Journal of Engineering Science and Technology
Special Issue on ISCoE2024 Vol. 20 No. 4 (2025) 96 - 102

ECONOMIC EVALUATION ANALYSIS OF CARDBOARD ENGLISH LEARNING MEDIA FOR ELEMENTARY SCHOOL

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Abstract

This study addresses the issue of ineffective and uncreative learning media in language education in Indonesia. The primary objective is to analyse the design of learning resource components - physical vehicles containing instructional materials - that can stimulate student engagement within an economic framework. Using simple mathematical analysis, the study evaluates the financial feasibility of these learning media. Economic evaluations were performed using key parameters such as cumulative net present value (CNPV), gross profit margin (GPM), payback period (PBP), breakeven point (BEP), break even cost (BEC), internal rate of return (IRR), return on investment (ROI), and profitability index (PI). Findings indicate that the industry will not generate profits during the first three years, with revenue starting to increase gradually in the fourth year. This research provides insights into the potential long-term financial sustainability of innovative educational tools in Indonesia's language learning sector.

Keywords: Cardboard, English, Learning, Media, Elementary.

1. Introduction

Ineffective and creative learning media is one of the problems in language learning in Indonesia. Media, from an educational perspective, is a very strategic tool in determining the success of the teaching and learning process [1]. Because its presence can directly provide its own dynamics for students. The word learning media comes from the Latin word, which literally means "medium," intermediary, or introduction. In Arabic, it is an intermediary or messenger from the sender to the recipient of the message. A medium, if broadly understood, is a person, material, or event that creates conditions that allow students to acquire knowledge, skills, or attitudes [2]. In this sense, they can be in the form of teachers, textbooks, and the school environment. More specifically, the definition of media in the teaching and learning process tends to mean graphic, photographic, or electronic tools to capture, process, and reconstruct visual and verbal information [3].

Learning media can also be defined as tools, methods, and techniques used to effectively communicate and interact between teachers and students in the educational and teaching process in schools. So, educational media is an effective supporting tool that can be used by teachers to achieve the desired goals [4]. Table 1 shows the state of the art of previous research.

Table 1. Research summary cardboard English learning media.

No.	Topic-Analysis	Ref.
1	A systematic review of google cardboard used in education	[5]
2	A qualitative exploration of cardboard architecture in post-pandemic schools	[6]
3	Preschool children's social and playful interactions with a play-facilitating cardboard robot	[7]
4	Brain responses to a lab-evolved artificial language with space-time metaphors	[8]
5	Probing vision and language models for construction waste material recognition	[9]
6	Negotiating language ideologies through imaginary play: Children's code choice and rescaling practices in Dominica, West Indies	[10]
7	Language comprehends are sensitive to multiple states of semantically similar objects	[11]
8	Beyond semantic distance: Automated scoring of divergent thinking greatly improves with large language models	[12]
9	No evidence for language benefits in infant relational learning	[13]

Implicitly, the word learning media includes tools that are physical and even integrated with the technology used to convey the content of teaching materials, which are composed of, among others, books, recording devices, tapes, video cameras, video recorders, films, slides (frames), photos, images, graphics, television, and computers [14]. In other words, media is a component of learning resources or physical vehicles that contain learning materials in the student's environment that can stimulate students to learn. Educational media is everything that can be used to convey messages (learning materials) and stimulate students' attention, interests, thoughts, and feelings in learning activities to achieve certain

learning goals [15]. Figure 1 shows the composition of the media, both small-scale and large-scale tools.

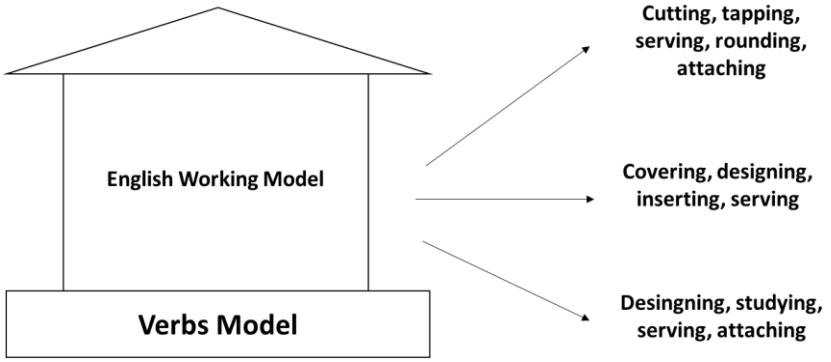

Fig. 1. Illustration image of cardboard media.

2. Literature Review

One of the learning models commonly used by teachers is the direct teaching model assisted by cardboard media. The cardboard-assisted hands-on teaching model is a learning approach specifically designed to support students' learning [16], related to declarative knowledge and well-structured procedural knowledge that can be taught with a scheme of gradual and gradual activities.

Cardboards are very effective for learning because, in addition to being able to concretize abstract things, they can also attract attention [17]. His approach to reality provides a better understanding. Figure 2 is a flowchart for media from used cardboard boxes. The function of learning media is as a learning resource that functions imaginatively, with semantics and motivation. The needs of students can be accommodated according to their learning methods, especially for those who have visual, auditory, kinaesthetic, or other types. Some common characteristics of the medium:

(i) are seen, heard, or touched by the five senses,
(ii) the emphasis of educational media is placed on images, where possible, audio,
(iii) educational media is used to communicate teacher-student interactions in the learning process,
(iv) educational media is one of the components of educational resources (messages, people, materials, vehicles, techniques, and the environment), and
(v) attitudes, actions, organizations, strategies, and their elements are related to the application of science.

3.Methods

The analysis method in this study uses a variety of different data based on the average price on the market and products available on online shopping websites to ensure the latest prices of raw materials. All data was calculated using simple mathematical analysis. Economic evaluation confirmation was carried out with the following parameters: CNPV, GPM, PBP, BEP, BEC, IRR, ROI and PI. Then, various conditions are tested in the feasibility assessment, including changes in raw materials, sales capacity, working conditions, and interest rates [18-22].

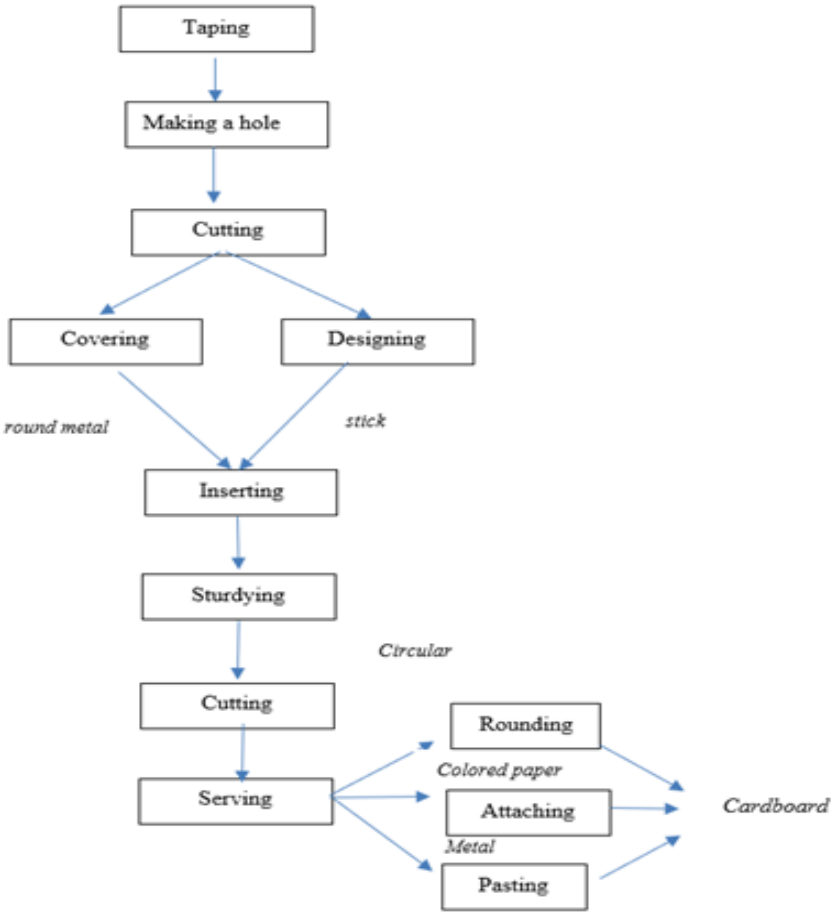

Fig. 2. Flowchart for media from used cardboard boxes.

4. Results and Discussion

The following are the results of the economic evaluation analysis that has been carried out. Before calculating the economic evaluation, the calculation of raw materials is first carried out. The calculation of raw materials consists of the tools needed in creating a single tool, along with the assumption of the details required for the needs per small-scale production and large-scale production, the price is calculated based on the number of units needed multiplied by the unit price. Then it is calculated with a prediction of large-scale needs so that the total price for each raw material will appear. The following is the composition of the raw material. Table 2 about the consumable process, the materials calculated here are products that are needed on both a small scale and a large scale.

Next is the calculation of total manufacturing cost by calculating the amount of raw materials, utilities, loan interest, operating labour, and all labour related costs including supervisory and laboratory charges. After that, it is combined with financing needs related to taxes, insurance and packaging distribution including distribution and marketing. Table 3 explains the total manufacturing cost for all

needs in a production. Figure 3 describes that the process of business development, can be done from scratch but to get a large profit requires a long time.

Table 2. Consumables prices.

No	Product	Price (IDR)	Capacity
1	Coloured paper	57,270	5 Pack
2	Cartolina	5,000	5 pieces
3	Stick metal	115,000	4 pieces
4	Stick glue	150,000	1 Pack
5	Wrapper	84,000	2 Pack
6	Scratched tape	40,000	2 pieces
7	Double-sided tape	30,000	3 pieces
8	BBQ Stick	25,000	2 pieces
9	Round metal	50,000	2 pieces

Table 3. Total manufacturing cost.

Item (Total ~~Life Time~~Lifetime)	Factor	Years	Price (IDR)
Raw Materials			166,881,000.00
Utilities			128,000.00
Loan Interest	7%	of loan	-
Operating Labor			312,000,000.00
Payroll	30%	of labour	93,600,000.00
Laboratory charges	12%	of labour	37,440,000.00
Maintenance	6%	of labour	18,720,000.00
Operating supplies	15%	of maintenance	2,808,000.00
Environmental	15%	of (equipment)	62,370.00
Depreciation	10%	of (FCI)	295,120.26
Local taxes, insurance	4%	of (FCI)	118,048.10
Plant overhead cost	100%	of (OL)	2,951,202.60
Packaging	1%	of sale	25,920,000.00
Distribution and marketing	2%	of sale	34,560,000
Total product cost (TPC)			773,483,740.96

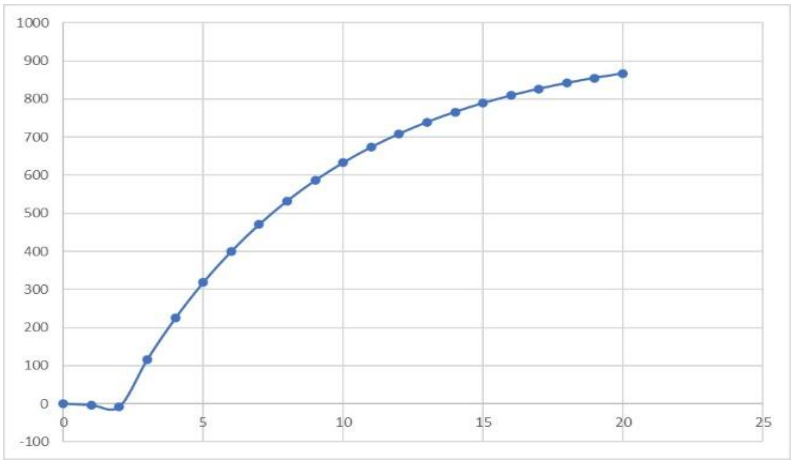

Fig. 3. Curva of Ideal conditions for CNPV/TIC to a lifetime (year).

5. Conclusions

The analysis shows that the total before measuring manufacturing costs must take into account the calculation of equipment and utilities. Manufacturing costs are greatly influenced by components such as raw materials, utilities, loan interest, operating labour, capital-related costs, and sales-related costs so that the total price needed for each item per year can be determined. Then, the BEP cost parameter can be determined by considering fixed costs, variable costs, and estimated profits. The curve illustrates that the industry will not make a profit for the first three years; revenue will creep up in the fourth year and beyond.

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