
Empowering College Students Critical Thinking Skill Through Mathematic and Newspaper Literacies

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ABSTRACT

In this 21st century, Mathematic Literacy plays important roles in the world of mathematics education. Learners are expected to be mathematical literate and are able to understand and actualize it in real-life problems. The real-life problems of mathematics, for example the graphics of Economic Inflation, can be easily found in the on and offline newspapers. The newspapers literacy is expected to advocate to students' mathematic literacy. Today, the mathematics is often abstractly valued so that it hardly affects the students' ability to solve mathematic problems found in the real-life.

This research is literatur research that studies, analysis, and concludes literatture. This paper will discuss about the relationship between Mathematic and Newspaper Literacies. Furthermore discuss how to the empowering college studens critical thinking skill trough mathematic and newspaper literacies.

Keyword : *Mathematics Literacy, Newspaper Literacy*

Introduction

Our life can not be separated from mathematics. Math is the language of technology, and it is used to solve problems in engineering, economics, communication and many other diverse fields. "Mathematics is a common human activity, increasing in importance in a rapidly advancing, technological society. A greater proficiency in using mathematics increases the opportunities available to individuals. Students need to become mathematically literate in order to explore problem-solving situations, accommodate changing conditions, and actively create new knowledge in striving for self-fulfillment".(Proceeding MCATA, 2002)

Mathematics is not only computation and an emphasis on manipulation and symbolic logic. Mathematics uses symbols to

represent concepts, vocabulary that has differing meaning from our everyday language, and text structure that makes use of succinct writing. (Kavin Ming, 2012). While some students are content with knowledge for the sake of knowledge, most students want to know why something should be of importance to them. One thing they will generally accept is that If we can find the mathematics we are covering in the newspaper then they know they need to understand the mathematics in order to understand what they are reading. If we can help them see the need to understand mathematics in order to be a well informed consumer or citizen then we increase our chances of improving their attitudes and performance, (Worth, 2002).

DISCUSSION

Mathematics Literacy

Math enables us to advance our understanding of our ever-changing world and to manage the technologies that help us to live successful and productive lives. Strong math skills are vital as we move forward in the information age. Various mathematical topics can be found in the real life. “Mathematical literacy is an individual’s capacity to formulate, employ and interpret mathematics in a variety of context. It includes reasoning mathematically and using mathematical concepts, procedures, facts and tool to describe, explain and predict phenomena. It assists individuals to recognizes the role that mathematics plays in the world and to make the well-founded judgements and decisions needed by constructive, engaged and reflective citizen”. *Programme for International Student Assesment (PISA)* (2013). Elliot Eisner (1997) suggests the following view of literacy. It is inclusive and honours the many ways we come to understand and live in our world. “*In order to be read, a poem, an equation, a painting, a dance, a novel, or a contract each requires a distinctive form of literacy, when literacy means, as I intend it to mean, a way of conveying meaning through and recovering meaning from the form of representation in which it appears.*”

Mathematics literacy has been constructed on an important structure for the PISA test. This structure is based on the expression of mathematics competencies of students. In the PISA test, mathematics literacy refers to the ability of students to interpret their knowledge and skills and to use them in different conditions (Altun & Akkaya, 2014; Cosgrove, Perkins, Shiel, Fish, & Mcguinnes, 2012; Koğar, 2015). Mathematical Literacy is connecting mathematics to the real world, using mathematics appropriately in a variety of contexts, communicating using the richness of the language of mathematics, synthesizing, analyzing, and evaluating the mathematical thinking of others,

appreciating the utility and the elegance of mathematics, understanding and being conscious of what has been learned mathematically (Proceeding of MCATA Spring Syimposium 2002).

Students will be looking at deeper meanings and understandings of mathematics. They will have more opportunity to work in problem-solving contexts and to search for relationships and meanings themselves. The problems that they solve as applications of their learning will, to the extent possible, be based on real world contexts. Students require more than basic skills and procedures to be mathematically literate. It lays out the mathematics standards we need to address at each grade level and provides a solid base for mathematical literacy. Six different student levels were defined for the PISA mathematics literacy taking into consideration the ability of students to use top level cognitive skills (Aksu, 2017).

Level 1 (358-419 points): The students at this level can answer questions where all relevant information is present and the questions are clearly defined.

Level 2 (420-481 points): The students at this level students are considered to be sufficient in processes that require conclusion from one or more propositions. They can employ basic algorithms and formulae.

Level 3 (482-543 points): The students at this level can execute clearly described procedures, including those that require sequential decisions.

Level 4 (544-605 points): The students at this level can carry out actions by using pre-defined models when there are complex and concrete problem situations that may involve constraints and assumptions.

Level 5 (606-667 points): The students at this level can develop and work with models for complex situations. They can identify constraints and specify

assumptions regarding the models they develop. They can select, compare, and evaluate different strategies when they face complex problems.

Level 6 (668-1000 points): The students at this level can conceptualise, generalise and utilise information based on their investigations and modelling of complex problem situations. They can develop new and different approaches and strategies for the solution of the novel problems.

The competencies needed for mathematics literacy are described in the work of Program for International Students Assessment (PISA) under the auspices of OECD and are in line with description by Steen (2001):

- *Mathematics Thinking and Reasoning:* Posing questions characteristic of mathematics; knowing the kind of answers that mathematics offers; distinguishing among different kinds of statements; understanding and handling the extent and limits of mathematical concepts.
- *Mathematical Argumentation:* Knowing what proofs are; knowing how proofs differ from other forms of mathematical reasoning; following and assessing chains of arguments; having a feel for heuristics; creating

and expressing mathematical arguments.

- *Mathematical Communication:* Expressing oneself in a variety of ways in oral, written, and other visual form; understanding someone else's work.
 - *Modeling:* Structuring the field to be modeled; translating reality into mathematical structures; interpreting mathematical models in terms of context or reality; working with models; validating models; reflecting, analyzing, and offering critiques of models or solutions; reflecting on the modeling process.
 - *Problem Posing and Solving:* Posing, formulating, defining, and solving problems in a variety of ways.
 - *Representation:* Decoding, encoding, translating, distinguishing between, and interpreting different forms of representations of mathematical objects and situations as well as understanding the relationship among different representations.
 - *Symbols:* Using symbolic, formal, and technical language and operations.
- Tools and Technology:* Using aids and tools, including technology when appropriate.

Newspaper Literacy

Newspaper is not only for reading. Newspaper can be used to increase student literacy. Sanderson (1999) puts forth strong arguments in favor of using newspapers within the classroom. He asserts that using newspapers within the classroom encourages extensive reading by giving students the confidence, the motivation and the ability to continue their reading outside the classroom. Newspapers also keep students informed about what is happening in the world, thereby extending their knowledge and deepening their understanding. For this reason, they are of

general educational value and importance to students. Patterson (2007) said, news in the classroom is one of the best ways to prepare students for their role of citizens.

Newspapers can even serve as a tool for instruction. Newspaper In Education is a cooperative effort between a newspaper and a local school system to use the newspaper as a tool for instruction. The newspaper provides copies to the school, usually at a reduced rate, for use in the classroom. (Estes, et al, 2005). In her research use science literacy activities is to have students read a newspaper (Clark, 2009).

Bernadowski (2011) said that every educator is a teacher of reading the expression goes. That might be a difficult mantra to live by if you consider yourself a mathematician or historian. The truth is that despite your area of expertise, you will find yourself teaching reading and writing at some point during the day in middle or high

school. You may be teaching reading to adolescents who struggle to read. Berdowski made a framework for literacy strategy with newspaper as follows :

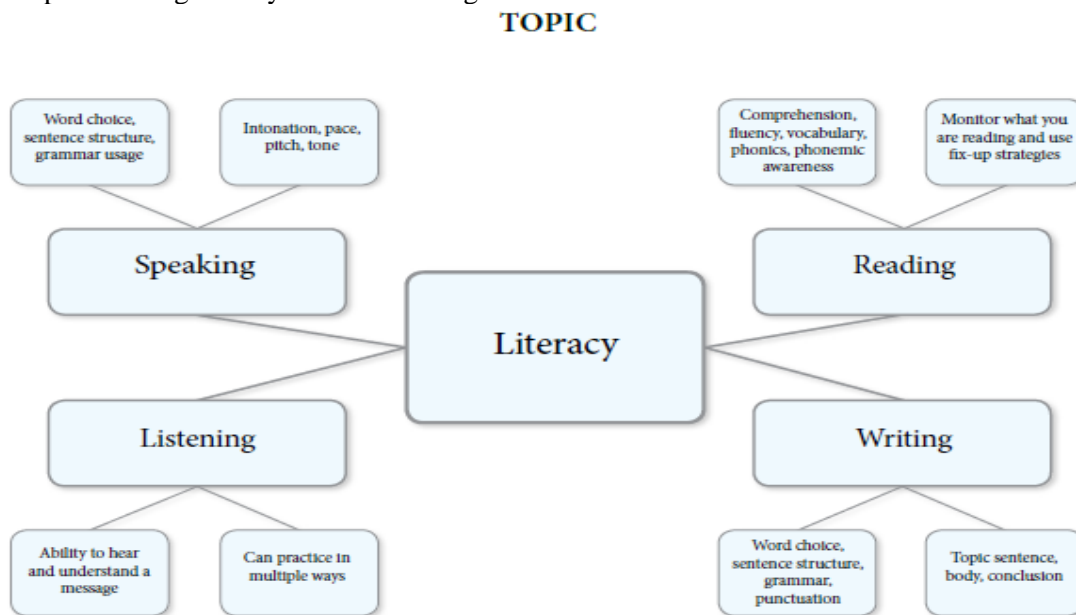


Figure 1. Literacy Strategies With Newspaper

Newspapers motivate students by offering them the opportunity to learn with reality. Students can put the concepts they learn into the context of the here and now. In addition, newspapers are adaptable to all levels of ability and interest. The wide

variety of features provides something interesting for every reader. From the front-page news to sports to the comics, students are sure to find material that makes them want to interact with the printed word. (NAA, 2006).

Related Mathematics Literacy and Newspaper Literacy

Various mathematical problems in the newspaper must be well understood by students to be able to take the mathematical concepts contained in the news. Worth, Professor Department of Mathematics and Computer Science Henderson State University whose presentation at the Arkansas Conference on Teaching (Little Rock Arkansas, 2002), deals with using various media sources as classroom examples of daily use of mathematics.

Newspaper literacy can be used to develop students' critical thinking skills. The middle grades are critical to developing those skills, as students continue to build on the mathematical learning foundation they began in elementary school. Their conceptions about themselves and their abilities will form the strategies with which they approach learning throughout the rest of their lives. Ultimately, those self-concepts will have an impact on their

opportunities in life. It is extremely important, then, that students find the math experience in middle school both demanding and supportive. For this reason and others, teachers are challenged daily to find new ways of engaging students in learning by using meaningful activities and relevant material. It is clear that students learn best when they are motivated and studying material that is relevant to their lives. The newspaper is of tremendous value in bringing the real world of authentic data into the classroom. (NAA, 2006).

Every day we can find news that has math content. The real-life problems of mathematics, for example the graphics of Economic Inflation, can be easily found in the on and offline news papers. West (1991) explained that the newspaper can be valuable tool for the mathematics teacher in convincing students that consumer and basic math skill are critical in everyday life. From a simple calculation of the total cost of a few grocery product to the more challenging calculations of total financed

solving techniques via mathematics. West written fifty activities to guide provide more comprehensive introductory, instruction and space for calculation. The activity sheet format may assist the teacher in evaluation of student works, without collecting whole pages of the newspaper form the students. Shaw (2005) spell out 32 activities at the research classroom for grades 4-12 using four key characteristics of effective classrooms to thoughtful literacy using newspaper. Developing critical thinking skills is an increasingly important part of the curriculum in elementary and secondary schools. Using newspapers in the classroom can provide an opportunity for students to practice these new skills as they examine daily coverage of national and local issues. The op-ed page is also a valuable forum for ideas and opinions which can spark lively discussion. At the student activities, we have 4 thinking level, there are application, analysis, synthesis and evaluation.(NAA, 2011).

CONCLUSION

Our life is inseparable from mathematics. To increase the student abilities of mathematical literacy, can be done using the newspaper as a tool in instruction. Newspaper literacy is also needed so that

students can understand what is explained in every news that contains math. We can use any activities to developing critical thinking skills of student.

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