

## MATHEMATICAL COMMUNICATION ACROSS CULTURE

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### Abstract

The world has more complex and pluralistic cultures, the topic of mathematical communication becomes important to discuss. Many studies has been done in the field of intercultural communication but not specific in communication mathematics across culture. Purposes this paper to give information about communication mathematics discuss unique aspects to achieve success in different culture. This paper give the reason why students failed build communication mathematics in different culture, solution can be given to be successful in learning.

### INTRODUCTION

National Council Teachers of Mathematics (NCTM, 2000) sets five process skills for the student's that is (1) mathematical communication, (2) mathematical reasoning and proofing, (3) mathematical problem solving, (4) mathematical connections, and (5) mathematical representations. Communication skills in world of works have an important. Recruitment of both teachers and employees in companiesthrough an interview test, and sure require the ability to communicate. In fact, teacher is a work that uses a lot of communication not only to the students but to the parents too so 2013 curriculum encourages students to communicate a lot, not only writing but also orally.

Manifestation of the mathematical ability through the ability to solve mathematical problems need to be developed early because it can help students in solving in daily problems in their life. If students have practice, more experience has gained so as to encourage someone to become a good problem solvers. Thus, it is important for teachers

to facilitate students to learn and practice math problem solving. In addition, ability to solve mathematical problems, social attitudes are also important to develop early too. As human beings, can't live alone without help of the others. Human always have a relationship for all they needs of his life situation. So, in everyday life both at home, at school, and in human society will not be separated from social attitudes. The application of these social attitudes can create a harmonious, peaceful, harmonious life in daily situation.

Factors affecting social attitudes are internal factors and external factors. Internal factors are factors that exist in the human person itself, while external factors are factors that exist outside the human person (Ahmadi, 2002:171). Internal factors of a person's ability to receive and process influences from outside. Individuals do selection to accept or reject the influence from outside adapted to the motives and attitudes that exist within him. This outward influence comes from families, schools, communities, peers and mass media. Teachers as facilitators in the

learning process should design appropriate teaching materials to be applied which of course must be in accordance with the student's condition and the student's environmental situation. Teachers must be clever in choosing a models or learning approach to be applicable to the students in the school. Learning should connected with students' living environments or real-life situations experienced by students and utilize a culture as a learning material.

Based 2006 curriculum to develop ancreative activity, appreciation math in daily life situation that is curiosity, attention and interest and self-efficacy in problem solving (Depdiknas, 2006). So, self-efficacy is a beliefs possessed by human to process related in daily life situation. If students have high self-efficacy and good performance because have strong motivation, goals, emotions, and performance ability. Indicator self-efficacy in this paper based on Noer (2012) that's (1) performance achievement, (2) student's experiences, (3) verbal persuasion, and (4) psychological index.

## **METHOD**

Method that used in this paper is to examine some of the literature related to cross-cultural problem solving. The author reviewed the literature related to mathematical problem solving and its relation to cross-cultural counseling. We want to provide examples of mathematical problems related to cross cultural environments in some areas. In this paper, we can give example problems based on culture related in daily situation.

## **RESULT AND DISCUSSION**

The paradigm of learning has changed, the students who have to dominate the learning activities in the classroom, the students as the object and subject of learning, knowledge must be actively built by students with group interaction. Students have to communication skills and learned in the school. Communication relating to the

delivery of messages from one subject to another object in related community. Communication is the delivery and understanding of messages from one person to another that we called communication is a social process. Roben (2008) suggests that communication is a behavioral activity to delivery of messages or information about thoughts or feelings to another person.

Ansari (2004) said that communication is the process of delivering messages from the sender of the message to the recipient of the message through a certain channel with a specific purpose. Thus, it can be concluded that the mathematical communication is the process of delivering messages or mathematical information orally or in writing from a messenger to the recipient of the message using a particular media with a specific purpose. In the communication must be considered how to make a message that someone can be understood by others. To develop communication skills, people can deliver in different languages including mathematical languages.

Communication skills become important when inter-student discussions are conducted, students are expected to be able to express, explain, describe, hear, ask and cooperate so as to bring students to a deep understanding of mathematics (Harlen, 1992; Pimm, 1996). Pimm in his research that children given the opportunity to work in groups in collecting and presenting data, they showed good progress where they listened to one another's ideas, discussed them together and raised the idea as their group idea, even they were able presents data in the form of bar charts vertically or horizontally. Apparently they learn most from communicating and constructing their own knowledge. Communicating with students should be trained through the making of questions with friends in the group to generate a clear response. If students assessed their level of understanding and communication in

mathematics, they need to practice the art of asking questions.

Construction of knowledge they get from the experience of their respective cultures. Developing a local culture in the learning process is one of the elements of national education as proposed (Alexon, 2010:3) that members of society are cultured. The culture he cultured must have been a civilized culture. Certainly there are cultural elements that are measured according to national and global size, not worthy of being included in a civilized culture. As the times progress, the elements of local culture undergo changes as long as they do not make a person lose their roots of culture. Local cultural values are the values that are first recognized by an Indonesian man. Therefore, the maintenance and development of local culture is one of the elements of national education.

The addition, this cultural element means presenting a culture in the learning process using a contextual approach. The use of this culture-based CTL approach allows students to better understand a concept because students are directly involved in the learning process. Teachers can simultaneously remind and increase students' love of a local culture to students, so that learning is more meaningful for students. Use of contextual approaches can train and improve students' mathematical communication skills. In order to realize this, it is necessary for the main efforts of teachers and counselors to cooperate. Thus, making meaningful and contextual learning is closely related to the cultural community, where a field of science is learned and will be applied later, and with the cultural community from which you originate. Making learning interesting and fun, learning conditions that allow the creation of contextual meaning based on experience as a member in a cultured society.

Examples problem in across culture in mathematics problems.

“My mother bought eggs for 22.000 rupiahs and each plate contains 16 grains.

If the eggs that mother bought 8 plates and resold with a profit of 200 rupiahs per item, what is the whole egg sale price?”. The problem is contextual in the city on the island of Java, but not contextual for the region of Papua, Sulawesi, NTT, and many island in Indonesian. This is because the price of eggs in the region of Papua more expensive when compared with the Java region. This is because the cost of delivery from the island of Java to all regions in Indonesia very expensive. Calculation of birthday according to Javanese custom using modulo number system. This is certainly not applicable in other areas outside of Java, especially the area of East Java and Central Java. The Javanese calendar as well as other calendars shows the year, month, date and day of the day. In this calendar system there are seven days, weeks to Saturday there are also five market days: “kliwon”, “legi”, “pahing”, “pon” and “wage”. In Java, two kinds of days are combined to remember important events, such as someone born on “Sunday Legi” or “Monday Wage”, someone dies on “Friday Kliwon” or “Friday Wage”. In the Javanese culture, the day cycle system is diverse.

From this problems “Aunty took  $\frac{2}{4}$  kg of chili in the garden. The next day Aunty harvested more  $\frac{3}{4}$  kg of chili. How many chilies are harvested?”. This problems can solved by students if they understand concept fraction, but this problem not related in daily situation, because impossible took  $\frac{2}{4}$  kg of chili in the garden. Smart student can explore meaning from the problem that given by the teachers, if they feel the problem not contextual to related daily life situation so students can experience difficulty to solved the problem. So, if the teacher would give problems to their students must be meaningful and related to daily situation.

## CONCLUSION

The vision above is described in mathematical learning objectives proclaimed by the KTSP-Curriculum (2006) and 2013-Curriculum, and in accordance with the recommendation of NCTM (2000), which aims to develop: 1. The ability to solve mathematical problems emerged from real life; 2. The ability to use mathematics as a tool of communication; 3. The ability to relate the idea within mathematics; 4. The ability to reason mathematically in any circumstances, such as critical thinking, logical, and systematic; be objective, honest and disciplined in looking at and solving problems. Communication is much more than words—written, spoken, or unspoken. It is also in how a person participates in or orchestrates discussion (in a hallway or in a meeting). Conversation is shaped by what a person knows or anticipates about colleagues' previous experiences and how to attend to that in the context of the goals of a given professional interaction. Pugalee (2001) said students need to be familiarized in learning to give an argument for each answer as well as to respond to answers given by others, so that being studied becomes more meaningful. Through, culture-based learning will be more meaningful and longer to remember the lessons it learned. Its form with a mathematical communication which is the process of delivering messages or mathematical information orally or in writing from a messenger to the recipient of the message using a particular media with a specific purpose. In the communication must be considered how to make a message that someone can be understood by others. To develop communication skills, people can deliver

in different languages including mathematical languages.

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