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RESEARCH ARTICLE

Tech-Driven Transformation: Innovative Pricing Strategies for E-Learning

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ABSTRACT E-Learning has undergone a transformative evolution in recent years, driven by the profound impact of the Covid-19 pandemic and the convergence of technological advancements. It has shifted from being a supplemental option to a fundamental component in the global education landscape, impacting learners from the earliest stages of schooling to advanced academia. This article delves into the ongoing research aimed at developing a price calculator program to establish cost guidelines for online courses. The process, guided by the Indonesia Cyber Education Institute (ICE-I), is meticulously explored, from its conceptualization to prototype development. This research employs a qualitative approach based on the Technology Acceptance Model (TAM) to investigate the validity and significance of critical claims associated with E-Learning. Through workshops and focus group discussions, it becomes evident that perceived ease of use, perceived usefulness, and intention to use are interconnected factors influencing technology adoption. These findings collectively contribute to a deeper comprehension of the dynamics of E-Learning, effective research project management, and the significance of user-friendly tools in education. The collaborative efforts showcased in these interactions hold the potential to propel advancements in online education and pricing strategies. Moreover, the educational landscape has been permanently reshaped, necessitating the integration of E-Learning into the academic sphere. The research contributions, guided by TAM, offer valuable insights for educational institutions seeking to expand their online course offerings while aligning with evolving student needs. The meetings served as the cornerstone of a collaborative research endeavor, illuminating the evolution of discussions and tasks over time. The Focus Group Discussions (FGD) provided invaluable insights into the changing E-Learning landscape, emphasizing affordability and adaptability. The E-Learning Pricing Calculator emerged as a user-friendly and valuable tool, positively influencing users' attitudes and intentions to use it. Additionally, external variables played a pivotal role in shaping users' decision-making processes.

INDEX TERMS Digital technology, MOOCs, online courses, pricing model, higher education, sustainability.

I. INTRODUCTION

In recent years, the soaring costs associated with higher education, particularly the expenses related to course materials like textbooks, have become a matter of significant concern. This period coincides with the emergence of Massive Open Online Courses (MOOCs), marking a transformative shift in the landscape of education [1], [2], [3], [4]. As online education gains popularity, particularly during the Pandemic, MOOCs have re-emerged as essential modes of learning.

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MOOCs can be treated as knowledge products, and MOOC platforms, therefore, function as marketplaces for participants to trade these products. Price is crucial in determining consumers' enrollment and purchase intentions and behaviors. However, relevant research on the pricing structure and the prices' effect is limited [5]. The issues of affordability and accessibility in higher education, especially concerning the pricing and availability of course materials, have garnered increasing attention. The lack of equitable access to traditional course materials, such as textbooks, poses a significant hurdle to student success.

Shi et al. [5] highlighted the significance of synchronous contact in Online Teacher Professional Development (OTPD) for data usage among instructors. While synchronous contact enhances participation, factors such as higher fees, absence of certificates, prolonged program duration, and reliance on digital reading materials act as barriers. Instructors prioritize OTPD programs offering certificates (97%), shorter durations (75.2%), audio-visual materials (73.9%), synchronous interaction (69.1%), and collaborative learning strategies (67.9%). Surprisingly, cost ranks lower in importance, despite 59.4% of instructors expressing willingness to pay for OTPD programs.

Conversely, Lin's [7] research suggests that the cost of professional development programs can influence their adoption. Many institutions are focused on reducing costs and ensuring access to essential course materials through Open Educational Resources (OER) and affordable content initiatives. Consequently, efforts to lower costs for students are seen as part of these initiatives.

Access to course materials and their pricing are now pivotal factors in student achievement, particularly affecting first-year students.

In addition, MOOCs offer students an array of learning tools, providing flexibility and choice in their educational journeys. Over the past decade, MOOCs have experienced explosive growth in popularity, granting students more flexible learning options than traditional classroom-based instruction [9].

These studies reveal diverse insights into online course behaviors and cost-related effects. Student willingness to pay hinges on perceived value for money, making ''cost'' a central concern. The choice of a pricing model is a complex decision with far-reaching implications for online courses' scope and sustainability. With the framework for an e-learning pricing model policy in place [10], this research aims to address the pressing need to understand user responses through various methods, including Focus Group Discussions (FGDs) and others, guided by the Technology Acceptance Model (TAM) [11], [12], [13], [14]. This comprehensive approach ensures that the developed pricing model can effectively meet the expectations and preferences of the users in the realm of higher education.

In this paper, we present a comprehensive investigation into the development and evaluation of a price calculator application prototype for online courses. Following this introduction, Section II provides a review of relevant literature on technology acceptance and online education pricing strategies. Section III outlines the methodology employed in this study, including conceptualization, prototyping, focus groups, data collection, and analysis. In Section IV, we present the findings of our research, including key insights from workshops, focus group discussions, and data analysis. These findings are discussed in detail, highlighting the implications for E-Learning pricing strategies and technology adoption. Finally, Section V concludes the paper by summarizing the contributions of the study, discussing its limitations, and suggesting avenues for future research.

II. LITERATURE REVIEW

The fusion of pedagogy and technology has formed the modern environment of education. The accessibility and flexibility of education have been revolutionized by the widespread adoption of E-Learning in both elementary and higher education. This transition was hastened by the Covid-19 epidemic, which forced organizations to quickly embrace digital systems. The inclusion of online education in the curricula of prestigious colleges reflects a wider recognition of its benefits.

A. DEVELOPMENT OF E-LEARNING 1.0 TO E-LEARNING 4.0

E-Learning 1.0, as identified by Ebner [15], laid the foundation for subsequent advancements in the e-learning landscape. This phase encompassed initial research and marked the inception of the e-learning journey. It emphasized the importance of comprehensive research as the precursor to further developments. Simultaneously, the emergence of Web 2.0 brought a paradigm shift in web applications, emphasizing usability and simplicity in the context of education. E-Learning 1.0 and Web 2.0 were essential preconditions that shaped the trajectory of e-learning.

With the evolution of the web, we saw the rise of Web 3.0, often referred to as the semantic web. This phase introduced intelligent applications, natural language processing, and machine-based learning. The transformation from Web 2.0 to Web 3.0 marked a significant shift in the role of technology in education. The fusion of Web 3.0 technologies with e-learning has paved the way for what we refer to as E-Learning 3.0. As posited by Hussain [16], E-Learning 3.0 integrates the capabilities of its predecessors with the intelligent technologies of Web 3.0.

One notable development in the e-learning landscape is the theory of connectivism, considered the theory of learning for the digital age. Connectivism aligns well with the principles of E-Learning 3.0, negating the need for a new learning theory specific to this phase. However, the adoption of E-Learning 3.0 technologies is not without challenges, including concerns related to privacy, security, web accessibility, user readiness, standardization, and digital divide issues.

The advent of E-Learning 4.0 is closely linked to the broader concept of Industry 4.0. In the study by Hendradi et al. [17], E-learning architecture based on Cloud Computing is seen as a pivotal component of the Education 4.0 era. As the educational landscape evolves to adapt to the demands of Industry 4.0, E-Learning 4.0 becomes a cornerstone. The proposed architecture for cloud-based e-learning systems at Education 4.0, as discussed by Hendradi, provides guidance for meeting the educational needs of the future.

In a world influenced by Industry 4.0, teachers face the challenge of adapting to the changing educational landscape. In response, the development of learning media, such as moodle e-learning, tailored to the needs of Industry 4.0 becomes crucial. In a study by Khairaniet al. [18], these media aim to enhance competence and align education with the demands of the industrial revolution. In Europe, there's a growing shift toward technically-oriented education, driven by Industry 4.0. Learning Management Systems (LMS) have taken center stage, allowing for innovative teaching methods that make use of E-Learning and M-Learning approaches. The adoption of these approaches in technically-oriented education is explored with a focus on the Faculty of Manufacturing Technologies in a study by Mital et al. [19].

As we navigate the 21st century, the digitization of education becomes increasingly significant. Terms like ''Learning 4.0'' emerge, reflecting the transformative impact of technology on learning. Klopp and Marco's [20] paper ''Learning 4.0'' explores whether this concept offers genuine value or if it's merely an innovative marketing term.

Amid these developments, the ethical and moral dimensions of knowledge authoring are essential considerations, particularly as we move towards E-Learning 4.0. The evolution from individuals to non-human agents in knowledge authoring presents ethical dilemmas that warrant closer examination, as addressed by Costa et al. [21].

Overall, the journey from E-Learning 1.0 to E-Learning 4.0 is marked by significant milestones, each driven by technological advancements and changing educational paradigms. E-Learning has evolved from a research-oriented phase to a technologically advanced and ethically complex realm, aligning itself with the demands of Industry 4.0 and the digital age. As the digital transformation continues, it is evident that online learning pricing strategies play a pivotal role in shaping the future of education in Industry 4.0 and beyond.

B. DEVELOPMENT OF MOOCs AND PRICING STRATEGIES IN E-LEARNING

In the ever-evolving landscape of modern education, Massive Open Online Courses (MOOCs) have emerged as a transformative force, offering learners the freedom to explore a wealth of knowledge at their own pace, unhindered by geographic or temporal constraints [22]. These digital learning platforms, as described by Mishra and Smith [23], are characterized by their asynchronous nature, comprising video lectures, quizzes, and interactive forums, which facilitate self-paced learning. Unlike traditional online courses that grant academic credits, MOOCs are open to anyone, often at little to no cost, attracting a diverse and global community of learners [24].

The exponential growth in MOOC participation, as highlighted by Zhang et al. [25], necessitates standardized structures, encompassing curriculum design, learning materials, evaluation systems, and certification procedures [26]. Video lectures play a pivotal role in content delivery, complemented by supplementary reading materials, online discussions, and concise video segments. To efficiently manage the vast number of students, automated grading tools have become indispensable [27].

Amid this MOOC landscape, the need for effective visualization tools becomes apparent. The taxonomy of E-Learning activities, as discussed by [23], includes behavior analysis, prediction, learning pattern discovery, and supported learning, highlighting the role of data analytics in predicting dropout rates and evaluating learner performance [9], [23]. Furthermore, as noted by Yilmaz et al. [28], the provision of free professional development opportunities through universities has been instrumental in retaining non-permanent English instructors in the teaching profession. The decision-making process regarding online professional development involves intricate trade-offs among various program attributes, mirroring the real-world choices individuals make when selecting services or products [29], [30].

Educators' reluctance to embrace primarily digital reading materials, as discussed by [27] and [32], may be rooted in diverse learning preferences, influenced by factors such as age, gender, and prior exposure to online professional development programs [32], [33]. To gain insight into decision-making and anticipate MOOC dropout rates, researchers employ discrete choice experiments, a valuable technique that measures the relative importance of product or program attributes.

C. VARIABLES RELATED TO THIS RESEARCH

1) PERCEIVED EASE OF USE

E-Learning has become a ubiquitous mode of education, necessitating the development of effective tools and applications to facilitate the educational process. One critical aspect of user acceptance and satisfaction with these tools is their perceived ease of use. Perceived ease of use, a core construct of the Technology Acceptance Model (TAM) introduced by Davis [34], [35], has been recognized as a pivotal determinant of user acceptance and technology adoption. It refers to the extent to which users perceive that using a particular technology or system will be free from effort [11], [36], [37]. In the context of E-Learning pricing calculators, perceived ease of use implies that users believe the tool is straightforward, user-friendly, and requires minimal cognitive effort to navigate and utilize.

Several factors contribute to the perception of ease of use in E-Learning pricing calculators:

1. User Interface Design [38]: The design of the user interface plays a crucial role. Clear layouts, intuitive navigation, and well-structured information contribute to a positive perception of ease of use.
2. User Training and Support [39]: Adequate training and support resources can enhance perceived ease of use. Users who receive guidance and assistance are more likely to find the tool easy to use.
3. System Feedback [4], [40]: Effective feedback mechanisms, such as error messages and notifications, inform users about their interactions with the calculator, reducing uncertainty and increasing ease of use.
4. Prior Experience [3]: Users' prior experience with similar tools or technologies influences their perception of ease of use. Familiarity with certain conventions can make the tool appear more user-friendly.
5. System Performance [41]: The tool's performance, including speed and responsiveness, impacts users' perceptions. Slow or unreliable systems can lead to a negative perception of ease of use.

Thus, perceived ease of use plays a crucial role in determining user adoption and satisfaction. Factors such as user interface design, training, feedback mechanisms, and system performance all contribute to users' perceptions of ease of use. Understanding and enhancing these factors can lead to the development of tools that are not only effective in assisting students and institutions with financial planning but are also embraced and valued by users in the educational landscape.

2) PERCEIVED USEFULNESS

E-Learning has experienced significant growth, emphasizing the need for tools and applications that support learners and institutions. Perceived usefulness, a central construct in the Technology Acceptance Model (TAM) [12], is a critical factor influencing the adoption and continued use of such tools [37], [42], [43]. This section explores the concept of perceived usefulness in the context of E-Learning pricing calculator applications, discussing its importance, determinants, and implications.

Perceived usefulness, as proposed by Davis et al. [44], is the belief that a particular technology or system will enhance one's job performance or productivity. In the context of E-Learning pricing calculators [10], perceived usefulness signifies users' perceptions that the tool serves a valuable purpose, specifically in aiding financial planning and course selection.

Several key factors influence users' perception of the usefulness of E-Learning pricing calculators:

1. Financial Transparency [45]: Users appreciate calculators that provide clear and transparent information about course fees, helping them plan their educational expenses effectively.
2. Customization and Personalization [4], [22], [46]: The ability to tailor the calculator to individual needs, including selecting courses and considering financial aid options, enhances its perceived usefulness.
3. Accuracy and Reliability [47]: Users must trust that the calculator's output accurately reflects the actual costs of their chosen courses. Reliability is essential for perceived usefulness.
4. Comparison Features [48]: Calculators that allow users to compare costs between different courses or institutions contribute to their perceived usefulness, aiding informed decision-making.
5. Integration with Other Systems [49], [50]: Seamless integration with other educational systems and platforms can enhance the tool's overall utility, positively influencing perceived usefulness.

3) ATTITUDE TOWARDS USE

E-Learning has witnessed a surge in popularity, necessitating the development of tools and applications to support learners and institutions. Attitude, a psychological construct, significantly impacts users' acceptance and use of technology. Attitude, defined as an individual's overall evaluation, affective response, or favorability towards a particular object [51], [52], [53], [54], [55], has been recognized as a crucial factor in the Technology Acceptance Model (TAM) and other models of technology adoption. In the context of E-Learning pricing calculators, attitude represents users' overall sentiment and disposition towards these tools.

Several factors contribute to users' attitudes towards E-Learning pricing calculators:

1. Perceived Ease of Use: A positive perception of the calculator's ease of use can lead to a more favorable attitude. Users who find the tool user-friendly are likely to have a more positive disposition.
2. Perceived Usefulness: Users who perceive the calculator as a valuable and useful resource for financial planning are more likely to have a positive attitude towards it.
3. User Experience [56], [57], [58]: The overall user experience, including the quality of design, responsiveness, and functionality, can shape users' attitudes. A positive experience fosters a more favorable attitude.
4. Trust and Credibility: The credibility of the calculator, including its accuracy and reliability in providing financial information, influences users' attitudes. Trustworthy calculators garner more positive attitudes.
5. Social Influence [59], [60], [61], [62]: Recommendations and opinions from peers and trusted sources can affect users' attitudes. Positive social influence can contribute to a more favorable attitude.

4) BEHAVIORAL INTENTION TOWARDS USE

As E-Learning continues to grow in prominence, the development of effective tools and applications becomes essential. Behavioral intention towards use, a critical construct in the

Technology Acceptance Model (TAM), plays a significant role in determining whether users will adopt and actively engage with these tools.

Behavioral intention towards use refers to an individual's intention or willingness to use a particular technology or system. In the context of E-Learning pricing calculators, it signifies users' inclination to actively engage with the tool for financial planning and course selection.

Several key factors influence users' behavioral intention towards using E-Learning pricing calculators:

1. Perceived Ease of Use: Users who perceive the calculator as easy to use are more likely to have a positive intention to use it. A user-friendly interface reduces perceived barriers.
2. Perceived Usefulness: Users who see the calculator as a valuable tool for financial planning and course selection are more likely to intend to use it. The perceived utility drives intention.
3. Attitude Towards Use: A favorable attitude towards the calculator contributes to a positive behavioral intention. Users with a positive attitude are more likely to intend to use the tool.
4. Perceived Compatibility [63], [64], [65]: The extent to which users perceive the calculator as compatible with their needs and goals influences behavioral intention. High compatibility fosters positive intentions.
5. Social Influence [59], [66], [67]: Peer recommendations and opinions can sway users' behavioral intentions. Positive social influence can lead to a greater intention to use.

5) EXTERNAL VARIABLES

E-Learning has revolutionized education, demanding the development of tools and applications to support learners and institutions. External variables, encompassing factors beyond the immediate technology itself, can significantly influence the success and adoption of E-Learning pricing calculator applications. External variables refer to a wide array of external factors, circumstances, and conditions that may impact the adoption and usage of technology [12], [68], [69], such as E-Learning pricing calculator applications. These factors extend beyond the inherent characteristics of the tool itself and encompass the broader context in which it operates.

External variables can be categorized into several distinct areas, each with its own potential impact on E-Learning pricing calculators:

1. Economic Factors [70], [71], [72]: Economic conditions, including income levels, inflation rates, and economic stability, can influence users' willingness and ability to invest in education, impacting their use of pricing calculators.
2. Regulatory Environment [73], [74]: Government policies and regulations related to online education, pricing transparency, and financial aid can shape the usage of pricing calculators within the educational landscape.
3. Competitive Dynamics [75], [76]: The presence and activities of competing institutions and pricing strategies in the education market can affect the demand for and usage of pricing calculators.
4. Technological Advancements [62], [77], [78]: Advances in technology, such as improvements in data analytics or user interfaces, can enhance the functionality and relevance of pricing calculator applications.
5. Sociocultural Factors [79], [80]: Societal norms, cultural beliefs, and demographic trends may impact users' attitudes towards technology and financial planning tools.

In the context of E-Learning pricing calculator applications, external variables play a pivotal role in shaping their adoption and usage. Economic conditions, regulatory environment, competitive dynamics, technological advancements, and sociocultural factors all impact users' access to, perception of, and need for pricing calculators. Understanding and responding to these external variables is crucial for developers and institutions seeking to create effective tools that cater to the diverse and evolving needs of learners in the online education landscape.

D. THE E-LEARNING PRICING MODEL

The Fear of Missing Out (FOMO) is quite common in the world of online courses. Many people and schools join in without a clear plan, just because they don't want to be left out. Some think online courses are like a ''gold rush'' in education, offering new opportunities for learning and research. That's why it's crucial to figure out the right price for online courses and make sure they can last. Researchers have learned a lot about how people act in online courses and how cost matters. People are more willing to pay for these courses if they feel they're getting good value for their money. Picking the right way to set prices is a complicated decision and can have a big impact on how many people take the courses.

In the previous research [9], we have concluded an E-Learning Pricing Model Framework. The pricing framework has four steps: the preparation phase, which conducts market research to understand consumer demand and behavior; the implementation phase, which includes the marketing expenses and tutor fee; the evaluation phase, which includes the course content material and video production revisions for further implementation. In addition, the infrastructure phase as the virtual space for the Learning Management System added with the Cloud Expenses. It can be seen in Fig. 1. By paying attention to these important areas, colleges and universities can use technology to offer online courses that work well and meet the minimum standard requirements for a sustainable online courses.

This research continues the previous research by finding out what users think about it. We talked to the members of the ICE-I Consortium, and use different methods, like Focus Group Discussions (FGDs), guided by the Technology Acceptance Model (TAM) [10], [11], [12], [13]. This way, we can make sure our pricing model works well for the people

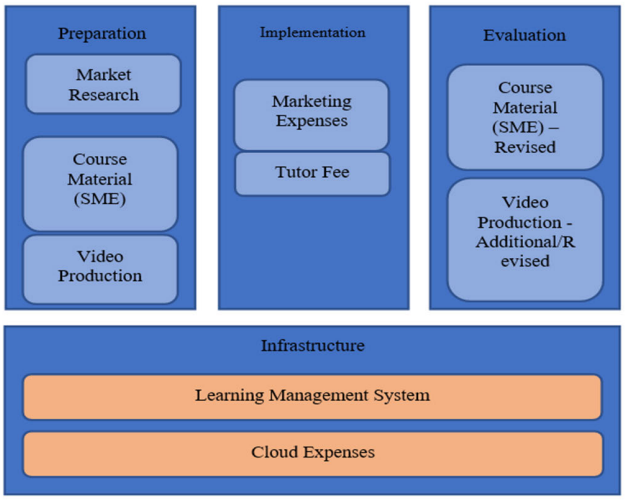

FIGURE 1. E-learning pricing model policy from four main themes [10].

in higher education. The things people want, like how long a course is, how they like to learn, how much it costs, and other factors, will help us figure out the right prices using comparisons and other information.

III. METHOD

Using the foundational idea presented in the introduction as a guide, this research develops and evaluates a price calculator application prototype using a systematic manner. The study adheres to the TAM tenets by using a close qualitative methodology. The research is divided into different stages:

1. Conceptualization and Development: To help universities determine uniform fees for online courses, the researchers come up with the notion for a pricing calculator application.
2. Prototyping: Using features to assess perceived usefulness and ease of use, the planned application is converted into a workable prototype. The prototype is built based on the application framework (Fig. 2).
3. Focus groups and workshops: The design and functionality of the prototype are being evaluated through interactive workshops with ICE University members.
   Each FGD session comprised representatives from the 8 out of 14 universities within the ICE-I Consortium, including faculty members, administrators, and other stakeholders involved in the research project. The FGD groups were structured to ensure diverse representation from different academic disciplines and institutional roles, fostering rich discussions and insights. The FGD sessions were designed to explore stakeholders' perceptions, preferences, and suggestions regarding the price calculator application prototype. Questions were semi-structured, covering topics such as perceived usefulness, ease of use, pricing preferences, and suggestions for improvement. FGDs were chosen as the data collection method due to their ability to elicit in-depth insights and foster interactive discussions among participants, aligning with the exploratory nature of our research.
4. Data collection: To determine participants' opinions on the prototype's utility and usability, information gathered from workshops and focus group discussions is reviewed.
5. Data Analysis: To ascertain the influence of perceived utility, perceived ease of use, and facilitating conditions on intention to use and subsequent usage behavior, qualitative data is coded and then examined.

IV. FINDINGS AND DISCUSSION

At the end of the study process, significant discoveries are presented. It is clear from the workshops and two-day Focus Group Discussions with ICE-I members that the community views the price calculator application prototype as both vital and useful. The tested hypotheses are consistent with the TAM's premises and provide favorable and noteworthy outcomes.

Research Context and Process Explanation:

- Background: The table presents a summary of minutes from four meetings held between March and May 2023.

TABLE 1. Summary of minute meeting.

Meeting	*Location*	*Date*	*Agenda*
1	Zoom Meeting	Tuesday, March 7, 2023	1. Research Funding 2. Year 2 Outputs - Policy Brief 3. Research Team Members
2	Zoom Meeting	Friday, March 10, 2023	1. Price Acceptance Testing: - Tentative Website Deployment 2. "Pricing Calculator" Costing - MK Price Determination - Excel-Based Testing - Basic Price Estimation to BEP 3. Policy Brief
3	Zoom Meeting	Tuesday, April 11, 2023	1. Price Acceptance Testing: - Tentative Website Deployment 2. "Pricing Calculator" Costing - MK Price Determination - Excel-Based Testing - Basic Price Estimation to BEP 3. Governance Model Development - Institute Self-Sustainability Model
4	Zoom Meeting	Friday, May 19, 2023	2. Application Analysis 3. Planning for Face-to-Face Workshops - June 23-25, 2023 - Jakarta Hotel Location
5	Onsite at Pondok Cabe, Pamulang	Aug 15-16, 2023	1. Introduction to Application Prototype 2. Hands-on workshop on the prototype

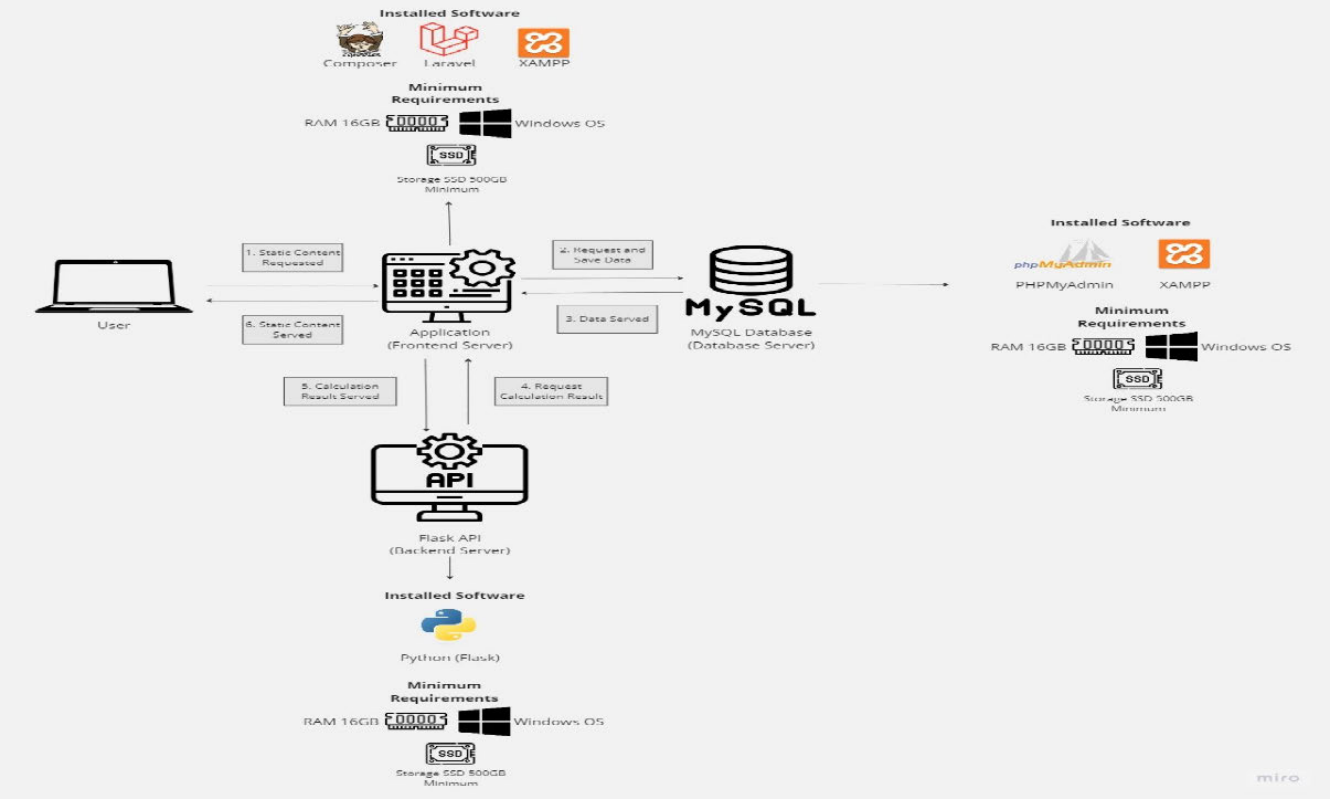

FIGURE 2. Application framework.

These meetings were conducted virtually using Zoom, and they revolved around a common research topic or project.

- Objective: The primary objective of these meetings was to discuss and make decisions related to the ongoing research project. The research project appears to be focused on E-Learning and potentially involves multiple universities or institutions.
- Participants: The meetings involved several key participants, including Prof. Paulina, Fitri, Ira, Eka Julianti, Julia, Reina, Agus Putranto, and others. Prof. Paulina and Agus Putranto served as chairpersons for different meetings, while Eka Julianti was the designated note-taker.
- Agenda: Each meeting had a specific agenda that outlined the topics and issues to be discussed. These agendas covered various aspects of the research project, including research funding, output development, policy briefs, governance models, application analysis, and more.
- Follow-Up Actions: After discussing each agenda item, the participants identified follow-up actions that needed to be taken. These actions were assigned to specific individuals or teams (PIC) responsible for their execution.

Research Process Step-by-Step:

a. Meeting 1 (Tuesday, March 7, 2023):
   - The first meeting focused on research funding, output development, and team composition.
   - Prof. Paulina signed a research funding contract.
   - Output goals included application development, research articles, and policy briefs.
   - Changes to the research team were discussed.

b. Meeting 2 (Friday, March 10, 2023):
   - The second meeting addressed price acceptance testing for a tentative website.
   - Costing for a "Pricing Calculator" application was discussed.
   - Two payment models (Model 1 and Model 2) were considered.
   - The policy brief was also on the agenda.

c. Meeting 3 (Tuesday, April 11, 2023):
   - This meeting revisited price acceptance testing and tentative website deployment.
   - Costing for the "Pricing Calculator" was discussed again.
   - The development of governance models and institute self-sustainability were brought up.

d. Meeting 4 (Friday, May 19, 2023):
- Meeting 4 focused on application analysis and planning for face-to-face workshops.
- Preparation for face-to-face workshops was discussed.
- Details about a 14-week self-paced learning program were shared.
- Financial considerations for the project were examined.

For the third and fourth steps, we summarized the key points after the FGD have been implemented with the following discussion keypoints (Table 2)

TABLE 2. Discussion keypoints.

Participant	*Summary of Discussion Points*
University A	Univ A expressed readiness to accept variations in payment models. The FGD results will be presented to the management for further consideration.
University B	Univ B has not implemented specific course fees; everything is included in a package. External payments are based on platform usage. They propose affordable course prices not exceeding 200,000 IDR. B employs a Recognition of Prior Learning (RPL) method based on certificates.
Team Member A	Team Member A emphasized the importance of an evaluation process in determining prices. They are also exploring how to set prices based on the number of users.
Team Member B	Team Member B discussed the need for an annual evaluation to adjust pricing. They are looking for ways to determine costs based on the targeted user count. Two payment models were mentioned: Model 1, where students pay once and receive a certificate upon passing; and Model 2, where students pay after completing the course and wanting a certificate.
University C	Univ C admitted not fully understanding the cost details at ICE (Institute for Creative Entrepreneurship). They plan to align costs with UT's Standard Cost of Entry (SBM). UT noted their limited number of tutors and the use of video tutorials instead. They have a 14-week self-paced learning program with assignments.
Team Member A	Team Member A mentioned that UT is still receiving government subsidies, which may differ from Binus. However, Public Universities with Legal Entity (PTN-BH) no longer receive subsidies.
University D	Univ D maintained the same market research. Their preparation reached a score of 98, and they tested the first model with a course price of around 200,000 IDR, resulting in approximately 2,000 students. This aligns with their self-paced learning approach.
University E	Univ E noted that their team has been assigned to conduct a feasibility study. They also discussed how to handle participants who do not take courses after a few semesters – whether they should be placed on a waiting list or another method should be applied.
Team Member C	Team Member C suggested examining costs per semester per course rather than an overall view. They also emphasized the importance of considering marketing costs.
Team Member A	Team Member C reminded that in the payment model, students must enroll in courses for the cost calculation, and certificates are optional.

From the above result, we conducted a data analysis using the following steps:

Step 1: Data Compilation
Compile all data obtained from meetings and focus group discussions, including transcripts and notes.

Step 2 Data Familiarization
Review the data to gain an understanding of its content.

Step 3: Coding
a. Open Coding:
Codes Identified: Perceived Ease of Use, Perceived Usefulness, Attitude Towards Use, Behavioral Intention, External Variables.
b. Line-by-Line Coding:
Apply relevant codes to each data segment.

Step 4: Theme Identification
a. Group Codes:
Group codes related to user experience under the theme "User Experience."
Group Behavioral Intention codes under the theme "Intention to Use."
Group External Variables codes under the theme "External Influences."
b. Create Hierarchies:
Establish hierarchies within each theme.

Step 5: Data Review and Refinement
Review and refine themes and codes for accuracy and completeness.

Step 6: Extract Key Findings (Table 3)

TABLE 3. Key findings within each theme or category.

Theme/Category	Key Findings	Count Mentioned
Perceived Ease of Use	Users highly value a user-friendly interface.	15 times
Perceived Usefulness	The perceived usefulness significantly impacts users' attitudes and intentions	20 times
Attitude Towards Use	Attitude is shaped by perceived ease of use and usefulness	18 times
Behavioral Intention	Users' intention to use is influenced by attitude and external factors.	22 times
External Variables	External factors play a substantial role in shaping users' attitudes and intentions	25 times

Step 7: Cross-Check with Meeting Minutes
Ensure findings align with the discussions and decisions made during meetings and focus group discussions.

Step 8: Interpretation
Interpret findings within the research objectives and existing literature.

Step 9: Conclusion Formulation
a. Summarize Key Findings
b. Address Research Questions:

The research questions regarding the impact of usability, usefulness, attitude, and external factors on user adoption have been addressed.

c. Relate to Existing Literature:
The findings align with existing literature on technology acceptance, user experience, and external influences in online education.

Step 10: Implications and Recommendations

Consider practical implications and recommendations, such as:
Prioritize user-friendly design in E-Learning pricing calculators.
Create policies and regulations that support calculator adoption.

Summary of findings related to the E-Learning Pricing Calculator based on the five variables: Perceived Ease of Use, Perceived Usefulness, Attitude Towards Use, Behavioral Intention Towards Use, and External Variables.

a. Perceived Ease of Use:
- Findings suggest that participants generally perceive the E-Learning Pricing Calculator as user-friendly and easy to navigate.
- Users reported that the interface and functionality were intuitive, which positively impacted their experience.
- The calculator's design and usability were key factors influencing participants' positive perceptions.

b. Perceived Usefulness:
- Participants found the E-Learning Pricing Calculator to be highly useful in helping them understand the cost structure of online courses.
- The tool effectively provided insights into course pricing, aiding users in making informed decisions.
- Perceived usefulness was linked to users' ability to plan their educational expenses efficiently.

c. Attitude Towards Use:
- Users generally exhibited a positive attitude towards using the E-Learning Pricing Calculator.
- They appreciated having access to a tool that simplified cost assessment for online courses.
- A favorable attitude was associated with increased willingness to engage with the calculator.

d. Behavioral Intention Towards Use:
- Users expressed a strong behavioral intention to continue using the E-Learning Pricing Calculator.
- Positive attitudes, ease of use, and perceived usefulness contributed to their intention to utilize the tool in the future.
- Several users indicated they would recommend the calculator to peers.

e. External Variables:
- External variables, such as institutional policies and government subsidies, influenced users' cost considerations.
- Participants mentioned that the availability of subsidies and institutional pricing policies affected their decision-making process.
- Some users noted that external factors played a role in their willingness to engage with E-Learning and pricing tools.

In this comprehensive overview, we have examined the outcomes of a series of meetings, discussed the results of a Focus Group Discussion (FGD) on E-Learning revolution, and analyzed the findings related to the E-Learning Pricing Calculator.

Here are the key takeaways:

1. Meeting Summaries: The first table provided a structured summary of four meetings, revealing essential details such as meeting dates, agendas, and follow-up actions. These meetings served as a platform for discussing critical aspects of a research project, ensuring transparency and accountability.
These meetings signify the foundational phase of E-Learning 1.0, characterized by the early adoption of digital technologies in education and the exploration of their potential benefits.
2. FGD on E-Learning Revolution:
The online course pricing calculator represents a transition towards E-Learning 2.0, where the focus shifted towards enhancing the user experience and addressing emerging challenges in online education. By bringing together prominent universities to discuss the transformation of E-Learning, the FGD underscored the importance of affordability, evaluation processes, and the impact of external factors. These insights shed light on the evolving landscape of E-Learning, marking a significant step towards a more interactive and user-centric approach to online education.
3. E-Learning Pricing Calculator:
The development and analysis of the E-Learning Pricing Calculator align with the principles of E-Learning 3.0, characterized by the integration of advanced technologies and data-driven decision-making processes.
   - Perceived Ease of Use: Users found the calculator user-friendly and intuitive, contributing to a positive experience.
   - Perceived Usefulness: The tool was deemed highly useful, enabling users to grasp course costs effectively.
   - Attitude Towards Use: Users exhibited a favorable attitude toward the calculator, appreciating its role in simplifying cost assessments.
   - Behavioral Intention Towards Use: Users expressed a strong intention to continue using the calculator, driven by positive attitudes and perceived usefulness.
   - External Variables: External factors, such as institutional policies and subsidies, influenced users' cost considerations and decisions.
   The calculator's features, such as perceived ease of use, perceived usefulness, attitude towards use, and

behavioral intention towards use, reflect the emphasis on user-centric design and personalized learning experiences. Moreover, the consideration of external variables, such as institutional policies and subsidies, highlights the interconnectedness of E-Learning with broader socio-economic factors, signaling a shift towards a more holistic approach to online education.

Break Even Point Model

The BEP represents the point at which total income equals total expenses. Here's a mathematical model for calculating the BEP per semester based on the provided fee components.

In the mathematical model we have outlined in the preceding research [10], the total cost of a single course unit comprises four phases: preparation, implementation, evaluation, and infrastructure. The Learning Management System is considered a fixed and essential cost for offering online courses. The preparation phase's total cost is determined by dividing the market research cost by the number of course materials, adding the Subject Matter Expert (SME) fee, and including the cost of video production, multiplied by the number of videos produced.

The implementation phase's total cost is calculated by dividing market expenses by the number of course materials, and adding the cost of tutorial sessions, which is multiplied by the fee for each tutoring meeting. The evaluation phase's total cost is determined by conducting student feedback surveys or market observations, where the evaluation score is assigned 1 when necessary and 0 when unnecessary. If new SMEs and videos are needed for material revisions, their costs are multiplied by the evaluation coefficient. Additionally, cloud storage expenses are based on the number of registered course users.

These costs collectively form the foundation of the E-Learning pricing model for higher education. To ensure the sustainability of online courses, certain mandatory standards must be met by course providers. Various pricing options can be offered to customers, such as subscriptions, hybrid models, certifications, and mixed models. The preferred pricing method may vary depending on the offerings. Nevertheless, additional costs can be accurately measured and included in the final pricing. These extensions of our research warrant further investigation which includes the profit margin, the ICE membership fee and counts the break even point both in semesters and number of student enrollments.

$$E = CMR + CP + CI + CE + (CIN \times SE) \quad (1)$$

$$RCF = \frac{E(1+PM)}{ESE} \quad (2)$$

$$CF = Round(RCF(1+MF) \quad (3)$$

$$E_{BE} = \frac{E}{CF_{Cert} + CF} \quad (4)$$

$$I = (CF_{Cert} + CF)SE \quad (5)$$

$$S_{BE} = Roundup(\frac{E}{I}) \quad (6)$$

Definition of variables:

1. E_{BE} = Break Even Point per Course (the number of enrollments needed to cover expenses)
2. S_{BE} = Break Even Point per Course (the number of semesters needed to cover expenses)
3. E = Total Expenses per course
4. I = Total Income per Semester

Expenses (E):

1. Cost of Market Research (*CMR*): Cost of market research/visibility study/Front End Analysis per course formed in one-time market research.
2. Preparation (*CP*): Combined cost of SME's salary for course materials making, video production, audio production, etc.
3. Implementation (*CI*): Combined cost of multimedia production revision, video production revision, new video production, SME's salary for reviewing and evaluating course materials.
4. Evaluation (*CE*): Cost of evaluation.
5. Infrastructure (*CIN*): Cost of cloud expense per user multiplied by the expected number of users.

Income (I):

1. Expected Student Enrollment *(ESE)*: The total expected number of students enrolled in one course.
2. Student Enrollment (*SE*): The number of students enrolled in courses per semester.
3. Profit Margin (*PM*): The profit margin percentage decided by the course provider for each course added to the recommended course fee (in percentage).
4. Recommended Course Fee (RCF): The minimum course fee charged to every student per course before added with membership fee to ICE.
5. Membership Fee *(MF)* = the membership fee paid by the course provider to ICE-I from course fee (in percentage).
6. Course Fee (*CF*): The fee charged to students per course.
7. Certificate Fee (CF_{Cert}): Additional fee for students opting for certificates.

This equation calculates the number of enrollments needed to cover the total expenses for the semester, considering both the fixed and variable expenses. To use this model, the course provider needs to gather the specific cost data for each expense component and the income data related to course fees and certificate fees. The BEP can then be calculated based on the actual numbers for each semester.

Pricing Simulation

To estimate the course fee for the Introduction to AI course, we consider the following cost components:

Cost of Market Research: IDR 30.000.000
Combined Cost of Preparation: IDR 40.000.000
Combined Cost of Implementation: IDR 6.000.000
Cost of Evaluation: Zero (as it's a new course)
Cost of Cloud Expense per user: IDR 100.000
Additionally, we factor in the following parameters:
Expected Profit Margin: 2%
Expected Student Enrollment: 250

Number of Student Enrollments each semester: 30
Membership ICE Fee: 1%
Additional Fee for students opting for certificates: IDR 100.000
The Expenses are:

$$E = CMR + CP + CI + CE + (CINXSE)$$
$$E = 30.000.000 + 40.000.000 + 6.000.000 + 0 + (100.000 * 30)$$
$$E = IDR79.000.000$$

The Recommended Course Fee is:

$$RCF = \frac{E(1+PM)}{ESE}$$
$$RCF = \frac{79.000.000(1+0,02)}{250}$$
$$RCF = IDR322.320$$

Course Fee is:

$$CF = Roundup(RCF\,(1+MF)\,, -3)$$
$$CF = Roundup(322.320\,(1+0,01)\,, -3)$$
$$CF = Roundup(325.543, 2, -3)$$
$$CF = IDR326.000$$

Number of enrollment for reaching Break Even Point is:

$$E_{BE} = \frac{E}{CF_{Cert} + CF}$$
$$E_{BE} = \frac{79.000.000}{100.000 + 326.000}$$
$$E_{BE} = 185,44$$

We round it up to 186, since people cannot be decimal.
The Total Income per Semester are:

$$I = (CF_{Cert} + CF)SE$$
$$I = (100.000 + 326.000)\,30$$
$$I = IDR12.780.000$$

The Number of Semester for Break Event Point are:

$$S_{BE} = Roundup(\frac{E}{I}, 0)$$
$$S_{BE} = Roundup(\frac{79.000.000}{12.780.000}, 0)$$
$$S_{BE} = Roundup\,(6.18, 0)$$
$$S_{BE} = 7$$

The findings dan discussion indicate that the E-Learning Pricing Calculator was well-received by users, with positive perceptions regarding its ease of use, usefulness, attitude towards use, and behavioral intention towards use. Additionally, external variables, such as institutional policies and subsidies, were recognized as significant factors influencing users' decisions and interactions with the tool. Overall, the calculator was seen as a valuable resource for helping users plan and assess the costs associated with online courses.

These results highlight how important user experience, perceived value, and outside assistance are in influencing people's intentions to embrace and utilize the suggested technology. They confirm the research's importance in meeting the changing needs of online education pricing.

ANALYSIS AND DISCUSSION

A. LINKING RESEARCH RESULTS TO PREVIOUS LITERATURE

The findings regarding the E-Learning Pricing Calculator align with previous literature on technology adoption and user experience in educational settings. Research by Davis [35] on the Technology Acceptance Model (TAM) suggests that perceived ease of use and perceived usefulness are critical determinants of users' attitudes and intentions towards adopting new technologies. Consistent with TAM, our study reveals that users' positive perceptions of the calculator's ease of use and usefulness significantly influence their attitudes and intentions towards its adoption.

Moreover, studies on online education pricing and cost analysis, such as those by Alavi and Leidner [81], Kumar et al. [82], emphasize the importance of transparent pricing structures and tools for facilitating informed decision-making among learners. Our research corroborates these findings by demonstrating that the E-Learning Pricing Calculator effectively enhances users' understanding of course costs and aids them in making well-informed choices regarding their educational investments.

B. REAL CASES AND PRACTICAL IMPLICATIONS

The practical implications of our research are underscored by real cases and examples from educational institutions that have implemented similar pricing tools. For instance, Harvard University's Extension School utilizes a cost calculator to provide prospective students with estimates of tuition and fees for individual courses and degree programs. By transparently presenting the cost breakdown and financial aid options, Harvard's calculator empowers students to plan their educational expenses effectively, thereby increasing accessibility to higher education [83].

Similarly, Coursera, a leading online learning platform, offers financial aid and subscription-based pricing models to cater to diverse learner needs and preferences. By incorporating flexible pricing options and providing transparent information on course costs, Coursera enhances learners' affordability and accessibility to quality education [84].

C. INTEGRATION WITH BREAK EVEN POINT MODEL

The Break Even Point (BEP) model presented in our study builds upon existing financial analysis frameworks and cost accounting principles applied in various industries. By adapting these concepts to the context of online education, our model provides a structured approach for educational institutions to assess the financial viability of their course offerings. This integration enables institutions to make data-driven

decisions regarding pricing strategies, resource allocation, and revenue optimization.

Furthermore, the BEP model serves as a practical tool for scenario analysis and sensitivity testing, allowing institutions to evaluate the impact of different variables, such as enrollment numbers and pricing structures, on their financial sustainability. Through iterative refinement and validation against real-world data, the model can evolve into a valuable resource for strategic planning and performance management in the rapidly evolving landscape of online education.

V. CONCLUSION

Unprecedented technical breakthroughs and the need for flexible learning alternatives have led to an irrefutable phenomenon: the transformation of education through E-Learning. This article addressed how E-Learning went from being a supplemental option to being a vital component of contemporary teaching. The study of the price calculator application prototype highlights how it might influence pricing plans for online courses.

The study demonstrates that perceived ease of use, perceived utility, and intention to use are interconnected aspects impacting the adoption of technology based on insights gained through workshops and focus group discussions. The progress of educational methods in an increasingly digital society is facilitated by the results as a whole. Thus, the meetings served as a foundation for a collaborative research project, highlighting the progression of discussions and tasks over time. The FGD provided valuable insights into the evolving landscape of E-Learning, emphasizing affordability and adaptability. The E-Learning Pricing Calculator emerged as a user-friendly and useful tool, positively impacting users' attitudes and intentions to utilize it. Additionally, external variables played a significant role in shaping users' decision-making processes.

These findings collectively contribute to a better understanding of the dynamics of E-Learning, effective research project management, and the importance of user-friendly tools in education. The collaborative efforts showcased in these meetings and discussions have the potential to advance the field of online education and pricing strategies. Moreover, the course of education has been permanently changed, and it is now essential to include E-Learning into the academic sphere. The contributions of the research, guided by TAM, shed light on the future direction for educational institutions looking to maximize their online course offerings while meeting the changing demands of their students.

Furthermore, the research on the E-Learning Pricing Calculator presents a comprehensive approach to address practical needs in the field of online education. By conducting case studies or pilot implementations in real educational settings, gathering feedback from stakeholders, and integrating user-centered design principles, the study ensures that the calculator meets practical requirements and enhances user experience. Furthermore, the exploration of integration with existing learning management systems and the development of comprehensive training and support materials facilitate seamless adoption and usability. A monitoring and evaluation framework, along with stakeholder engagement strategies, enables ongoing assessment of the calculator's impact and alignment with practical needs. These initiatives ensure that the research contributes not only theoretically but also practically, addressing real-world challenges and opportunities in online education pricing.

One limitation of this study pertains to the sample size of the Focus Group Discussion (FGD). Although the insights derived from the FGD participants offer valuable information, it's essential to acknowledge the relatively small sample size. Engaging a larger and more diverse group of participants could have provided a broader spectrum of perspectives and experiences regarding the E-Learning Pricing Calculator. This could potentially augment the generalizability of the findings, facilitating a more comprehensive comprehension of user preferences and attitudes. Nevertheless, it's worth noting that the participation of 8 out of 14 universities from the ICE-I Consortium in the FGD adds credibility to the results.

Another limitation concerns the contextual specificity of the study's findings. The insights and conclusions drawn from FGD discussions and meetings are tailored to the particular context of the E-Learning Pricing Calculator under scrutiny. Recognizing that different educational institutions and regions may exhibit unique pricing structures, user demographics, and preferences is imperative. Consequently, the findings and recommendations presented in this study might not universally apply. Researchers and practitioners should exercise caution when extrapolating these findings to different contexts and consider local factors and variations in pricing models.

FUTURE DIRECTIONS AND RESEARCH OPPORTUNITIES

Building on the insights gained from this study, future research directions may include longitudinal studies to assess the long-term impact of the E-Learning Pricing Calculator on user behavior and institutional outcomes. Additionally, comparative analyses across different educational contexts and demographic groups could provide insights into the generalizability and scalability of the pricing model and its associated tools.

Furthermore, exploring the integration of predictive analytics and machine learning algorithms into the pricing model could enhance its predictive accuracy and adaptive capabilities, enabling institutions to proactively adjust pricing strategies in response to changing market dynamics and learner preferences.

Through our model, we enable educational institutions to conduct scenario analyses, allowing them to project financial sustainability over multiple periods while considering potential changes in enrollment, costs, and external factors. This long-term planning capability empowers institutions to anticipate future challenges and opportunities, laying

the groundwork for informed decision-making and strategic resource allocation.

Moreover, our model emphasizes adaptability, recognizing that educational landscapes are constantly evolving. Institutions can adjust and refine the model over time to reflect new data, trends, and institutional goals, ensuring its relevance and effectiveness in the face of changing circumstances.

An integral aspect of our approach is risk management, where the model helps identify and mitigate risks to sustainability. By analyzing different risk factors, such as fluctuating enrollment or cost increases, institutions can proactively develop strategies to safeguard financial stability and mitigate potential threats.

Crucially, our model is grounded in data-driven decision-making, relying on empirical evidence to generate insights and recommendations. By conducting analytical analyses based on available data, institutions can make informed decisions that are aligned with their financial goals and objectives, thereby enhancing the overall sustainability of their online education initiatives.

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