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RESEARCH ARTICLE

E-Learning Pricing Model Policy for Higher Education

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ABSTRACT The technological advancement in learning has made it possible for students to study beyond space and time restrictions, known as online learning. Impacted by the pandemic for an extended period, most students have adapted to online learning and, even more, have realized the vast benefits of online learning despite all the minor disadvantages. As a result, worldwide institutions, including Indonesia, are now offering online degrees and courses. Previous studies have shown contradictory results of cost factor effects on online courses, from the least important to the most critical factor for student achievements. Therefore, deciding the online course rates has been a major concern for online course providers. This research aims to answer the fundamental question of designing costs for online learning by analyzing online course preferences and ensuring sustainability by proposing a framework for the E-learning Pricing Model Policy in Higher Education using literature studies and qualitative approaches. The results show four main phases: the preparation phase, which conducts market research to understand consumer demand and behavior; the implementation phase, which includes marketing expenses and tutor fees; evaluation phase, which includes the course content material and video production revisions for further implementation. In addition, the infrastructure phase as the Learning Management System's virtual space is added with the Cloud Expenses. However, as a limitation of this research, countless factors influence online course rates, and no exact number can determine those rates. Nevertheless, the course cost can be estimated by considering the factors that affect the overall cost and the number of learners who take the course. As a result, this framework acts as an essential foundation for institutions to determine sustainable online course rates.

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

I. INTRODUCTION

Higher education prices have drawn considerable attention in recent years, and students have carefully studied each expense. The growing cost of course materials, particularly the traditional textbook, stands out among these cost issues [1]. Massive Open Online Courses (MOOCs) were introduced in 2011 by several organizations, including Coursera, Udacity, and edX, reflecting critical emerging educational trends. A person's skills and knowledge are provided by higher education institutions, as is common knowledge [2]. The education industry has been reluctant to recognize the effects of the most recent learning technologies and, consequently, the environmental changes in what it advises to

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learn. Universities have made a concentrated effort over the past several years to offer and increase the usage of MOOCs, making them accessible to both their students and the broader public. However, MOOCs are currently causing concern on a global scale. MOOCs vary from standard information items in that they are instructional. Thus it is crucial to pay close attention to their price approach [3].

The affordability and accessibility of higher education are significant and rising concerns. The price and accessibility to required course material are among the factors now gaining much attention. Access to textbooks and other traditional course materials has become a barrier to student performance, especially for first-year and first-generation students. Their costs have continued to rise gradually and sharply [1].

Furthermore, according to [4] 's findings, synchronous contact is the most significant characteristic. When there is synchronous contact, participation by instructors in the Online Teacher Professional Development (OTPD) for data usage improves; however, when the fee is higher, no certificate is given, the program lasts a long time, and the learning resources are digital reading materials decline. They discover that instructors' desire to participate in the OTPD program appears to be significantly impacted negatively by the characteristic ''cost.'' Moreover, teachers prefer the program that offers a certificate (97%), followed by programs that are organized in a short amount of time (75.2%), that offer audio-visual materials or resources (73.9%), that use synchronous interaction (69.1%), and that use a collaborative learning strategy (67.9%), according to the results of presenting each attribute and its levels to teachers one at a time. Even though 59.4% of instructors are ready to pay for the program, this cost factor is of minor importance.

On the contrary, according to Lin's [5] research, a professional development program's cost can either help or impede its uptake, although instructors are not overly concerned with whether or not their institutions are footing the bill. For many institutions, the goals of their Open Educational Resources (OER) or affordable course content initiatives are cost reduction and assuring access to the necessary course material; therefore, all appropriate resources are used to those ends. As a result, even resources or programmatic initiatives that preserve but lower the cost charged to students for access to course materials are frequently seen as parts of OER and initiatives for inexpensive course content [1]. Likewise, [6] indicates that users of MOOC-based technologies are price-sensitive; in their case study, a US$49 price cut was associated with a quadrupling in the percentage of confirmed enrollment.

Access to and the price of course materials have become critical factors in student achievement. Reference [7] indicates that the cost to students is skewed toward first-year students. Reference [8] predicted that the price per teacher for a one-year data usage program would be roughly $2500. This information suggests that in-person Online course is expensive. In addition to other benefits of offering educational programs online, doing so might increase their efficiency. According to [4] 's findings, English teachers are more likely to pay for the interaction mode than for the other features. If compared to the asynchronous program, they are prepared to spend roughly 269,211.1 IDR (18.91 USD) to take part in the synchronous program for data consumption. On the other hand, they are less interested in the qualities of the certificate, duration, and learning material. The OTPD program without a certificate upon completion has the most significant decline in English teachers' willingness to pay (401,835.4 IDR/-28.22 USD), followed by the program with a long duration (227,854.3 IDR/-16.00 USD), and the program with primarily digital learning materials (193,942.5 IDR/-13.62 USD). English teachers are eager to pay for the OTPD program since it offers a credential, is completed quickly, and primarily uses audio-visual learning resources.

Moreover, [9] presents evidence that actual and relative prices for full-time undergraduate online education declined from 2006 to 2013. Although the pattern of results suggests some hope that online technology can ''bend the cost curve'' in higher education, the impact of online learning on education quality remains uncertain.

The studies above show different results of online course behaviors and effects related to cost, ranging from the cost factor to being of the most minor importance to the most critical factor in student learning and achievements. Students are willing to pay a specific amount if they think the price is reasonable compared to what they will obtain in return. As a result, we focused on ''cost'' as the primary concern since we were trying to determine the best pricing model for online courses based on the student's expectations. Deciding on a pricing model is a very challenging task as it will determine the offering and sustainability of the online courses. This research addresses this urgency by creating a framework for an e-learning pricing model policy for higher education.

Literature studies show that many factors influence online course rates; no exact figure can determine those rates. However, the course cost can be estimated considering the factors that affect the overall cost and divided by the number of students taking the course. The conducted literature study concluded that determining the course rate charged to the student is influenced by the factors that give rise to the cost and the number of students enrolled in the course. For this reason, research involving teaching staff, teams from schools, technical teams of learning media makers, and the Government that handles education is needed to provide appropriate cost estimates for online courses in Indonesia. Furthermore, there should be an assurance to keep the courses sustainable in the long term. Therefore, this research needs to understand the preferred characteristics of online courses before determining the proper pricing model. Thus, the research problems are formulated as follows: (RQ1) *What factors influence the determination of online course rates in Indonesia? (RQ2) What is the Indonesian context's model for determining online course rates?*

To answer the research problems, this research conducts a literature study to analyze the online course preferences, impacts of online courses, and pitfalls of online courses to set the minimum standard requirements for the proposed courses. After the minimum standard requirements are determined, we record existing online course rates and compare the rates to the determined standard. In addition, interviews and FGDs are conducted to formulate a model for determining online course rates. Finally, we proposed an E-learning pricing model for higher education.

II. LITERATURE REVIEW

A. ONLINE COURSES AND MOOC PLATFORMS

MOOCs, like the majority of online courses, give students the freedom of self-paced learning without location- or time-based restrictions [10]. Many MOOC activities are asynchronous, where students view a series of videos, take quizzes, or participate in discussion forums, to facilitate self-paced learning. However, MOOCs don't have enrolment limits and can be taken by anybody interested in doing so for little to no cost, unlike online courses that give credits [11]. As a result, MOOCs features a far more extensive and diversified learner community compared to other online learning settings. Designing instructional materials to serve the highly different learners in MOOCs is crucial but challenging [12].

According to Castaño-Muñoz and Rodrigues [13], there are a rising number of MOOC providers and students registering for courses. A curriculum and associated learning objectives, course materials, an evaluation system, and a certification procedure make up the standard framework of MOOC courses [14]. Short films have always been the primary means of delivering learning content in the pedagogical model around which MOOCs are founded. Supplementary reading materials occasionally enhance the learning experience, conversations in online forums with other participants, instructors, and teaching assistants, and short movies. The sheer number of students enrolled in MOOCs makes it impossible to grade assignments and examinations manually. Instructors use instruments that enable automated grading to assess the performance of participants [15]

A blended model was developed for the characteristics of interaction, learning resources, and learning technique; as a result, the levels of the three characteristics contained the term ''mainly or primarily,'' for instance, ''largely asynchronous interaction vs. synchronous interaction.'' This held for the characteristics of learning resources and the learning approach [16]. MOOCs are becoming more and more commonplace due to the popularity of online learning in recent years. Because it aids in dropout risk prediction, platform effectiveness evaluation, and learner performance analysis, visualizing online learning is particularly crucial. Finding concealed information is challenging because of the data acquired by online learning's large-scale, high-dimensional, and various properties. To better understand the importance of visualization in online learning, we examine and categorize the available research for it in this work. The four categories of online learning activities that comprise our taxonomy are behavior analysis, behavior prediction, learning pattern discovery, and supported learning [17].

The most fundamental feature of MOOCs is that they are accessible online courses. There are currently a significant number of courses that start with those specifications. There are presently two main types of MOOCs being considered. The first is based on the connectivism theory of learning, which supports informal networks of learners developing. They are referred to as cMOOCs. The so-called ''x MOOCs'' are more conventional, content-based, and match conventional educational paradigms more closely. With assignments and conversations taking place online using proprietary software, a content-based xMOOC is more likely to feature one or more professors who often present lectures via YouTube-style videos. The course administrators can issue grades and credits using due dates for projects and an online mode of ongoing evaluation. Online participants are free to participate if they are not interested in earning credits [18]. According to study findings, MOOCs are the most excellent option for economically disadvantaged students who would otherwise be unable to attend college [2].

B. FACTORS AFFECTING ONLINE COURSES PREFERENCES

According to [19] and [20], a brief online data usage intervention can impact teachers' practices, beliefs, and self-efficacy. Teachers favor a short length for instructional data use, despite research stressing the value of a longer duration for in-person instructional data use interventions [21]. But care must be used when interpreting this result. In other words, it is crucial to address the conflict between theory and this teacher's taste for a brief length. To ease the tension, it would be possible to create a series of brief online programs based on the subjects or procedures involved in using instructional data. This way, instructors feel connected to the program's structure, and their views will be heard [22].

Another study found that free professional development opportunities offered by the university contribute to non-permanent English instructors staying in the classroom [23]. The trade-offs between qualities are comparable to real-life situations where people must assess several factors when choosing between options for a service or product (such as purchasing a mobile phone) or when making judgments [24]. A discrete choice experiment may be used as a stated preference technique for measuring the relative strength or relevance of the features of a good, service, or program and forecasting possible adoption rates [25]. It makes sense that the teachers are reluctant to use primarily digital reading materials because they need to consider their personal learning preferences (e.g., verbalizers versus visualizers). Although the instructors' choices may not necessarily reflect their multimodal literacy, they favor a depiction of mixed multimodal learning resources or blending several modalities for meaning-making.

Reference [4] indicate a significantly favorable preference for synchronous interaction but a negative preference for expensive programs, programs that don't offer certificates of participation or completion, that are conducted over a more extended period, and that use digital reading materials. Additionally, subgroup studies reveal that teachers' preferences are influenced by age, gender, and prior exposure to online professional development programs.

Furthermore, [26] explores the abilities utilized to engage ICTs with self-efficacy and locus of control among MOOC learners from five areas by merging the resources and appropriation literature with second-level digital divide research. Results from a study of 2882 students enrolled in five MOOCs in English and Arabic show that students from different places differ significantly. Some learners have noticeably more excellent capabilities than others in other locations based on where they live. Additionally, male students from three of the five areas are more engaged with ICTs than female students.

References [24] and [25] offer a more thorough categorization of online learning. They include tracking dropout rates, evaluating the caliber of the course, looking into student engagement, and evaluating student success. State of the art on prediction in MOOCs is surveyed by [29] using a Systematic Literature Review. According to the findings, there is a lot of interest in foretelling MOOC dropouts, including the Intelligent Tutoring System. However, efforts to make such systems intelligent are still being made, and there are still theoretical debates around them [30].

Reference [31] highlighted that learning analytics is only partially supported by MOOC platforms such as edX, Coursera, Canvas, and UdaCity. To guarantee that learners are assisted during problem-solving, it is required to make these systems more comprehensive, combine them with Intelligent Tutoring System, and further integrate the data of both systems. A crucial part of learning scaffolding is feedback. Feedback highlights how to best support students in reaching their learning objectives and enhancing their self-regulation abilities. Due to the physical and geographical distance between instructors and students in online courses, feedback is even more critical. Feedback in this situation enables the teacher to adapt the curriculum to the requirements of the pupils. However, providing feedback can be difficult for teachers, particularly in situations with large cohorts [32].

C. IMPACTS OF ONLINE COURSES

The MOOC platform presents an incredible chance to give cutting-edge multimedia technologies in both the lectures and the assessment materials [33]. Reference [2] looks into how MOOCs have affected higher education in the Saudi Arabian Kingdom (KSA). The analysis shows that MOOCs substantially influence higher education by enhancing educational achievements. Additionally, a 65% boost in educational results was attributed to MOOCs. The results demonstrate that MOOC courses impact the kingdom's higher education system favorably.

According to [31] and [32] 's research, online programs can expand teachers' access to learning new information and skills at more convenient times. With the expansion of online learning, MOOCs give students access to various learning tools. Over the past ten years, MOOCs have swiftly developed and expanded in popularity among students. Online learning gives students more flexibility in their learning options than traditional classroom instruction [17].

In a flipped classroom, students are in charge, so in-class time may be devoted to more participatory and creative activities that enhance more profound learning. Students often view video lectures on their own time. The lengthy production time needed to create video lectures is one of the obstacles to this strategy; according to Van Arsdale, it took six minutes to produce every minute of video for his course. MOOCs are not a threat. Instead, it is the new potential that online learning presents to both on-campus and distance learners. Furthermore, rather than displacing academics, MOOCs would encourage them to enhance their instruction through strategies like flipping classes [33].

Participants in MOOCs with partners from the commercial sector can hear from experts with backgrounds outside of academia, which may be helpful for aspirational students and institutions that stand to gain from such alliances. A range of MOOC courses might position a university as a reliable entry point for global learning and a possible cost saver. When a business model is created that can keep the courses accessible for the user while still generating income for the partner schools, this might be highly fascinating for university administration. The drawback may be that if a course or service offered by an institution is of low quality, its reputation could be severely and swiftly destroyed. Anyone who reads YouTube comments will be aware that the internet can be nasty; the anonymity and accessibility of online forums can make them a place full of vile profanity and frivolous humor. Some administrators might want to avoid putting their institution's image at the mercy of such a situation [18].

D. PITFALLS OF ONLINE COURSES

Some pitfalls of online courses are recorded from previous studies.

First, numerous studies [36], [37] have reported on in-person programs to improve teachers' data literacy. However, in-person professional growth is only sometimes possible due to factors like mobility restrictions and efficiency concerns. *Second,* only approximately 12% of the 35,000 students who signed up for Lander's MOOC finished it all, which is one of edX's highest retention percentages. Just over half of the enrolled students even made it through the first lecture of Noor's MOOC the first time around, and from there, the numbers dropped swiftly and steadily, with just approximately 6% making it through the last week of lectures; such trends are typical across all MOOCs [33].

TABLE 1. Types of payment.

Classification	*Attendance*	*e-communication*	*Alias*
Type A	✓	x	Face to face
Type B	x	x	Self-learning
Type C	x	✓	Asynchronous
Type D	✓	✓	Synchronous
Type E	x	✓	Blended/Hybrid
Type F	✓	✓	Blended/Hybrid-Synchronous

Third, a typical MOOC may draw thousands of registrants, but just 10% of them would finish the course, according to data [18]. Meanwhile, a study by [38] shows that purchasing entrance into a certificate-eligible program inside MOOCs significantly raises completion rates. For instance, completion rates for participants in HarvardX and MITX courses average 7.7%, whereas completion rates for verified participants average 60%.

Fourth, Self-regulated learning (SRL) is the process through which students direct their education. Supporting SRL has been found to improve learning outcomes and use SRL methods in computer-based learning environments. However, there needs to be more information available on supporting SRL in MOOCs. Weekly SRL prompts were included as videos in a MOOC for this project. Results indicated that compared to non-SRL-prompt viewers, SRL-prompt viewers engaged with more course activities and finished them in a more comparable sequential order. Likewise, participants may be impacted not just by the amount of money they spend on a course but also by anxiety over failing to fulfill the reference point—that is, the goals they establish for themselves—by enrolling in the certificate track [39]

Giving learners with various characteristics good advice to direct their learning is a critical difficulty. Self-regulated learning is directing one's own learning, including planning, self-monitoring, and self-reflection [40].

E. STEPS FOR PRICING MODEL POLICY

Along with the increase in online learning, several types of learning can be done. Currently, six types of learning are summarized (Table 1) as outlined by [41].

Attendance is the presence of both educators and students during lectures, physically and virtually. E-communication is defined as whether the content is delivered online or not.

Traditional type (type A) means face-to-face learning as usual. Self-study type (type B) means that students learn independently without any conditions of attendance and communication with the teacher. Virtual asynchronous type (type C) means all teaching and learning activities are online. Students will interact with lecturers, hear lectures online, do assignments, give questions, and others. All these things are facilitated by technology. On type C, there are no scheduled in-person meetings (either online or offline). In synchronous type (type D), students get learning materials and discussions online. In addition, there is a particular time scheduled for educators to meet with students in person and online. Blended type means that students attend lectures where they alternately attend school online and offline. Mixed/hybrid type (type E) means that the student has yet to have a definite time to study online, and the student decides when he or she will study online. In this type, the school already prepares a list of lectures and lecturers available at certain hours, so the student will decide to follow when he has questions or needs more explanations. Synchronous mixed/hybrid type (Type F) means spending specific time participating in online learning. A specific time has been scheduled for students to participate in online lectures.

1) COMPARISON OF ONLINE TUITION FEES WITH FACE-TO-FACE TUITION

One of the exciting things to discuss is the comparison between online tuition fees and face-to-face lectures. However, answering this takes work. We cannot compare the cost of online education with the cost of education with traditional processes because different factors affect it, as revealed by [42]. Some studies determine the cost per student during lectures or the cost per student per course. However, the cost per course must be redefined because the credits of each course are different, which depends on the number of hours the student spends studying the course. Reference [43] states that the easiest way to determine the cost of education is to determine the average cost per student.

Comparing the cheaper costs between online tuition fees and face-to-face lectures depends on calculating the cost component and the number of students who follow it. No definitive statement states online tuition is cheaper or more expensive than face-to-face tuition. The development of lectures and online courses is a multi-stage and complex process, and it is impossible to know the price in advance thoroughly. Too many variables in the final price tag equation affect pricing.

The following are the results of previous studies summarized in studies written by [44]. A study at the University of Illinois found that tuition fees in 9 courses dropped when changed from online to offline learning. Another study revealed that online lectures with no e-material development would be cheaper than face-to-face lectures. This research reveals that online lectures involve the development of materials, so the cost savings depend on the number of students who take the lectures. Based on the results of this study, standard web-based courses with pre-prepared web materials and online discussion forums are more effective than face-to-face teaching with several students over 40 people per year over four years. If it is 20 students, this online lecture could be more economical.

The comparison of online tuition fees and face-to-face fees is quite varied. The study by [44] states that the costs universities spend on distance learning are more expensive than face-to-face learning with the same number of students. This is due to the use of learning media, the problems faced in guiding students online, and the cost of publishing a lecture

on an online course will increase. In addition, it will take a lot of effort from faculty and staff to develop and maintain learning materials and administrative systems to control students remotely. However, the cost spent per student becomes lower. Another study in Australia by [43] found that if students bear communication costs, online lectures are cheaper, but if not, online lectures cost more.

2) FACTORS AFFECTING TUITION FEES AND ONLINE COURSES

In the section above, we have discussed that determining the cost of an online course is obtained by considering several factors. Several case studies can be used as a reference in calculating the fees applied for online lectures. Several variables influence the calculation of such costs. The following factors are considered in determining the tuition fees obtained from several case studies.

Case study 1. Factors affecting online learning rates based on [45]

The following are five variables that drive the cost of education based on the studies by [45]. The factors described are distinguished in learning carried out online and in a mixture of online and offline. Table 2 describes the factors influencing learning rates in online and blended learning.

1) Manpower
   Manpower costs are calculated by two variables, the number of workers and the average salary for such workers. The workforce costs through technology can be reduced by lowering the student-instructor ratio or the instructor's salary.
   One way to calculate the cost of the virtual manpower model is to use a teacher-student ratio that fits the traditional model and pay the virtual teacher the same fee. The way to derive cheaper manpower cost values is to (i) increase the student-teacher ratio and (ii) reduce teacher salaries by converting teachers to part-time or utilizing professionals. However, it should be noted that virtual schools also need the support of administrative personnel. The addition of IT staff sometimes adds to the cost.
2) Content acquisition and development
   The content fee at traditional schools states teachers' supporting materials in offline learning, such as textbooks, workbooks, videos, games, and others. The content fees on online schools are as follows: - Content created by open source/teachers is a learning video posted for free - Ready-made online content is purchased; some are equipped with instructors, and some are not;- Large-scale development content: the costs spent recruiting large-scale development teams to create the school's course equipment or learning system/information system.
3) Technology and infrastructure
   Technology on virtual models. The technology in this model is used to make purchases of teacher support tools (computer or tablet), the cost of connectivity, storage, and servers. In addition, sometimes virtual schools also cost money to (i) provide internet subsidies to students or offer instructional devices and (ii) prepare for the additional needs of lecturers to prepare video lessons such as webcams or cameras.
4) School Operations
   Traditional schools require operational costs such as transportation, food, buildings, etc. Virtual schools do not require transportation, food, and other costs, but virtual schools also have costs such as the cost of physical buildings used by teachers and staff. The mixed model has more cost-effectiveness than traditional schools because there is a reduction in the number and size of buildings needed.
5) Student-Support services
   The fee for student support services is in the form of counselors for each student. In the virtual model, these

TABLE 2. Online course fee categories [45].

Category	*Fee Description*			
	Online	Estimation	Blended	Estimation
Manpower	Student Teacher Ratio	$2600	Time spent on computer facilities for online learning.	$5500
	Teacher's Salary		Men Support on computer facilities for online learning.	
	Professional Support such as IT Staff		Men Support on computer facilities for onsite learning	
Content Acquisition and Development	Content Quality	$800	Content Quality	$400
Technology and Infrastructure	Purchase of computers or internet subsidy for students	$1200	Student – laptop ratio	$500
	Purchase of additional hardware for teachers (i.e., webcam)		Wireless requirement	
School operations	Measurement of physical facilities (buildings) (If the teachers work remotely)	$1000	Measurement of physical facilities (buildings)	$1700
	Transportation, food, building, etc.			
Student-Support Services	Counselor allowance and transportation expenses for face-to-face counseling	$800	Counselor allowance	$800

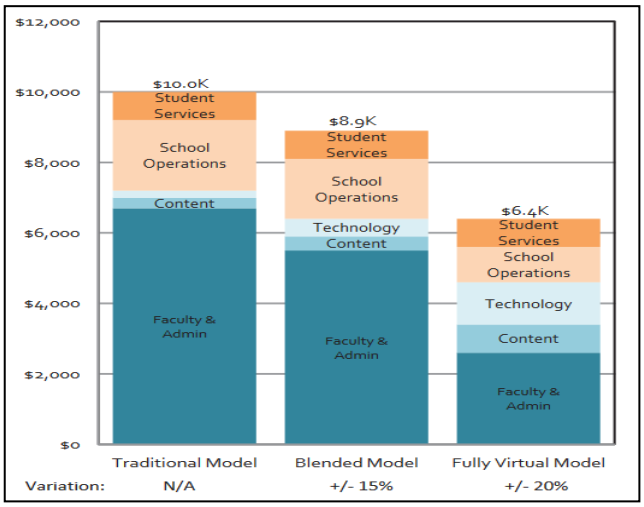

FIGURE 1. Average Expense Per Student [45].

costs include counselors' payroll and travel expenses if face-to-face counseling is needed. In the mixed model, this cost is in the form of a counselor's payroll.

Through interviews and observations, [45] concluded that the average expense spent by each student for online courses could be seen in the following Fig 1.

On the traditional model, learners spend about $10,000; on mixed models, learners will spend about $8,900; on virtual models, learners will spend about $6,400. This figure estimates the expenditure per student in the US for public schools (high school and middle school), published in 2012. It can be seen that in the traditional school model, more than half of the budget is spent on financing employees. This type's technology cost is minimal compared to the overall cost. The mixed model reduces the cost of school operations and labor. The virtual school model significantly reduces labor costs. Nevertheless, these three models need to be qualified due to the need for more data regarding the model. This fee is obtained from public documents and interviews with experts.

Case Study 2: Factors influencing online learning rates based on [44]

This case study discussed the three variables considered in determining the cost of online education.

a: THE COST OF DEVELOPING ONLINE LEARNING MATERIALS

A high proportion of the cost of creating learning materials is the cost of manpower. All studies state that creating a learning medium for a one-hour lecture will take longer than teaching for an hour. Boettcher in [46] stated that it takes about 18 hours of working time to make an hour of online lectures.

b: ONLINE LECTURE DELIVERY FEE (E-DELIVERY)

Although the cost of creating online learning materials is higher than textbooks, there are savings on electronic delivery or deployment (e-delivery). For example, online libraries save more in providing online materials than copies in printed form to every reader in need. Online libraries make savings in terms of inventory, packing, and shipping costs. However, this increases the cost for students because they will pay for the material online and print it themselves.

It is stated that online lectures reduce tuition fees because students spend more time studying the material, so the time provided by lecturers per student in class will be less. Other studies suggest that students spend more time discussing their fellows and reduce lecturers' time. Furthermore, one of the lecturers at Penn State University said he spends less time guiding students in online lectures. However, other studies have found that online tutorials increase the number of messages for online discussion. Each discussion requires more than one message, taking more time than in-person interaction.

TABLE 3. Learning expenditure of higher education.

Cost Description	*Elements of Online Learning*	*Elements of Face-to-face learning*
Fixed Cost	Building construction, rent, utility, insurance, cleaning, electricity, etc.	Learning platform (server, intranet, software license, maintenance, infrastructure, supporting staff)
	Equipment (furniture, PC, flip chart, board, overhead projector, training system/server, etc.)	PC, laptop, network. Intranet, software, etc.
	Administration (registration and tracking, invitation, reminder, evaluation, etc.)	Administration (registration and tracking, invitation, reminder, evaluation, etc.)
Variable Cost	Inventory (printing, workbook, food, beverages, stationary, etc.)	Inventory (CD, additional workbook).
	Course development (designer, expert, editor, etc.)	Course development (web development, designer, expert, editor, etc.)
	Course delivery (instructor, facilitator, supporting staff)	Support (Facilitator or trainer, tutor, customer service training)

c: ONLINE ADMINISTRATION FEE

Administrative costs are administrative costs needed to support the continuity of online learning.

Case Study 3: Factors influencing online learning rates based on [41]

The case studies discussed here describe the total cost of education incurred by students, universities, and society. This section also describes these costs if done in online learning or offline learning. The components are as follows [41] as outlined in Table 3-5.

F. THE PROCESS OF DETERMINING THE COST OF ONLINE COURSES

This section will explain the process of determining the cost of an online course. Two steps are taken; the first is about

TABLE 4. Learning expenditure of students.

Cost Description	*Elements of Online Learning*	*Elements of Face-to-face learning*
Fixed Cost	Course/College Fee deducted by Government subsidy	Course/College Fee deducted by Government subsidy
Variable Cost	Education Loan, lost income from the market, and non-market activities during the study period (opportunity cost)	Education Loan, lost income from the market, and non-market activities during the study period (opportunity cost) Health issues due to technology usage (eyesight issues, obesity)

TABLE 5. Learning expenditure from the social aspect.

Parties	*Cost Description*	*Elements of Online Learning*	*Elements of Face-to-face learning*
Government	Fixed Cost	Facilities (building, amortization, rent, utility, insurance, cleaning, etc.)	Learning platform subsidy (server, intranet, license, software, maintenance, infrastructure, supporting staff)
	Variable Cost	Scholarship and subsidy.	Scholarship and subsidy.
Environment	Fixed Cost	Co2 and greenhouse emission for fixed cost	Co2 and greenhouse emission for fixed cost
	Variable Cost	Co2 and greenhouse emission for variable cost per student	Co2 and greenhouse emission for variable cost per student

strategies for determining course fees, and the second is about the steps in determining the cost of online courses by comparing the current pricing model of online course rates.

1) STRATEGIES FOR DETERMINING ONLINE COURSE RATES

Several instructions can be followed based on [43] determining the cost of online lectures. The instructions are as follows:

1) Do not give course fees based on the time spent on the course.
   The fees applied to the course should be based on the value of the content offered, not on the length of the content. Students will expect content based on the price already paid. The standard cost is that if the applied course fee is $500, there should be 3-5 hours of training.
2) See competitors for the courses offered.
   Do not give prices for courses offered based on the prices of competitors' courses. Competing courses can validate market demands and ensure that people are interested in studying the courses offered.
3) Calculate the scores your students can achieve.
   To determine the appropriate course fee, describe the results achieved after taking the course. For example, if the courses offered will save students time studying, describe how many hours can be saved. If the courses offered will make savings, describe how much savings can be made.
4) Test several types of prices.
   This section takes time to be able to determine the optimal price. The trick is to make a low (but not too low) fee, then increase it slowly and see how many people are interested in taking the course. Increase it continuously until the optimal cost is found, which is the point where when the price is increased again, the number of enthusiasts begins to decrease.
5) Consider the resources' credibility in the market.
   If the lecturer is an expert on the topic offered, this determines the higher price of the course offered. Nevertheless, if the lecturer is not an expert, then publishing free content is a step toward increasing credibility in the market. Content can be shared through YouTube blogs or podcasts to gain credibility.
6) Consider the possible alternatives that students may take.
   This is done to look at the costs spent by the student in taking the courses offered and compare them with if the student is doing other ways of studying (self-study, private study, studying in college). If the cost spent on other alternatives is more expensive and takes more time than the courses offered, that is the selling point.
7) Determine the purpose of the courses offered.

2) COMPARISON ANALYSIS TO THE CURRENT PRICING MODEL OF ONLINE COURSE RATES

To have better understanding about the ideal pricing model, we gather data of the current pricing model of online course rates from ICE Institute. ICE Institute, also known as the Indonesia Cyber Education Institute, is the central of online learning courses in Indonesia accredited by the Minister of Education and Culture. ICE Institute provides various online lectures from many universities and online course providers in Indonesia. The main purpose of ICE Institute is to facilitate the availability of quality education as well as to guarantee the quality of online learnings. Through ICE Institute, students can choose the right online lecture for future career development in Industry 4.0 [47].

Table 6 shows the recent average charge for non-credit and credit online courses as one of the considerations for the proposed pricing model policy. However, the average price charged to students by the online course providers in Indonesia through the ICE Institute has been subsidized by the Indonesian Government. Therefore, we include the following Fig. 2 and Fig. 3 to show the percentages.

Aiming for sustainability, we also provide the long – term projection of ICE Funding and Revenue (Fig. 4)

Fig. 3 shows that non-consortium courses are projected to have the highest development followed by the foreign university courses, Indonesian University courses and consortium courses.

III. METHOD

This research is conducted in six consecutive steps using qualitative and quantitative approaches by conducting 15 interviews and FGDs from Dec 2021 up to November 2022 including a market survey in August and September

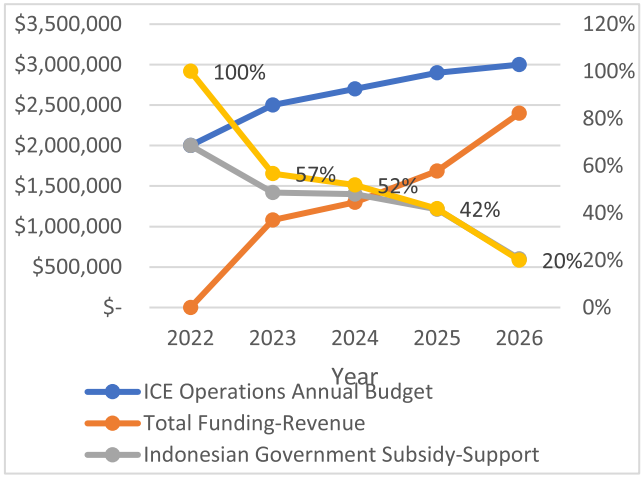

FIGURE 2. ICE Institute Growth and impact financial model [48].

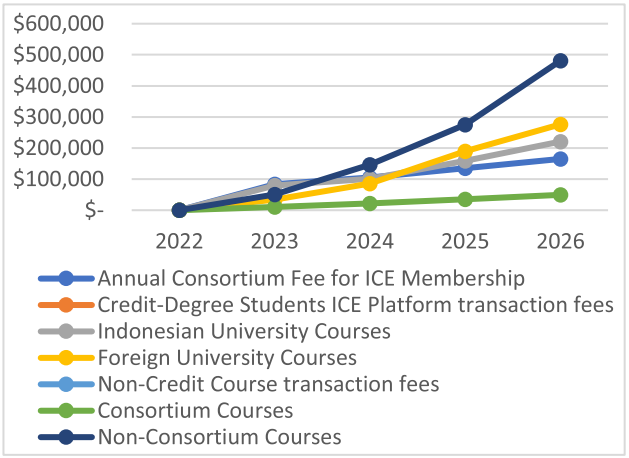

FIGURE 3. ICE Funding and Revenue [48].

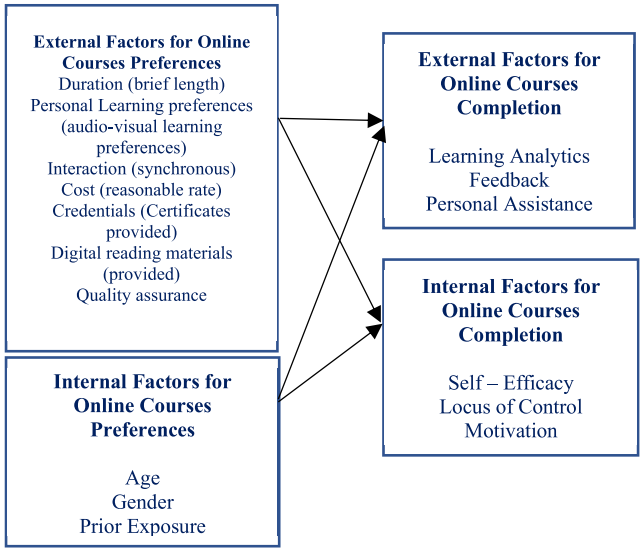

FIGURE 4. A framework of external and internal factors for online courses preferences and completion.

2022. In the first step, the leaders of reputable Higher Education Institutes in Indonesia held a meeting to discuss the research's initial problem and roadmap. In the second step,

TABLE 6. Average charge for non-credit and credit online courses [48].

Non- Credit Assumptions	Avg. Charge per online course (IDR)
University A	300.000
University B	15.000
University C	50.000
University D	75.000
Consortium 5 - 9	15.000
Consortium 10 - 14	15.000
Consortium 15 - 19	15.000
Consortium 20 - 25	15.000
Credit Assumptions	**Avg. Charge per 3 credit online course (IDR)**
University A	1.300.000
University B	150.000
University C	400.000
University D	3.000.000
Consortium 5 - 28	350.000
Consortium 29 – 35	350.000
Consortium 36 – 45	350.000
Consortium 46 - 55	350.000

previous literature from 94 reputable journals is recorded and summarized to capture the phenomenon through the Gaps and Inconsistencies Analysis. The result from the second step becomes the foundation of the subsequent literature studies to determine the preferences and minimum standards required for sustainable online courses in the Higher Education context. Along the literature review process, as many as 15 interviews and FGDs between the leaders of Higher Education institutions in Indonesia and experts from international MOOCs were conducted. Next, a market survey of 340 respondents was conducted to understand the market demand for paid online courses. Finally, all the results of the interviews and FGDs were synthesized and compared to the literature studies to build the proposed E-Learning pricing model for Higher Education in the Indonesian context.

IV. FINDINGS AND DISCUSSION

From the fourth step of the research method, the following Table 7 is acquired.

Only a small portion of students and professors are considering how MOOCs may be planned and delivered to ensure high-quality learning experiences; otherwise, they are primarily focused on the content or problematic regions [49]. Over 80% of educators believe that MOOCs are helpful in the learning process, even though the majority have never taught or taken one. This suggests that educators' general attitude toward MOOCs is favorable. The real benefit of MOOCs is their flexibility and significant potential for self-directed learning [50]. Moreover, it supports the notion of lifelong learning. The fast growth of information and communication

TABLE 7. Interviews and FGDs result.

No.	*Topics*	*Date*	*Participants*	*Output*
1.	Discussion on Proposal	Dec. 20, 2021	Research Team	Research Purposes and Targets
2.	Business Model and Pricing Strategy	Jan. 20, 2022	Research Team	Steps for Business Model and Pricing Strategy
3.	Research Timeline and Advice from Experts	Jan. 27, 2022	Expert A Expert B Research Team	Input and Suggestions Expert A Pricing policy for direct and indirect registration Short/Long Term duration Benchmark from Open University Long-Term Competitive Advantage Strategy Focus on the most significant population that needs courses. A different location has a different willingness to pay. Expert B: Increase engagement Public/international institutions can contribute to the content How to withdraw resources from private companies to ensure sustainability. Monitoring new entrants Identification of useful content for future career possibilities.
4	Research Progress Report	Feb. 9, 2022	Expert B Research Team	Discussion and reports from each team on research progress in marketing strategy and pricing policy.
5.	Discussion on research sustainability.	Feb. 16, 2022	Expert B Research Team	Data capture on design and development of online courses.
6	Team formation	Feb. 23, 2022	Expert B Research Team	Responses and recommendations for Marketing approaches
7	The result from Marketing Survey Team	Mar. 9, 2022	Expert B Research Team	Evaluation and Revision
8	Review on Net Present Value (NPV) Discussion and brainstorming on internal pricing policy approach for credit courses	Mar. 23, 2022	Expert B Research Team	Solutions to support growth and market usage for all students
9	Interviews with experts from Open University	Apr. 5, 2022	3 Experts from Open University	Information on online courses financial model at Open University
10	New business model and updates	Apr. 6, 2022	Expert B Research Team	Discussion and brainstorming on surveys and future online course projects.
11	Discussion and brainstorming on revenue model portfolio from time to time	Apr. 20, 2022	Expert B Research Team	MOOCs Revenue Model Potential business model from benchmarks such as: Udemy Eunis Coursera
12	Discussion on the preliminary research result	May 18, 2022	Expert B Research Team	5-year Financial draft Financial model for sustainable business
13	Discussions with Consortium leaders	22-23 Jun 2022	Consortium Leaders Expert B Research Team	Scope of work - Pricing for Online Courses Willingness to pay Consortium model Business Model from ICE Institute Book Chapter
14	Discussions with consultants from ADB	9-10 Sep 2022	ADB Consultants Research Team	Research Progress Pricing Model Policy
15	Discussion with the CEO of edX	Nov. 11, 2022	3 Experts and CEO - edX Tim ICE Institute Research Team	Business Process of edX

technology impacts higher education. To present the learning abilities and methodologies found in contemporary scientific research and provide students a competitive edge, it has helped to develop new technology tools like MOOCs [2].

New teaching methods, including online courses, collaborative assignments, dynamic grading systems, real-time feedback, and motivating inserts into the learning process, indicate a modern and successful educational approach. Massive open online courses (MOOCs) and e-learning have recently gained popularity and combine many elements that allow distant students to participate in higher levels of education. Younger generations are moving toward a purely online world, yet most professional and intellectual abilities can only be efficiently acquired through in-person instruction and guided practice. However, the fundamental issue raised in this study is the flaw in most traditional educational systems: the steadily declining incentive it provides students, who have matured and are now part of several virtual realities from which they derive the necessary intrinsic desire and energy [51].

The most frequent critique of these online courses is the frequently stated statistic that 90% of those who enroll in them never finish them. A further issue is the quality. As is the case with much self-directed learning, the ad hoc nature of many of these courses makes quality assurance or simply quantifying reachable learning goals challenging. These courses' long-term viability has been questioned on a bigger scale. MOOCs, or at least those that are for-profit, may soon become extinct due to the absence of a clearly defined business strategy. This might be important for colleges that see embracing MOOCs as a method to combat their dwindling funding and growing expenses. The dream is alluring run a stable of engaging online courses, earn money (somehow) for doing so, and cut back on or do away with the expensive liabilities of paying teachers' salaries, maintaining premises, and handling administration. Effective teaching will always have a role in the learning process and will only be easily replaced, no matter how fascinating the technology is [18]

For a traditional classroom, the attrition would be concerning, but for online learning, it only reflects people choosing their educational paths. The online learning environment produces a highly engaged academic community where students are more concerned with pursuing their own intellectual interests than obtaining a particular certificate.

Reference [4] show that instructors' motivation to engage in the OTPD program for data usage is decreased by the cost, the lack of a credential, the lengthy duration, and the use of digital learning materials. The descriptive data demonstrating that over 60% of the instructors are prepared to pay for the OTPD course might be used to explain the negative effect of cost. This suggests that instructors may believe their employers should be responsible for paying for an OTPD program instead of themselves.

Moreover, MOOCs are a subset of Learning Management Systems (LMSs); however, it doesn't seem that the teacher has much of an impact on these systems or none. These methods need to provide tailored instruction that acknowledges the unique distinctions and requirements of the learners and instead deliver the learning content and resources to all participants in the course in the same manner. According to reports, these issues can be solved by building the next generation of intelligent learning systems [30].

In this case study, the development of an online course model uses a model referred to as ADDIE, an acronym for Analysis, Design, Development, Implementation, and Evaluation. At the analysis stage, a study of the market to be entered is carried out, and a study of its competitors is carried out. This section will help highlight the uniqueness of the courses offered to its clients. In the design phase, work on the display of teaching materials is carried out. In the development phase, teaching materials are developed, starting with lecture notes, tasks to be delivered, presentations, videos, and others. At the implementation stage, all the materials have been completed, displayed on the website, and compiled into an online course. Error checking is carried out in the compiled learning material at this stage. At the evaluation stage, an analysis is carried out to monitor the success of the course by looking at the course goals and achievements obtained.

From the explanation above, we offer a framework of external and internal factors for online courses preferences and completion (Fig. 4) before going further to cost designing. This framework also acts as an answer to the first research question of this research.

The following is a determination of the costs spent on online courses based on [52]. The developed model is the ADDIE model. The costing process considers the process at each stage of creating an online course and the team in charge. The following example is the cost spent creating a 1-hour course of learning videos, texts, and lesson analysis.

Stage 1: The cost of the analysis. At this stage, an analysis of possible participants, an analysis of competitors, and an analysis of the corresponding promotions are Stage 2. Design costs. This section will use visual content design and assignments/exercises during the course. This section involves consulting with the experts, teaching staff, content designers, and learning videos. This stage involves the marketing team.

Stage 2: Design costs. This section will use visual content design and assignments/exercises during the course. This section involves consulting with the experts, namely teaching staff, content designers, and learning videos.

Stage 3: Course development costs. In this section, course notes and videos will be used. This involves graphic designers, video editors, video operators, and faculty.

Stage 4: Implementation costs. This section contains the stages of uploading content, checking errors, and checking writing.

Stage 5: Calculation of the total cost. The following are the costs spent in stages 1 – 4. Based on the observation results, it was obtained that in 2021, 1 hour of e-learning content costs will cost $8,542 – 36,320. In addition, it is obtained that 1 hour of learning content will take about 100-160 hours to create.

We summarize the following data from the 5th step of the research, the market survey.

TABLE 8. Market survey statistics result sample information (N=340).

Demographic	Range	% Of Total Sample Size	
		Students	Students and Workers (Professionals)
Occupation		47,2	52,8
Education Level	Diploma	1,99	0,59
	S1	94,04	63,91
	S2	2,65	24,85
	S3	1,32	10,65
Internet Connection Stability	Available	84,8	91,1
	Not Available	15,2	8,9
Expenses on Internet Connection	Less than IDR 50.000	2	3
	Between IDR 50.000 – IDR 100.000	21	19
	Between IDR 100.000 –IDR 150.000	32	26
	Between IDR 150.000 – IDR 200.000	17	18
	More than IDR 200.000	28	34
Preferred Learning Modes	Offline	27	5
	Online	39	61
	Hybrid	34	34
Sentiments on Online Courses	Neutral	58	21
	Positive	38	78
	Negative	4	1
Learning Management System (LMS)	Have used	82	78
	Have not used	18	22
Paid Online Courses	Have used	32	28
	Have not used	68	72
Willingness to pay complete course package	Strongly Agree	36	37
	Agree	29	29
	Somewhat agree	24	21
	Disagree	6	11
	Strongly Disagree	5	2
Willingness to pay for premium features	Yes	68	76
	No	32	24

Table 8 depicts the demographic and descriptive statistics describing the market survey results. In addition, most respondents come from four universities: Open University (UT), Del Technology Institute, Medan State University, and Telkom University. For tuition fees, the majority of the respondents have paid the tuition fee between IDR 1.000.000 to IDR 2.000.000, followed by respondents who have paid the tuition fee between IDR 6.000.000 to IDR 10.000.000. The result shows a significant difference between the sentiments of online courses for students and professionals. Also, the result shows that only 11% of students and 13% of professionals are unwilling to pay for the complete course package. Furthermore, the professionals have higher percentages by 8% compared to students in willingness to pay for premium features. Therefore, there is a promising business for online course providers, and this result proves the importance of this research.

TABLE 9. List of variables and parameters.

Variables	
Y	Total Cost of 1 Online Course
PRE	Cost of Preparation Phase
IMP	Cost of Implementation Phase
EVA	Cost of Evaluation Phase
MR	Market Research
SME	Subject Matter Expert Fee for New Course Material
VP	Video Production
ME	Marketing Expenses
TF	Tutor Fee
SMER	Subject Matter Expert Fee for Revised Material
VPR	Video Production Revised
CE	Cloud Expenses
p	Number of Course Materials in one time research
n	Number of Video Production
m	Number of Tutorial Sessions
e	Coefficient of evaluation (0 means not need to be evaluated, 1 means need to be evaluated)
l	Number of users

As such, we come up with a list of variables and parameters to propose a mathematical model for the cost in Table 9.

From the list of variables and parameters, we propose the following mathematical model,

$$\text{PREP} = \frac{1}{\text{p}}\text{MR} + \text{CM} + \sum_{\text{i}=1}^{\text{n}} \text{VP} \tag{1}$$

$$\text{IMP} = \frac{1}{\text{p}}\text{ME} + \sum_{\text{j}=1}^{\text{m}} \text{TF} \tag{2}$$

$$\text{EVA} = \text{e} \times \left(\text{CMR} + \sum_{\text{i}=1}^{\text{n}} \text{VPR}\right) \tag{3}$$

$$\text{Y} = \text{PREP} + \text{IMP} + \text{EVA} + \sum_{\text{k}=1}^{\text{l}} \text{CE} \tag{4}$$

As stated in the mathematical model above, the total cost of 1 unit course can be calculated by adding all the components in the four phases, including the preparation, implementation, evaluation, and infrastructure phases. Assuming that the Learning Management System is a fixed cost and is a must to provide online course services, the total cost of the preparation phase is obtained by dividing the cost of market research by the number of course materials, added with the cost of Subject Matter Expert (SME) for the course, and added with the number of video production multiplied by the cost of 1 video production. Next, the total cost of the implementation phase is obtained by dividing the cost of market expenses by the number of course materials, added with the number of tutorial sessions multiplied by the cost of one tutor fee meeting.

Furthermore, the total cost of the evaluation phase is obtained by conducting the evaluation survey/feedback to students or observing the market change; when deemed necessary, the coefficient evaluation *e* will be scored 1 or 0 when deemed unnecessary. Assuming that another SME will revise

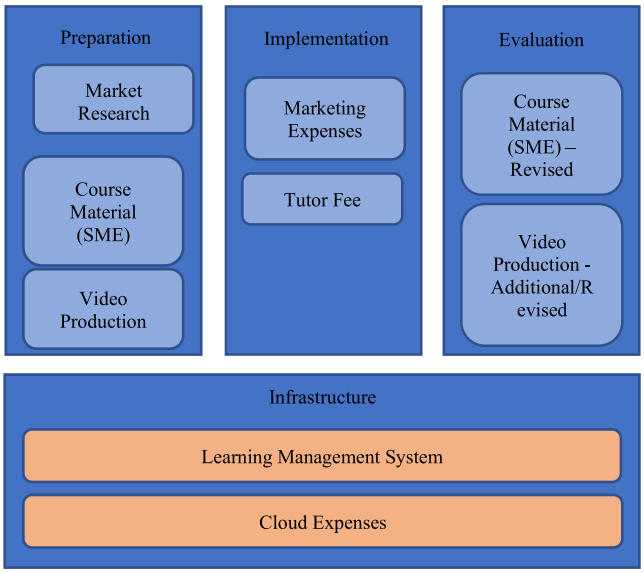

FIGURE 5. Overview of pricing model policy from four main themes.

the materials and new Video Productions will be released, the coefficient *e* will be multiplied by the total cost of hiring the new SME and producing new videos for the course. Lastly, the cost of cloud storage expenses *CE* is calculated by the number of users registering for the course.

These costs add up to a single number of costs that are a fundamental basis for the E-Learning pricing model policy for Higher education. To ensure online course sustainability, some standards are compulsory and must be met by the online course providers. In this study, each online course provider can give customers different pricing offerings, such as subscription, hybrid, certifications, and mixed models. The best pricing method could alter if the offerings change. However, the additional costs can easily be measured and added to the final price offerings. These expansions of our work demand further research.

Finally, this research concludes all the variables and calculations above and proposes the following E-learning pricing model policy (Fig. 5)

V. CONCLUSION

Regarding MOOCs, the FOMO phenomenon is widespread in natural academic groups. Many feel that ''We can't fall behind,'' even if many individuals and academic institutions lack a clear vision and justification for joining the MOOC movement. We cannot be excluded. Others believe MOOCs will bring a new ''gold rush'' to higher education. MOOCs provide chances for learning and studying. Research is where so-called premier colleges racing into MOOCs made their name [49].

Based on this fact, higher education must determine the correct pricing model for online courses and make sure that the online courses stay sustainable. Therefore, knowing the minimum standard requirements preferred by the students has been the main focus of this research. Previous studies showed that duration, personal learning preferences, interactions, reasonable cost, credentials, digital reading materials, and quality assurance are the main external factors. Learning analytics, feedback, and assistance are the main external factors that affect the students' course completion. From these minimum standard requirements, rates can be measured using comparative analysis and other pricing sources.

As a result, the pricing model is divided into four main phases, namely 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. 5.

This model shows that through the five stages of building the e-learning pricing model policy for Higher Education, we obtain four big themes that should be the focus of Higher Education Institutions when they want to take advantage of the technological advancement through online courses offered. Online courses have been alluring, noting that many institutions have delivered the services well and obtained an excellent profit.

Thus, course rates become crucial in determining the success of online courses. Rates are expected to be reasonable, which refers to the expectations met by the online courses compared to the course rates. Therefore, the proposed pricing model includes preparing and implementing online courses and evaluations. Hence, the sustainability of the online course can be ensured and performed well.

This research sends a promising message for online course providers to establish a sustainable online course while providing the expected quality in their services. As a continuation of this research, more offerings will be added to the pricing model and the mathematical model after another market survey is conducted.

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