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STUDENTS' PROJECT-BASED LEARNING: LOCAL COMMERCIAL PRODUCTS AND MARKETING MIX

Abstract:

This research is a case study that explored the problems and constraints of producing and marketing of local commercial products based on Thai students' project-based learning in mathematics. This study employed an analysis of components of marketing mix and SWOT analysis of local commercial products using Thai students' project-based learning. These local commercial products were collected from sample schools in Amnajar Charoen Province, Nan Province, and Payao Province Thailand. The components of marketing mix: 4Ps consisted of product, price, place and promotion, and SWOT analysis matrix strategies were employed to analyzed data. The research findings revealed that project-based learning approach provides opportunities for students to integrate the contents of different subject areas to the production process. However, it did not good enough in business. The factors affecting on local commercial products using the students' project-based learning were based on their products, prices, places and promotions. These findings showed that local commercial products using Thai students' project-based learning in mathematics have no brand name, the cost of production per unit is very high, no proper place to sell the products, and not enough promotion. The research findings were in line with the main four elements: 4 Ps of marketing mix theory.

Keywords:

students' project -based learning, local commercial products, marketing mix, SWOT analysis, and SWOT analysis matrix strategies

JEL Classification: I29

Introduction

The purpose of this paper is to describe the research findings of this case study that explain the problems and constraints of marketing of local commercial products based on Thai students' project-based learning in mathematics.

In Thailand, mathematics is a compulsory subject for every student at all levels. The Ministry of Education (MOE) announced that the mathematics learning area aims to have all students continuously learning mathematics in accordance with their full potential (MOE, Thailand 2008). Mathematics plays an importance role in enhancing students thinking skills especially in creative thinking, critical thinking, problem solving skills and decision making in daily life. There are six learning standards of mathematics stated in intended curriculum of the Basic Education Core Curriculum B.E. 2551 (A.D. 2008) MOE, Thailand. The six learning standards consisted of the numbers and operations, measurement, geometry, algebra, data analysis and probability, and mathematical skills and processes. In addition, MOE Thailand announced that student-centered learning have to be used in the learning classroom. Teachers need to design learning activities that allow students to demonstrate what and how they are learning. The teaching and learning approaches to be used in student-centered mathematics classes as suggested by MOE Thailand are constructivist approaches, cooperative learning, problem solving, mathematics project-based learning and the use of information and communication technology.

Mathematics Project-Based Learning

Mathematics project-based learning approach is one of the learning activities that shift away from the traditional classroom practices which are isolated, and teacher-centered. This approach emphasizes learning activities that are long-term, interdisciplinary, student-centered, and integrated with real world tasks to enhance learning. Students engage in project-based learning generally work in cooperative groups for extended periods of time, and seek out multiple sources of information (Oon-Seng Tan, 2003). Mathematics project-based learning approach provides opportunities for students to apply and integrate the content of different subject areas such as mathematics, arts and the use of technology to the production process. Thai students have to design and develop their mathematics skills that relate to their daily lives. This idea was supported by Masingila, J (1993), she said that it is her contention that the gap between doing mathematics in school situations and doing mathematics in out-of-school situations can only be narrowed after much is learned about mathematics practice in the context of everyday life.

Marketing Mix

The basic meaning of the word "market" that the marketers learn as they start out in the market is putting the right product in the right place at the right price and at the right time. Marketing was define as a process by which individuals and groups obtain what they need and want through creating and exchanging products and value with others. Marketing definition is based on the concepts of needs, wants, demands, marketing offers exchange, transaction and relationship, value and satisfaction, products, services and experiences (Kotler & Armstrong, 2004).

The marketing mix is one of the most famous marketing terms. According to Kotler & Armstrong (2006) the marketing mix is the set of controllable, tactical marketing tools that the firm blends to produce the response it wants in the target market. The marketing mix consists of everything the firm can do to influence the demand for its product. The possibilities variables can be grouped into four variables known as the “four Ps or 4Ps”: product, price, place and promotion.

Kotler & Armstrong (2006) explain that **Product**, the first **P** means the goods and services combination the company offers to the target market. The second **P**, **Price** is the amount of money charged for a product or service or the sum of the values that consumers exchange for the benefits of having the product. The third **P**, **Place** is the location where the service is actually going to be delivered. The product should be available from where your target consumer finds it easiest to shop. The final **P**, **Promotion** includes all of the activities marketers undertake to inform consumers about their products and to encourage potential customers to buy these products.

SWOT Analysis

According to Albert Humphrey (2015) SWOT stands for strengths, weaknesses, opportunities and threats. Strengths and weaknesses are internal SWOT factors. Opportunities and threats are external SWOT factors. A strength and opportunity is a positive factor while a weakness and a threat is a negative factor. The researcher employs SWOT analysis as a tool to audit the producing and marketing of local commercial products based on Thai students’ project-based learning in mathematics. The results of SWOT analysis shall provide the information to turn the weaknesses into strength and threats into opportunities. The findings will give the important part of the planning and looking at the existing position to do the business in the future.

Students’ Project-based Learning and Local Commercial Products

The contents in mathematics are involved in every piece of goods/products such as size, shape and pattern. The use of mathematics project-based learning approach enhance students in exploring and creating mathematics content to commercial product such as weaving, patterning of broomstick, and ceramics design. The students are able to apply knowledge on graph of functions and arts to create the patterns of Thai textile weaving design. They incorporate multiple transformations of functions ranging from trigonometric functions to logarithmic functions to absolute value functions. These new designed were passed to weavers in the community, including to the students’ parents, who wove them into commercial products using traditional hand looms. The new fabric pattern came up with the beautiful fabric design.

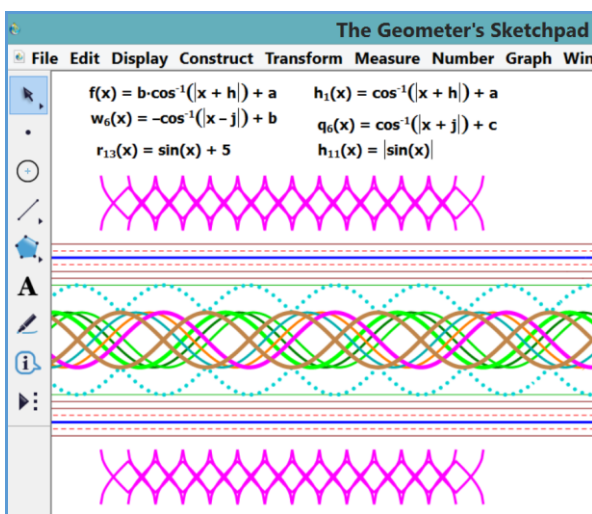
The Examples of students’ project-based learning and their products are as follows:

- 1) From functions to Nan fabric designed by students of Srisawat Witayakarn School, Nan Province. Thai weaving textile was designed by the students of

Srisawat Witayakarn School, Nan Province Thailand. The students applied knowledge on graph of functions and used a mathematics dynamic software program: The Geometer's Sketchpad (GSP) to create the patterns of Thai weaving textile design. The students used GSP to create the graphs of trigonometric function especially graph of $\sin \theta$, $\cos \theta$, arcsine θ , and arccos θ and came up with the fabric design name "Kleau-Klun" (Khairiree, 2010).

Figure 1: Students' Project-Based Learning: Kleau-Klun Design using GSP

Figure 2: The Local Weaver and Kleau-Klun Fabric Commercial Product



2) Mud-Mee: Lai KarnKab is a new patterns designed by the students of Phana Suksa School, Amnajok Province. The students applied knowledge on mathematics in the topics of translation rotation and reflection to create the patterns of Mud-Mee: Lai KarnKab.

Figure 3: Students' Project-Based Learning: Mud-Mee Lai KarnKab

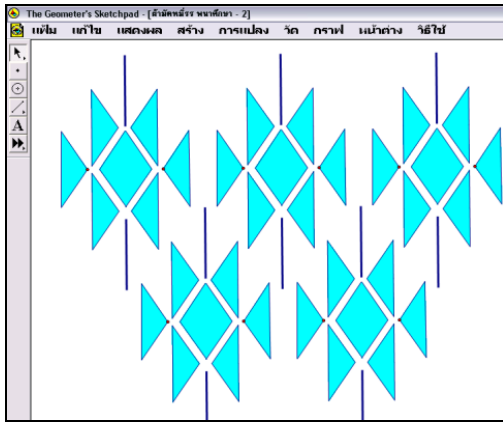


Figure 4: The Weaving Fabric Local Commercial product



3) From geometry in mathematics to broomstick and walking stick designed by students of Payao Witayakarn School, Payao Province. The students applied knowledge learned on geometry, translation, reflection and symmetry topics in mathematics to create the patterns of broomstick design.

Figure 5: Students' Project-based Learning: The Patterns of Broomsticks Design

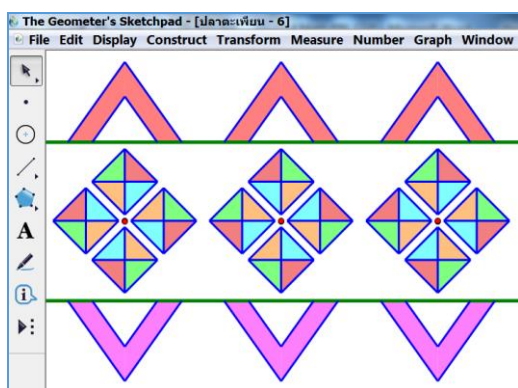


Figure 6: The Broomsticks Commercial Products at Payao Province



Research

This research is a case study that explored the problems and constraints of producing and marketing of local commercial products based on Thai students' project-based learning in mathematics. Data of the study were collected from students' project-based learning and their local products from schools in Amnaj Charoen Province, Nan Province, and Payao Province Thailand. In this study, the researcher collected data from various resources such as classroom observations, students' project reports, newspaper, and commercial products. Semi-structured interviews with the teachers and students were also conducted.

Research Question

What are the problems and constraints of producing and marketing of local commercial products based on Thai students' project-based learning?

Research Findings

The components of marketing mix: 4Ps consisted of product, price, place and promotion, and SWOT analysis matrix strategies were employed to analyzed data.

The research findings and results are displayed in Table 1 below.

Table 1: SWOT Analysis and Local Commercial Product using Thai Students' Project-Based Learning

	Strength	Weakness	Opportunities	Threats
Product	<p>1. New product and new design</p> <p>2. Good example how mathematics can be employed in daily life.</p> <p>3. The new product was recognized as a local product of the province.</p>	<p>1. No brand name</p> <p>2. Not easy to weave the new fabric pattern</p> <p>3. It took longer time to weave the new fabric patterns than the traditional pattern.</p> <p>4. Few weaver who can weave the new patterns</p> <p>5. Able only to produce in a small volume because of handmade.</p>	<p>1. Thailand Government may supports the new products in order to increase the household income.</p> <p>2. New products can be recognized as Government project "OTOP: One Tambol One Product"</p>	<p>1. New products have No brand name.</p> <p>2. The new products are well known only in the group of students, teachers and the local community.</p> <p>3. The buyers want to buy the traditional fabric products more than the new one.</p>
Price	<p>The price of new products are not expensive when compare to the traditional products.</p>	<p>1. Cost per unit is very high.</p> <p>2. Less profit.</p>	<p>The products can have more profits if the schools received the budget from the Government.</p>	<p>1. The schools have no budget for investment.</p> <p>2. Students have to use their own money to produce their products.</p>
Place	<p>The products are sold in school and OTOP shop of the province.</p>	<p>1. No proper place and no distribution channels.</p> <p>2. Sale only in the local community or in province.</p>	<p>New products can be sold as Government project "OTOP: One Tambol One Product"</p>	<p>Many similar local products and new products in the same shop.</p>
Promotion	<p>1. Personal selling</p> <p>2. The new products are well known in the same community or in the province.</p>	<p>1. Not enough promotion</p> <p>2. No budget to promote the products.</p>	<p>New products can promote as Government project "OTOP: One Tambol One Product"</p>	<p>The students' new products are new brand. Companies prefer to sponsor the local products.</p>

Based on the SWOT analysis matrix strategies, the researcher found that local commercial products using Thai students' project-based learning in mathematics have no brand name, the cost of production per unit is very high, no proper place to sell the products, and not enough promotion.

Conclusions

The research findings revealed that project-based learning approach provides opportunities for students to integrate the contents of different subject areas to the production process. However, it did not good enough in business. The factors affecting on local commercial products using the students' project-based learning were based on their products, price, place and promotion. The research findings were in line with the main four elements: 4 Ps of marketing mix theory.

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