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CULTURE-BASED CONTEXTUAL LEARNING TO INCREASE PROBLEM-SOLVING ABILITY OF FIRST YEAR UNIVERSITY STUDENT

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Abstract

The purpose of this study is to show the differences in problem-solving ability between first-year University students who received culture-based contextual learning and conventional learning. This research is a quantitative research using quasi-experimental research design. Samples were the First-year students of mathematics education department; Nusa Cendana University consists of 58 students who were divided into two groups each of 29 students. The results showed there are differences in the n-gain average of problem-solving ability significantly between students who receive culture-based contextual learning and conventional learning. The n-gain average of experiment group is 0.51 or medium category while the average n-gain of the control group is 0.29 or low category. Student categories of SNMPTN and Mandiri are significantly different whereas students' category of SBMPTN between the two groups does not differ significantly.

Keywords: problem-solving ability, contextual learning, culture based

Abstrak

Tujuan penelitian ini adalah untuk menunjukkan perbedaan kemampuan pemecahan masalah mahasiswa tahun pertama di universitas yang mendapatkan pembelajaran kontekstual berbasis budaya dengan geogebra dan pembelajaran konvensional. Penelitian ini merupakan penelitian kuantitatif dengan desain penelitian kuasi-eksperimental. Sampel adalah siswa tahun pertama jurusan pendidikan matematika, Universitas Nusa Cendana yang terdiri dari 58 mahasiswa dan dibagi dalam dua kelompok masing-masing 29 mahasiswa. Hasil penelitian menunjukkan ada perbedaan peningkatan rata-rata kemampuan pemecahan masalah secara signifikan antara siswa yang mendapatkan pembelajaran kontekstual berbasis budaya dan pembelajaran konvensional. Rata-rata n-gain kemampuan pemecahan masalah kelompok eksperimen adalah 0.51 atau kategori menengah sedangkan rata-rata n-gain kelompok kontrol adalah 0.29 atau kategori rendah. Kategori mahasiswa dari jalur SNMPTN dan Mandiri berbeda secara signifikan sedangkan kategori mahasiswa SBMPTN antara kedua kelompok tidak berbeda secara signifikan.

Kata kunci: kemampuan pemecahan masalah, pembelajaran kontekstual, berbasis budaya

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A problem is the situation that is faced by a person in life that requires a solution and the solution would not be readily (NCTM, 2000; Schoenfeld, 1992; Polya, 1945). It is important to realize that a problem for one person may not be a problem for others person because it is operating at different development levels. Krulik dan Rudnick (1988) reveal a problem is a situation, quantitative or otherwise, that confronts an individual or group of individuals, that requires resolution, and for which the individual sees no apparent path to obtaining the solution. Furthermore, they distinguish three commonly used terms namely question: a situation that can be resolved by recalling from memory, exercise: a situation that involves drill and practice to reinforce a previously learned skill or algorithm, and problem: a situation that requires thought and a synthesis of previously learned knowledge to resolve.

A question that is a problem for a person if:

1. Relative, depending on the situation and condition of someone who deals with it,
2. Cannot be resolved directly with routine procedures but still allow the person to get it done through data selection information and the organization of its concepts,
3. It is understood, meaning that a question in a particular field will be an issue only for those studying or working in these fields (Prihandoko, 2006).

Learning mathematics is to learn to solve problems. The term "problem-solving" refers to mathematical tasks that have the potential to provide intellectual challenges for enhancing students' mathematical understanding and development (NCTM, 2010). These conditions allow for mathematics is a human life activity. Problem-solving is a major focus of the learning of mathematics today after ignored longer. Mathematics is considered different with the students' daily life activities. One of the mathematics learning objectives in curriculum 2006 is to solve the problems that include the ability to understand the problem, devise a mathematical model, solve the model and interpret the obtained solution. Solving problems is not only a goal of learning mathematics but also a major means of doing so. It is an integral part of mathematics, not an isolated piece of the mathematics program. Students require frequent opportunities to formulate, grapple with, and solve complex problems that involve a significant amount of effort. They are encouraged to reflect on their thinking during the problem-solving process so that they can apply and adapt the strategies they develop to other problems and in other contexts. By solving mathematical problems, students acquire ways of thinking, habits of persistence and curiosity, and confidence in unfamiliar situations that serve them well outside the mathematics classroom (NCTM, 2000).

The problem-solving ability that is developed today is not only focused on middle school level but also at the higher education level. In analytic geometry lessons recent years, the mathematical problem-solving ability of first-year university students is low. This condition was caused the attention of learning activities did not in the student's cognitive development. The first, 'transitional' year of a mathematics program at a research-intensive university aims to deepen understandings of the transition to 'advanced mathematical thinking', or in effect, 'rigor and proof (Jooganah & Williams, 2010). The first year is an adaptation period to be successful at advanced levels. Learning activities are more focused on the delivery of teaching materials and student independent work will bring them into university learning situation at the university which emphasizes advanced mathematical thinking since the first year. The erroneous treat from the students' adaptation process tends to be more severe. Students experience learning as a pressure on the cognitive processes that result in the inability to solve the problem properly.

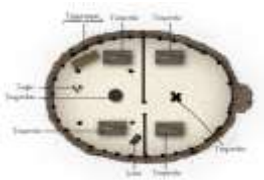
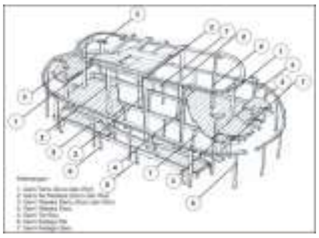
The first-year university is a period of transition. Theoretically, the transition requires very good bridges between mathematics middle school level and mathematics at university. One link in the transition process is a learning activity that corresponds with the needs of the students. Such links are indicated treatment that is still characterized by middle school level learning but with a focus on developing problem-solving ability appropriate university level. This learning can be done with contextual teaching and learning. Contextual teaching and learning is a learning which links the material with the real-world context of students' everyday life either within family, community, environment, and the world of work so that students are able to make connections between knowledge possessed by its application in everyday life. There are eight main components of contextual teaching and learning: 1) making meaningful connections, 2) doing significant work, 3) self-regulated learning, 4) collaborating, 5) critical and creative thinking, 6) nurturing the individual, 7) reaching high standards, and 8) authentic assessment Johnson (2002)

The contextual learning indicates the learning activities are experienced as part of life. This condition is in accordance with the demands of today learning that learning begins with observing the activities that are part of a scientific approach. Curriculum 2013 has given a space widely to accommodate the contextual problems as the introduction of learning activities also tests of indicators achievement. So far, contextual learning has been applied in learning with contextual aspects in general and not accommodated the richness of Indonesian culture. The researcher tries to integrate culture in contextual learning activities in the analytic geometry subject named culture based contextual learning. Culture-based contextual learning on this study begins with an identification of mathematics aspect in the East Nusa Tenggara culture. The mathematics aspects are studied in the form of a simple mathematical aspect or higher-level mathematics aspects that practiced by certain cultural groups. Based on the above background, the purpose of this study is to show the differences in problem-solving ability between first-year University students who received culture-based contextual learning and conventional learning.

METHOD

This research is a quantitative study with a quasi-experimental design. Samples are the first-year students of Mathematics Education Department of Nusa Cendana University which consist of 58 students who were divided into two groups with details of a group culture-based contextual learning consists of 29 students and a group of conventional learning consists of 29 students. The research variables consist of the independent variable, dependent variable, and control variable. Independent variables are culture-based contextual learning and conventional learning. The dependent variable is problem-solving ability. The control variable is the state university entry requirements consists of SBMPTN, SNMPTN, and Mandiri. Pretest and post test data were analyzed by Mann-Whitney U Test, t-Test, and two-way ANOVA. The experiment group was taught by culture-based contextual learning with the details of mathematics aspects and cultural are seen in Table 1.

Table 1. Mathematics aspects and culture

Material	Culture and its description
Circle	*Mbaru Niang* is a traditional stilt house in the village of *Wae Rebo, Flores* which has a conical shape and has 5 floors with the diameter of each floor are 11m, 9m, 6m, 3m, and 1.8m. The high of *Mbaru Niang* is 15m and have 9 main pole pieces are arranged at regular intervals, as well as the supporting pillars are arranged in a regular pattern in accordance with the diameter of the floor  (Source; Antar, 2010)
	The traditional house in the *Kaenbaun TTU* village is called *Ume Kbubu*. *Ume* means house and *Kbubu* mean circle. So *Ume Kbubu* is a circle house ancestral or is often called the mother home. The floor is circular with *Ni Enaf* as the center. The radius of the largest 6m. Total timber supporting customized home with a diameter of floor *Ume Kbubu*.  (Source; Lake, 2014)
Ellipse	*Sonaf* is a traditional building in the *Maslete TTU* village. There are two types of *Sonaf* namely *Sonaf Son Liu Nis None* and *Sonaf Son Liu Tusala*. *Sonaf Son Liu Nis None* is a residential building of King/Royal Palace is also called *Sonaf Bikomi*. *Sonaf* building is a non-stage building with an elliptical floor and has ± 3.5 m radius minor and major radius ± 4.65 m. The high of Sonaf is 5 m.  (Source; Nugrahaeni & Suprijanto, 2010)
	 (Source; Kapilawi, 2015) *Ammu Hawu Rahi* is a one of the traditional building of Sabu that often referred to as *Ammu Hawu* or Sabu House. Horizontal cross section of the structure is elliptical with two decks.
Parabola	 (Source; Wikipedia) *Sasando* is a stringed musical instrument played by plucking. *Sasando* has a unique form and different from other stringed instruments in which it looks like a parabola. The main part of *Sasando* is a long tubular made of special bamboo. *Sasando* size varies slightly but most small bamboo middle usually measuring 40 cm.

RESULT AND DISCUSSION

In this section, I would describe classroom learning activities, the results problem-solving ability pretest and posttest, learning activities observations, student response and result discussion.

Description of learning activities

Phases of culture-based contextual learning activities (experiment group) starting with present the contextual problem. Presentation of contextual problems can be displayed in pictures, stories, videos and more with the various problems that enable student to review their activities to think critical, analytic and creative. The second phase is presentation some questions that provokes and activate students' thinking skills. Questions are emphases on critical and analytic thinking abilities. After this phase, problem-solving discussion activities begin. Students solve the problem individually and groups and then presentation and reflection.

Problem-solving results

The pretest and posttest results of problem-solving ability in both classrooms based on learning groups and students' category are presented in Table 2.

Table 2. Pretest and posttest results of problem-solving ability

Group	Category	n	Pretest average	Posttest average	n-gain	n-gain category
Experiment	SBMPTN	10	10.33	54.50	.52	Medium
	SNMPTN	14	3.81	50.59	.49	Medium
	Mandiri	5	1.33	53.67	.53	Medium
	Total	29	5.63	47.13	.51	Medium
Control	SBMPTN	10	6.00	34.33	.32	Medium
	SNMPTN	14	4.52	34.52	.31	Medium
	Mandiri	5	1.33	24.00	.23	Low
	Total	29	4.48	32.64	.3	Medium

Based on the analysis, the n-gain average of the problem-solving ability of experiment group is higher than the control group. Review on the university entry requirements, n-gain average in SNMPTN and SBMPTN category are medium category except for the Mandiri category. Normality analysis of n-gain average is presented in Table 3.

The data normality test result of experiment group n-gain average with the Kolmogorov-Smirnov presents a probability value (sig.) = 0.072 or greater than 0.05, which means n-gain average of experiment group derived from a normally distributed population. The data normality test result of posttest control group presents a probability value (sig.) = 0.001 or less than 0.05, which means n-gain average of the control group derived from not normally distributed population.

Table 3. Normality analysis of n-gain average

Groups	Categories	n	n-gain	Normality test	Sig.	Decision
Experiment	SBMPTN	10	0.52	.173	.200	Normal
	SNMPTN	14	0.49	.146	.200	Normal
	Mandiri	5	0.53	.302	.153	Normal
	Total	29	0.51	.155	.072	Normal
Control	SBMPTN	10	0.32	.197	.200	Normal
	SNMPTN	14	0.31	.295	.002	Not Normal
	Mandiri	5	0.23	.198	.200	Normal
	Total	29	0.298	.227	.001	Not Normal

Based on the results, n-gain average difference analysis between the experiment group and control group use Mann-Whitney test. The difference test between the category of SBMPTN and Mandiri in both learning groups uses statistical t-tests, while test the difference category of SNMPTN in both learning groups use Mann-Whitney test. The result of n-gain average difference based on the reviews both groups and learning categories is presented in Table 4.

Table 4. N-gain average difference

Groups	Categories	n	n-gain	Normality test	Sig.	Decision
Experiment	SBMPTN	10	0.52	.173	.200	Normal
	SNMPTN	14	0.49	.146	.200	Normal
	Mandiri	5	0.53	.302	.153	Normal
	Total	29	0.51	.155	.072	Normal
Control	SBMPTN	10	0.32	.197	.200	Normal
	SNMPTN	14	0.31	.295	.002	Not Normal
	Mandiri	5	0.23	.198	.200	Normal
	Total	29	0.298	.227	.001	Not Normal

The probability value (Sig.) of n-gain average difference between experiment and control groups is greater than 0.05 so H_0 is rejected, which means there is difference in the n-gain average of problem-solving ability significantly between students who receive culture based contextual learning and conventional learning or in other words the different treatment of learning that both groups give an effect of differing significantly towards problem-solving ability. From the data, students who have been taught with culture-based contextual learning have an n-gain average problem-solving ability higher than the conventional learning. From this description, it can be concluded that the culture-based contextual learning is effectively applied to increase the student's problem-solving ability. Category of SNMPTN students between these two learning groups and category of Mandiri students between these two learning groups have n-gain average different significantly. Unlike the categories of SBMPTN between the two learning groups do not differ significantly. Two-way ANOVA test illustrates the interaction between the learning and university entry requirement categories and its effect on problem-solving ability are presented in Table 5.

Table 5. The interaction test of problem-solving ability n-gain average

Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	.678[a]	5	.136	2.087	.082
Intercept	7.701	1	7.701	118.582	.000
Learning	.641	1	.641	9.865	.003
University entry	.008	2	.004	.061	.941
Learning * university entry	.029	2	.014	.222	.801
Error	3.377	52	.065		
Total	13.480	58			
Corrected Total	4.055	57			

a. R Squared = .167 (Adjusted R Squared = .087)

In the learning factor effect, because the probability value (sig.) < 0.05 then H_0 is rejected, which means there is an effect of learning factor toward the students' mathematics problem-solving ability. In the university entry requirements factor effect, because the probability value (sig.) > 0.05 then H_0 is accepted, which means there is no university entry requirements effect factor toward students' mathematics problem-solving ability. Furthermore, for the learning interactions and university entry requirements, because the probability value (sig.) > 0.05 then H_0 is accepted, which means there is no interaction effect between the learning factor and the university entry requirements factors toward increase student mathematics problem-solving ability. The Figure 1 clarifies the interaction between the learning and university entry requirements category towards student's mathematics problem-solving ability.

Figure 1 shows the average increase problem-solving ability with categories, namely SNMPTN, SBMPTN, and Mandiri in relation to the two types of learning activities. There is no interaction between the two types of learning and third category of university entry requirements toward the increased problem-solving ability. The different of n-gain average of culture based contextual learning and conventional learning is 0.3014, thus it can be said that the culture-based contextual learning more effectively used in learning for Mandiri students.

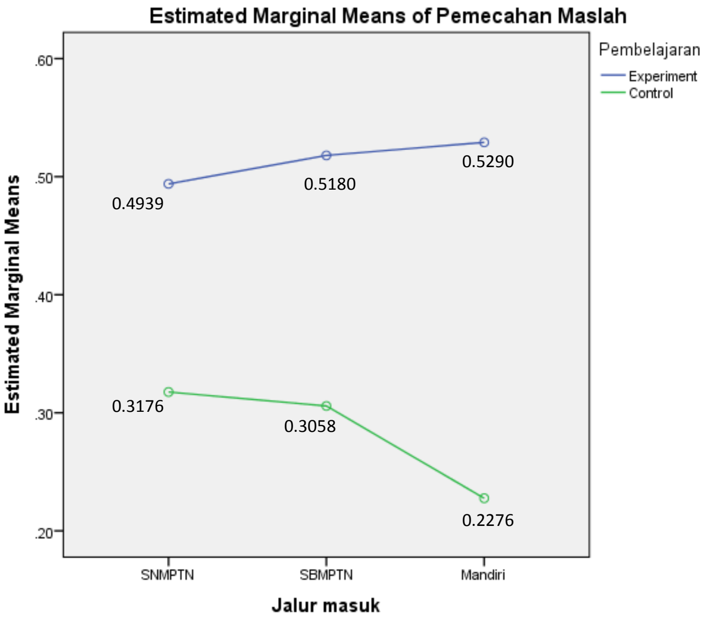


Figure 1. The interaction between the learning and university entry requirements

This research presents two important things, namely problem-solving and cultural integration into learning. Problem-solving activities are important things that are the goals of today's education, especially mathematics. According to Halmos (1980), problem-solving is “the heart of mathematics”. As the heart of mathematics, then problem-solving has some goal i.e., improve students' willingness to try problems and improve their perseverance when solving problems, improve students' self-concepts with respect to the abilities to solve problems and make students aware of the problem-solving strategies (Adoğdu & Ayaz, 2008).

The next important thing is cultural integration. Cultural aspects are closely related to the mathematical aspects. Nevertheless, many views express culture apart from science (Cobern, 1993). In this study, researchers conducted an exploration of regional culture and identified the mathematical aspects of the culture. Some aspects of the culture that researchers present have a mathematical value also show the progress and the complexity of the thinking way of cultural society.. The presentation of culture is a link between reality and formal mathematics. Approaching the teaching and learning of mathematics from a cultural standpoint serves a two-pronged purpose: It tends to build a bridge between the student's background knowledge, and the formal mathematics teaching and learning the student would encounter over several years in a typical school setting (Ezeife, 2002). In addition, according to D'Entremont (2015), mathematical concepts based on cultural perspectives allow students to not only reflect and appreciate their own culture, but also the culture and traditions of others. Culture is the prior knowledge that is closest to the students so starting mathematics learning with culture will enable their experience to engage in higher mathematical processes.

The positive impact of cultural integration in mathematics learning is seen in this study. The results showed the culture based contextual learning can increase student mathematics problem-solving ability with an average increase of 0.51 or in the medium category, while the conventional learning, increase student mathematics problem-solving ability with an average increase of 0.30 or in the medium category. This difference is due to different orientations in learning. Conventional learning more focused on material achievement, material mastery, and numeracy skills. Culture-based contextual learning requires students to prefer the ability to think not count, cooperating, sharing ideas and meta cognition. This difference is due to different orientations in learning.

Culture-based contextual learning can increase problem-solving ability in the medium category similar to conventional learning. This learning has the advantage theoretically and support for increasing problem-solving abilities, but not be able to increase the problem-solving ability to the high category. This condition is possible because problem-solving is not a problem that is often studied by students. Tambychika & Meerah (2010) revealed that students lacked in many mathematical skills such as number-fact, visual-spatial and information skills. Lack of general problem-solving skills or cultural context problem and word problem is caused by carelessness, lack of understanding, inability to represent problems to mathematical models and the presence of unusual words on the problem (Dela Cruz & Lapinid, 2014; Angateeah, 2017, Jupri & Drijvers, 2015, Nguyen & Rebello, 2009). Furthermore, problem-solving strategies learned at lower levels tended to be ignored instead of being applied in their mathematical engagements at the higher levels, possibly because of the routine nature of the high-stake national examinations (Leong & Janjaruporn, 2015). This situation becomes quite difficult for students to change the outlook and habits in mathematics past. Achievement in the medium category is caused by students experiencing the culture-based learning activities as something new. The students' weakness generally is to understand this cultural issue or problem is not fully understood in relation to the problem of commanding and interpreting the results in the context of the problem. Many students have difficulty in interpreting or understanding the cultural issues that are transformed into geometric shapes. These difficulties resulted from students' capability of solving the problems technically but not in accordance with the context of the problem with the results that the conclusion and interpretation of the problem are incorrect.

The results of this study are consistent with the opinion of Kadir (2015). Kadir integrates coastal culture into the linear equations system learning. The use of coastal context in learning mathematics significantly enhanced students' mathematical problem-solving skills compared to those with the conventional learning. This implies that the coastal context should be used as alternative context in teaching mathematics. In future, it is interesting to evaluate the effect of coastal context in C-Math teaching materials on the other high-order mathematical thinking skills (Kadir, et.al. 2015). Furthermore, Tandiseru (2015) and Palinussa (2013) develop learning with a cultural context to develop creative thinking skills. Creative thinking ability is also a problem-solving ability that encourages problem-solving in many ways. Both provide a similar description of the positive influence of cultural context integration with creative thinking ability. Some of these studies provide cultural integration in mathematics learning. The foundation for thinking is the same that culture is a source of everyday learning. Students with their environment are a learning experience in a different culture. Thus, integrating the culture in mathematics learning makes the students familiar with the mathematical content.

The result of the difference between students with an overview of different university entry showed the students in SBMPTN category have no difference in the average n-gain significantly. Students SBMPTN category are the student with a good individual ability. This individual's ability supports the students' ability in solving problems of cultural context. Various studies have revealed different entry qualification will contribute differently to the achievement of students (Yusof & Tamat, 2015; Aidoo-Buameh & Ayagre, 2013; Kukwi & Amuche, 2014; Maharani, Sukestiyarno, & Waluyo, 2017). This difference is due to differences in individual ability which is a good predictor of the learning achievement of mathematics (Andaya, 2014). Nevertheless, some researchers report no correlation between entry qualification and student performance (Babaloba, 2015; Falaye, 2015; Syamsuri, et al. 2017; Ismail & Rahman, 2017). The difference is influenced by different entry qualification reviews. In general, entry qualification reviews based on individual ability. That review presents similar results that there is a positive correlation of qualification entry with student achievement.

The application of contextual learning by integrating the local culture has several advantages such as; 1) to introduce the mathematics that exists in the culture. Culture contains learning values which is unfortunately raised and introduced infrequently as part of the learning activities, 2) to learn mathematics as their life activities, 3) to give introduction of culture into the right steps to encourage students to love their culture and preserve it, 4 to develop students’ ability to think to solve the cultural context problem.

CONCLUSION

Culture-based contextual learning is a learning approach based on constructivism by integrating cultural as part of the learning activities. The culture was appointed and introduced as an introduction to learning activities, with the content of mathematics and evaluation instruments. The results showed differences in enhancement between the problem-solving ability of students taught by culture-based contextual learning and conventional learning which culture-based contextual learning better able to increase the problem-solving ability than conventional learning. Moreover, in a review of the university entry, students with SNMPTN and Mandiri have differences increase problem-solving ability significantly. Integrating culture into learning activities is one of the other recommendations aimed at introducing local culture as identity also shows the relationship of culture with science. This lesson only presents some cultural aspects related to geometry content. Other researchers can explore more and integrate in mathematics learning at elementary and high school. Its purpose is to introduce culture and learn mathematics in that culture.

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REFERENCES

Andaya, O.J.F. (2014). Factors that affect mathematics achievements of students of Philippine Normal University-Isabela Campus. *International Refereed Research Journal*, *5*(4), 83-91.

Angateeah, K. S. (2017). An investigation of students' difficulties in solving non-routine word problem at lower secondary. *International Journal of Learning and Teaching*, *3*(1), 46-50.

Antar, Y. et al. (2010). *Pesan dari Wae Rebo: kelahiran kembali arsitektur nusantara: sebuah pelajaran dari masa lalu untuk masa depan*. Jakarta: Gramedia.

Aydoğdu, M., & Ayaz, M. F. (2008). The importance of problem-solving in mathematics curriculum. *e-Journal of New World Sciences Academy*, *3*(4), 538-545.

Babalola, I. T. (2015). Relationship between entry qualification and performance in a'level chemistry: a case study of school of basic and remedial studies, Yobe State University, Damaturu, Yobe State. *African Educational Research Journal*, *3*(2), S1-S6.

Buameh, J. A. & Ayagre, P. (2013). The effect of entry grades on academic performance of university accounting students: a case of undergraduates of central university college. *Research Journal of Finance and Accounting*, *4*(7), 198-206.

Cobern, W.W. (1993). *Contextual constructivism: The impact of culture on the learning and teaching of science.* In K. G. Tobin (editor), The practice of constructivism in science education (pp. 51-69). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

D'Entremont, Y. (2015). Linking mathematics, culture and community. *Procedia - Social and Behavioral Sciences*, 174 (2015), 2818 – 2824. International Conference on New Horizons in Education, INTE 2014, 25-27 June 2014, Paris, France.

Dela Cruz, J.K.B., & Lapinid, M.R.C. (2014). *Students' difficulties in translating worded problems into mathematical symbols*. Paper Presented at the DLSU Research Congress 2014 De La Salle University, Manila, Philippines.

Ezeife, A.N. (2002). Mathematics and culture nexus: the interactions of culture and mathematics in an Aboriginal classroom. *International Education Journal*, *3*(3), 176-187.

Faleye, B.A. (2015). Predictive validity of students' entry qualifications into mathematics programme in Nigeria's Osun and Oyo States' Colleges of Education. *Journal of Education and Human Development*, *4*(4), 209-217.

Halmos, P.R. (1980). The heart of mathematics. *The American Mathematical Monthly*, *87*(7), 519-524.

Ismail, Z. & Rahman, S.N.A. (2017). Learning 2-Dimensional and 3-Dimensional Geometry with Geogebra: Which Would Students Do Better?. *International Journal on Emerging Mathematics Education*, *1*(2), 121-134.

Johnson, B.E. (2002). *Contextual teaching and learning: connecting content to context. What it is and why it's here to stay.* California: Corwin Press, Inc., Thousand Oaks.

Jooganah, K., & Williams, J. (2010). *The transition to advanced mathematical thinking: socio-cultural and cognitive perspectives. In Joubert, M. and Andrews*, P. (Eds.) Proceedings of the British Congress for Mathematics Education April 2010 (113-120) Proceedings of the British Congress for Mathematics Education. England: University of Manchester.

Jupri, A. & Drijvers, P. (2006). Student difficulties in mathematizing word problems in algebra. *Eurasia Journal of Mathematics, Science & Technology Education*, *12*(9), 2481-2502.

Kadir, et. al. (2015). Coastal context in learning mathematics to enhance mathematical problem solving skills of secondary school students. *Proceedings of the 14th International Conference on Education and Educational Technology*, *15*(16), 95-102.

Kapilawi, Y. W. D., Antariksa, & Nugroho, A. M. (2015). Lokalitas struktur konstruksi rumah tradisional Sabu di kampung adat Namata, NTT. *Review of Urbanism and Architectural Studies*, *13*(2), 60-66.

Krulik, S. & Rudnick, J.A. (1988). *Reasoning and problem solving: a handbook for elementary school teachers*. Boston: Allyn and Bacon, Inc.

Kukwi, I.J. & Amuche, C.I. (2014). Entry qualifications as predictor of students' final year academic performance in Nasarawa State College of Education Akwanga Nigeria. *American International Journal of Research in Humanities, Arts and Social Sciences*, *7*(1), 38-42.

Lake, R.Ch. (2014). Konsep ruang dalam dan ruang luar arsitektur tradisional Suku Atoni di kampung Tamkesi di Pulau Timor. *E-Journal Graduate Unpar Part D-Architecture*, *1*(2), 61-74.

Leong, Y.H., & Janjaruporn, R. (2015). *Teaching of problem solving in school mathematics classrooms.* In S.J. Cho (ed.), The Proceedings of the 12th International Congress on Mathematical Education, Seoul, Korea, 8-15 July 2012.

Maharani, H.R., Sukestiyarno, & Waluya, B. (2017). Creative Thinking Process Based on Wallas Model in Solving Mathematics Problem. *International Journal on Emerging Mathematics Education*, *1*(2), 177-184.

National Council of Teachers of Mathematics. (2000). *Executive Summary Principles and standards for school mathematics*. Reston. VA: Author.

National Council of Teachers of Mathematics. (2010). *Why is teaching with problem-solving important to student learning?* Reston. VA: Author.

Nguyen, D., & Rebello, N.S. (2009). *Physics Education Research Conference*. AIP Conference Proceedings, 1179 (1), 221-224. USA: American Institute of Physics.

Nugrahaeni, R. & Suprijanto, I. (2010). Interpretasi makna bangunan tradisional Sonaf di kampung Maslete (bangunan tradisional Atoni, kabupaten Timor Tengah Utara, Propinsi NTT). Seminar Jelajah Arsitektur Nasional ITS, 1-10. Surabaya: Institut Tehnologi 10 November Surabaya

Palinusa, A. L. (2013). Students' critical mathematical thinking skills and character: Experiments for junior high school students through realistic mathematics education culture-based. *Journal on Mathematics Education*, *4*(1), 75-94.

Polya, G. (1945). *How to solve it*. New Jersey: Princeton University Press.

Prihandoko, A.C. (2006). *Pemahaman dan penyajisan konsep matematika secara benar dan menarik*. Jakarta: Direktorat Jenderal Pendidikan Tinggi Departemen Pendidikan Nasional.

Schoenfeld, A.H. (1992). *Learning to think mathematically: problem-solving, metacognition, and sense-making in mathematics*. New York: MacMillan.

Sudiarta, I.G.P. (2013). Pengaruh model pembelajaran IKRAR berorientasi kearifan lokal dan kecerdasan logis matematis terhadap kemampuan pemecahan masalah matematika, (Online). (http://fmipa.um.ac.id/index.php/component/attachments/download/154.html). Retrieved on August 17, 2016

Suwito, A. & Trapsilasiwi, D. (2015). Pengembangan model pembelajaran matematika SMP Kelas VII berbasis kehidupan masyarakat Jawara (Jawa dan Madura) di kabupaten Jember. *Jurnal Ilmiah Pendidikan Matematika (JIPM)*, *4*(2), 1-9.

Syamsuri, Purwanto, Subanji, & Irawati, S. (2017). Using APOS Theory Framework: Why Did Students Unable To Construct a Formal Proof?. *International Journal on Emerging Mathematics Education*, *1*(2), 135-146.

Tambychika, T. & Meerahb, T.S.M. (2010). Students’ difficulties in mathematics problem-solving: what do they say?. *Procedia Social and Behavioral Sciences 8* (2010), 142-151. International Conference on Mathematics Education Research 2010 (ICMER 2010), Malaysia.

Tandililing, E. (2013). Pengembangan pembelajaran matematika sekolah dengan pendekatan etnomatematika berbasis budaya lokal sebagai upaya untuk meningkatkan kualitas pembelajaran matematika di sekolah. Paper presented in Seminar Nasional Matematika dan Pendidikan Matematika dengan tema ”Penguatan Peran Matematika dan Pendidikan Matematika untuk Indonesia yang Lebih Baik" on November 9, 2013 at Mathematics Education Department, Universitas Negeri Yogyakarta.

Tandiseru, S.S. (2015). The effectiveness of local culture-based mathematical heuristic-kr learning towards enhancing student's creative thinking skill. *Journal of Education and Practice*, *6*(12), 74-81.

Yusof, R. & Tamat, H. (2015). The effect of entry qualification on the academic performance of university diploma students: a comparative study between sijil pelajaran malaysia or malaysian examination certificate (GCE O level equivalence) and certificate entry qualification. Proceedings of SOCIOINT15- 2nd International Conference on Education, Social Sciences and Humanities, 8th, 9th and 10th of June, 2015 - Istanbul (Turkey).