

# Developing a Model of Newspaper Literacy-Based Business Mathematics Learning in Higher Education: Preliminary Analysis Stage

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**Abstract**—The today's graduates of university are exceedingly demanded to be better able to apply the knowledge they have already learnt into the world of work. In fact, the understanding of the problems of mathematics in the real world is still an obstacle for the college graduates. This research aims at developing a model of Newspaper Literacy-based Business Mathematics Learning. This type of research was a Research and Development (R&D) using instructional Model of Plomp [21]. This model encompassed of three cycles, namely, preliminary research, prototyping and assessment phases. However, this paper mainly focused on analysing the basic philosophy of the curriculum, theoretical concepts, and students' characteristics. This research is expected to generate a valid, practical, and effective instructional model.

**Keyword**—*Newspaper Literacy, Mathematical Literacy, Problem-Based Learning*

## I. INTRODUCTION

Mathematics is widely applied in daily life that academically related to the various fields of science. Mathematics is mostly used to solve the real-world problems. Principally the kind of science, mathematics, is noticed as a primary subject in many different fields. [1], [2], [3].

Mathematics is one of the tools used in analyzing economic and business problems. Mathematics contributes to the economic life of people. The economic studies are required to prepare its own graduates to master the mathematics skills because these skills are determinant keys of entering the new real-life. Besides, Mathematics plays an indispensable role in developing individual reasoning for being entrepreneurs. [4], [5], [6].

Real-life issues covering economic, business and mathematical issues can be found in the mass media. Therefore, newspapers can be an imperative part in learning. Mathematics and economics were headlines of a newspaper which have been going on for decades. Even in 1978, the *New York Times* accommodated 950 articles which were primarily encompassing mathematical issues explicitly and implicitly [7],[8]. Pragmatically, the effect of newspaper as learning media had been a primary capital in educational practices in various countries. The newspaper has been considered as sources of knowledge. Using newspaper in the teaching and learning processes is one of the appropriate ways of preparing college students to play a role in society. [9], [10], [11].

Involving the newspaper in learning is one way of that supports students to understand and interpret the lessons contained in the news in the newspaper. Steps that can be taken are newspaper literacy. Revealing the approach of literacy through mass media is closely related to the literacy view that refers to the real world, [11]. Media literacy is easily done through broadcast content such as movies, television programs, magazines and newspapers. Media literacy certainly looks like a concept that helps everyone to more effectively and efficiently use and select the myriad of media information encountered. [11]. Activities in the news literacy are expected to help students become problem solvers and apply those skills in other classes and in the wider world. [12]

Math learning that involves a newspaper should be well designed to achieve the objective of learning. The ability of lecturers to apply the appropriate learning model is required to prepare the students to have better mathematical knowledge and skills. The lecturers should be able to propose mathematics learning that describes how lecturers think his/her students learn math well; how to understand the role of lecturers and students during teaching and learning processes, [13]. In fact, the Ministry of Education and Culture (2014) in the curriculum guide of higher education expressed some of the main problems of learning in universities, namely, the lack of understanding the essence of the curriculum in the educational system; the lack of preparation of lecturers in preparing learning tools before learning, the lack of clarity of the formulation of learning achievement; unclear strategy and learning methods, unclear whether the choice of strategies and methods of learning is the right choice to bring the learning achievements that have been set.

Skills and competencies are the ability to do something. They are the potential to master the knowledge that is easier to do some actions or activities. To engage students to learn as much as possible is a challenge for lecturers to relentlessly encourage them to study. [14] They can propose five students' mathematical abilities, namely problem solving, reasoning proof, communication, connections and representation.

Mathematical literacy is one's ability to identify, understand the role of mathematics in the real world and is one way of solving constructive problems in the life and future of the individual. Mathematical literacy is consistent with broad and integrative theories about the structure and use of language as reflected in the study of

socio-cultural literature. [15], [16]. Literacy in the context of mathematics is the power of using mathematical thinking in problem solving to be better prepared to face life's challenges. [17]

News literacy is a new kind of literacy rooted in the real world of instant information, global interactivity, and messages created on multiple platforms media. News literacy is a part of media literacy gaining scientific attention in schools and colleges. News in various media are such as newspaper, radio and television. [18], [19], [20].

In the world of education, newspapers have been widely used. In school, newspapers give students an understanding that what is happening in the world is important for life and family, [21] outline the instructions for carrying out the cycle. There are several things that were included, assigning different role models to students in a small group, giving the journal to record information about a given role. Students and/or teachers can choose an article to read, as students read the article with a particular focus and write important notes in their journals; they are ready to share information with their small group. In addition to retelling from the journal and asking questions to other students, the reader should be able to add comments to other student information sections. Student reports his or her field of expertise and no further comment, the discussion leader will summarize what has

happened within the group. The newspaper literacy should be done by 3 to 5 students per group. [22]

Problem-based learning is a model that can help students build knowledge and problem-solving skills and help students master important knowledge. [23]. The problems presented in problem-based learning are contextual and close to daily life [23]. Furthermore, [24],[23], Problem-based Learning is a learning which results obtained through a process of understanding the problem or obtaining a solution to a problem. There are five stages of problem-based learning activities such as student's orientation on issues, organizing students to learn, guiding individual and group investigations, developing and presenting the work, analyzing and evaluating problem-solving processes. [25]

## II. METHOD

The Plomp model consists of three stages, namely the preliminary analysis stage, the prototype development stage, and the assessment phase. In the initial analysis phase, there were needs analysis, curriculum analysis, concept analysis, and analysis of student characteristics. Needs analysis is done by having interview. Interviews were conducted on lecturers and students to explore information about the learning process that has been going on. Some of the information explored in the preliminary research is as follows.

TABLE 1. SUMMARY OF PRELIMINARY RESEARCH

Activities	Focus
Needs Analysis	Needs analysis focus on assessing the needs of prospective users i.e. lecturers and students. Needs analysis is done by studying newspaper literacy, learning tools, learning models, content, business process context and math, and assessment instruments.
Curriculum Analysis	In this curriculum analysis, there is an assessment of the objectives, content, organization or arrangement of teaching materials (horizontal and vertical) as well as evaluation of business (test and non-test) math learning.
Concept Analysis	The concept analysis is studied about the name, definition, hierarchy type, example, and not examples of concept.
Analysis Characteristics of Students	Analysis of students' characteristics conducted in this study more related to the characteristics of students viewed from the mathematical ability and their response to the model of PBL

## III. RESULTS AND DISCUSSION

### A. The Result of Needs Analysis

#### 1) Investigation Results of the Initial Need for PMB-BNL Model

The results of preliminary research conducted at Bangkinang STIE describes that the learning carried out so far has not supported the students' mathematical abilities after studying Business Mathematics. The lecturer's knowledge about newspaper literacy is still minimal. Nevertheless, lecturers have used news about

economics and business to assist students in understanding business math problems. Learning tools are made in complete accordance with applicable provisions in universities, and lecturers have their own instructional materials, in addition to encouraging students to enrich references with various textbooks.

Lecturers have applied several models of learning, including the PBL model in Business Mathematics lectures. In learning, lecturers noticed many students who are difficult to solve the problems of mathematics in

everyday life, especially in the business world. Although in general, the mathematical concepts for business mathematics have been taught at senior high school level but the students still have difficulties in understanding and solving business math problems, including related to the market balance involving two functions namely the function of demand and offer. The business math context in general can be compiled by involving business math problems in everyday life to improve students' understanding, but sometimes building relevant concepts is found to be a constraint, for example related to roots, rank and logarithms. In business math learning, a series of problem-solving activities involves the entire process of mathematics, i.e. from formulating to interpreting. The questions given at the college evaluation use essays, relating to the materials that have been taught and discussed during the lectures. Assessment is not only done on final exam results, but also related to mid semester exams, attendance, participation and assignment levels.

On the other hand, students preferring mathematical problems taken from daily life to motivate them to be able to understand the mathematical context and solve business math problems well. Students find that it is easy to know how mathematics is used in real life. However, students still have difficulty in using mathematical concepts,

especially if they are more complex, such as using more than one equation, as well as for solving market equilibrium problems. Students like group learning because it is easier to work together in solving problems. In lectures, students are provided with modules and student activity sheets (MFIs), but many students are still reluctant to fill the MFI and are not interested in adding references to assist in understanding concepts and solving math problems. Although, for example, students can trace mathematical problems in the mass media, but they have not been able to interpret the problem in accordance with the mathematical concepts being taught.

*2) Results of Curriulum and Bussiness Mathematical Concepts Analysis*

The course of business mathematics discussed the basic mathematics needed to understand the phenomenon of economy and business. A mathematical approach, an economic phenomenon can be analyzed more easily and simply because the complicated variables can be expressed in terms of symbols and verbs that can be expressed in terms of mathematical relationships. To achieve the objectives of learning business mathematics to improve students' mathematical skills, changes are made, as described in table 2 as follows.

TABLE 2. ANALYSIS OF BASIC COMPETENCE

<b>Basic Competence</b>	
<i>Curriculum</i>	<i>Change</i>
Applying the concept of linear functions in the field of business and economics covering materials are: <ol style="list-style-type: none"> <li>1. Function Demand, Supply and Market Equilibrium</li> <li>2. Effect of Taxes and subsidies to balance Market</li> <li>3. Analysis of Break Event Point</li> </ol>	Apply the concept of linear function in the field of business and economics covering the material including: <ol style="list-style-type: none"> <li>1. Demand Function, Supply and Market Balance</li> <li>2. Influence of Tax and Subsidy on Market Balance</li> <li>3. Break Event Point Analysis</li> </ol> that has been elaborated from the problem of business field contained in newspaper online and offline. Troubleshooting is done following the procedure of newspaper literacy and comes with the use of excel applications, for further interpretation into the real world.

Table 2 lists one of the KDs that have been changed to support the achievement of business math learning goals in universities. For example, on the material demand function, students are not only directed to solve linear equations in the form of a demand function, but learning begins with presenting problems related to the demand function in the newspaper and then performed the procedure of newspaper literacy to understand the problem so as to lead students to better understand the material being studied with real life conditions. Furthermore, problem solving comes with the use of Excel applications to familiarize students with the results of problem solving and to interpret them clearly and easily understood by non-mathematicians.

Concept analysis is a procedure developed to assist lecturers in planning teaching sequences for conceptual achievement. One of the concepts in business mathematics is the linear function. Functional elements

are variables, coefficients and constants. Linear function is a function, which it variable is one rank, or a function that the graph is a straight line. This problem of linear function in Student Activity Sheet begins with related news contained in the newspaper and then directed to the understanding of mathematical concepts.

*3) Results of Students' Characteristics Analysis*

Students at STIE Bangkinang who are generally already working students, are not interested in learning math. The mathematical ability, in general the average ability is only limited to the understanding of concepts and problem solving for simple cases. The ability of reasoning, connections, representation and communication of students are still low. Regarding the response to learning, students are interested when learning begins with the presentation of the problem. Students have not been able to maximally motivated to elaborate the source or course material to solve the given problem.

In general, students prefer to study in groups. STIE Bangkinang students who follow the business math courses are still unable to come up with new ideas for problem solving and not yet confident to put forward the idea of problem solving in discussion activities.

#### IV. CONCLUSION

Based on the results of preliminary analysis, it can be concluded that Newspaper literacy plays a role in supporting students to be better trained in problem solving in the business world by using mathematics as a tool and also able to reinterpret it in real life. Besides, the improvement of the students' mathematical skills totally requires the development of newspaper literacy-based business mathematical learning model. Where in the development of this model, it generated instructional products of the lecturer books, student books and model book.

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