban and rural areas, presents unique challenges that may not be present in other regions. As such, the findings should be considered with caution when applied to different educational systems. Moreover, the applicability of the proposed solutions may vary depending on the resources available in other regions.

Theoretical and practical significance

The results of this study hold both theoretical and practical significance. Theoretically, the findings contribute to the growing body of knowledge on the intersection of e-education, mass communication, and digital literacy. This study provides a framework for understanding the core challenges in e-education and offers targeted strategies for addressing these challenges, incorporating not only pedagogical and technological considerations but also ethical dimensions such as digital etiquette and responsible online communication.

Practically, the study offers actionable recommendations for policymakers, educational institutions, and practitioners involved in e-education. By focusing on improving digital literacy, updating instructional content, and strengthening assessment mechanisms, the study lays the groundwork for the development of a more effective and inclusive e-education system in Shaanxi Province. Furthermore, the proposed EIMCEM model can serve as a template for evaluating and improving e-education initiatives in other regions, helping to ensure that digital education promotes both academic and ethical growth in students.

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