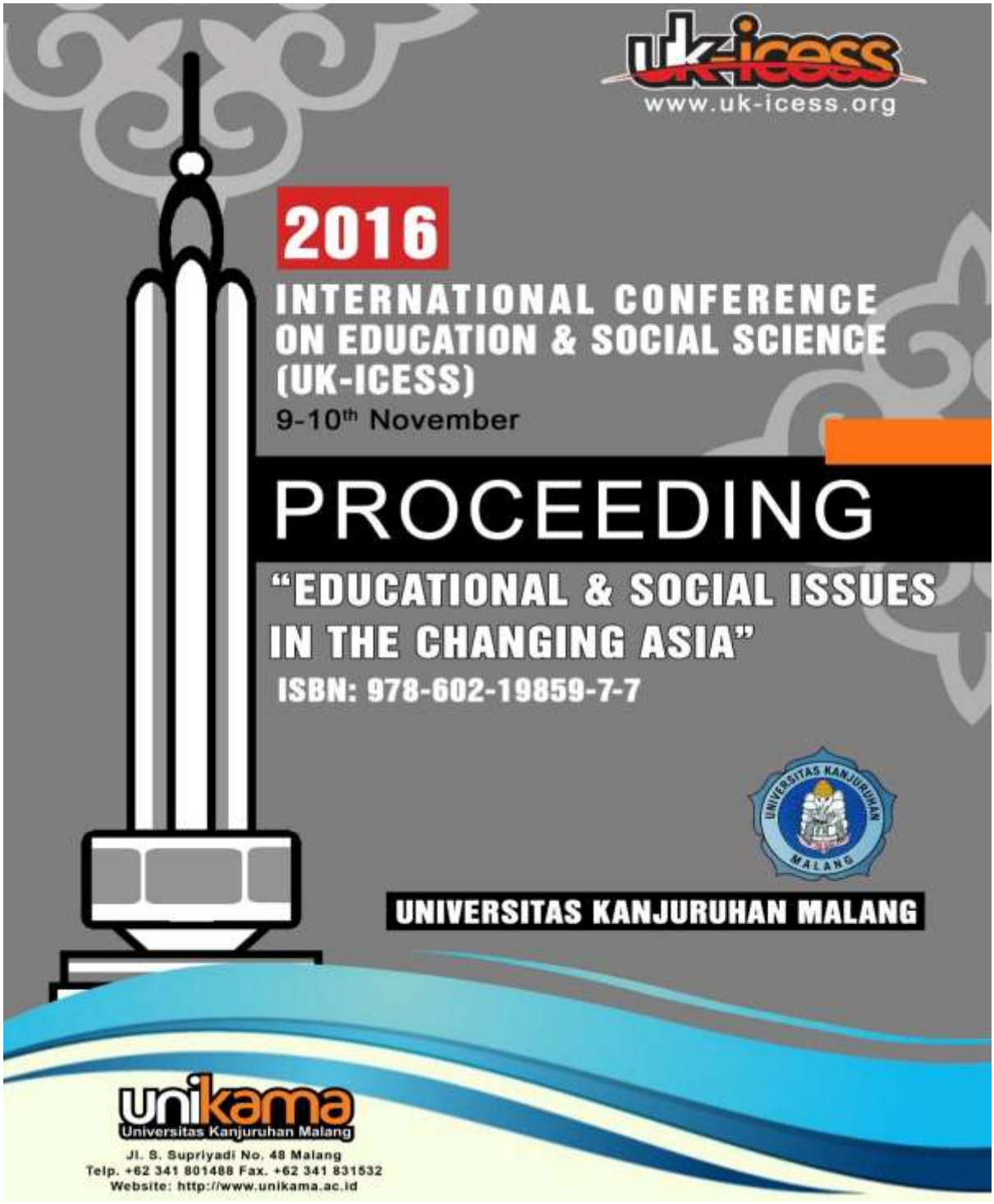
View metadata, citation and similar papers at core.ac.uk

brought to you by CORE

provided by Repository UNIKAMA



PROCEEDING

2016 International Conference on Education and Social Science (UK-ICESS) "Educational and Social Issues in the Changing Asia"

ISBN: 978-602-19859-7-7

Malang, Indonesia
November 9-10, 2016

Universitas Kanjuruhan Malang
Jl. S.Supriadi No. 48
Malang, Indonesia – 65148
Tel. (+62)341-801488
Fax. (+62)341-831532
www.unikama.ac.id
www.uk-icess.org

PROCEEDING
2016 International Conference on Education and Social Science (UK-ICESS)
"Educational and Social Issues in the Changing Asia"

ISBN: 978-602-19859-7-7

Reviewers
Prof. Dr. Sudjijono, M.Hum
Prof. Dr. Laurens Kaluge
Dr. Supriyanto
Umi Tursini, Ph.D
Umiati Jawas, Ph.D
Rusfandi, Ph.D

Editors
Ayu Liskinasih, M.Pd
Uun Muhaji, M.Pd
Dr. Permata Ika Hidayati
Hena Dian Ayu, M.Si, M.Pd

Cover Design
Susiati

Printed and Published by
Universitas Kanjuruhan Malang
Jl. S. Supriadi No. 48 Malang, Indonesia – 65148
Tel. (+62)341-801488; Fax. (+62)341-831532
www.unikama.ac.id; www.uk-icess.org; uk-icess@unikama.ac.id

First printing, November 2016
Copyright ©2016 by Universitas Kanjuruhan Malang

The texts of the papers in this volume were set individually by the authors or under their supervision. Only minor corrections to the text may have been carried out by the publisher. By submitting the paper to the 2016 International Conference in Education and Social Sciences (UK-ICESS), the authors agree that they are fully responsible to obtain all the written permission to reproduce figures, tables, and text from copyrighted material. The authors are also responsible to give sufficient credit included in the texts, figures, legends, or tables. The organizer of the conference, reviewers of the papers, editors, and the publisher of the proceedings are not responsible for any copyright infringement and the damage they may cause.

PREFACE

The 2016 International Conference on Education and Social Science (UK-ICESS) is the first international conference hosted by Universitas Kanjuruhan Malang as a part of its XLI Dies Natalis commemoration. This international conference invites all educators and researchers in the field of education and social sciences to share latest issues, research, and information in these areas. Thus, as an important part of this academic forum, the organizing committee is pleased to present the Proceeding of 2016 International Conference on Education and Social Sciences which brings up the main theme of Educational and Social Issues in the Changing Asia.

There are 65 papers in this compilation, covering various topics around the theme of educational and social issues in the changing Asia which were studied from vast research areas; such as economics, health, education, language, arts, technology, geography, civics, and entrepreneurship. It is expected that all papers in this proceeding will enrich our knowledge and broaden our insights of current issues, trends, research, and information in the areas of education and social sciences.

Lastly, the organizing committee would like to deliver great appreciation to writers, presenters, and all parties who have been contributing to the publication of this proceeding.

Malang, November 2016

The Committee

TABLE OF CONTENT

Preface iii
Table of Content iv

Conference Papers

1. The Application of Cooperative Learning Model (Tutor and Tutee) in the Playing Outdoor Activities for Early Childhood
   Achmadi; Aisyah..... 1

2. Parenting Parents in Developing Character Education in Early Childhood
   Aisyah; Isabella Hasiana..... 8

3. Looking beyond Teacher's Classroom Management: EFL Teachers' Pedagogical Knowledge from Different Backgrounds in Teaching Autistic Students in Different Settings
   Alam Aji Putera, M. Adnan Latief, Ali Saukah, Sri Rachmajanti..... 15

4. Student Activities in Learning NCTM Standards with Cognitive Load Theory Concept of Rank in Grade X Vocational High School
   Arika Indah Kristiana, Suharto..... 25

5. Effect of Betel Leaves Decoctionin to Speeding Perineum Healing for Postpartum Women in BPM Endang Sutikno Kediri
   Candra Wahyuni..... 30

6. The Importance of Entrepreneurship Education for Farmer
   Darmadji..... 36

7. Is Internal Corporate Social Responsibility Related to Employee Engagement?
   Dianawati Suryaningtyas..... 46

8. Implementation of Entrepreneurial Learning Model Based on Local Wisdom through Mind Mapping Method to Achieve the Effectiveness of Learning
   Endah Andayani; Lilik Sri Hariani; Suko Winarsih; Rusno..... 54

9. Entrepreneurship Learning Model Involving the Businessman (Entrepreneur in Residence); Implementation of Social Entrepreneurship at Ciputra University
   Wina Christina, Herry Purwoko, Astrid Kusumowidagdo..... 64

10. The Implementation of Social Science Inquiry Learning Strategy in Civics Education
    Hernawaty Damanik, I Nyoman S Degeng, Punaji Setyosari, I Wayan Dasna.. 71

11. Flores Local Genius on Move (Integrating both Character Education and Manggaraian Local Genius in Teaching English Speaking)
Hieronimus Canggung Darong……. 78

12. The Effectiveness of Jengah Conception to Control the Students' Communication Anxiety in Mathematics Learning
I Made Ardana…….. 88

13. The Impact of Blended Learning towards Teaching Learning Process and Student's Maturity
R. Jacobus Darmanto*; Agustinus Fahik*..…… 95

14. The Use of Google Slides to Build Students' Collaborative Work in Reading Comprehension Skill to Master the Report Texts
Jastman…… 103

15. Good Behaviour Game to Reduce Aggressive Behaviours on Children
Gracia Sudargo, Laura Makaria Sudargo…… 113

16. The Implementation of Curriculum 2013 on Economics by Using Scientific Approach in SMAN Malang
Lilik Sri Hariani; Endah Andayani…….... 122

17. Students' Perception of Interactive Multimedia Mediated Web-based Learning
Mclean HY, Isnawati…… 128

18. Building Student's Character through Indirect Teaching in Indonesian High Schools
Mirjam Anugerahwati……. 138

19. The Relationship between Gender, Age, and Attitude toward Mathematics among Malaysian Gifted Students
Mohd Fadzil bin Kamarudin; Mohd Hasrul bin Kamarulzaman;
Noriah Mohd Ishak.…… 143

20. The Development of Learning Model for Accounting Education Based On Islamic Ethics in Higher Institutions
Muslichah, Evi Maria…… 154

21. Integrating Sustainability Education into Higher Institutions
Muslichah; Shabrina Ramadania…… 167

22. Perceptions of Novice English Teachers on Student-Centre Approach in Teaching English
Neni Nurkhamidah; Sinta Dewi Yulianti…… 176

23. What is so Difficult about Learning Science through English?
Novriani Rabeka Manafre..... 182

24. Analysis Cognitive Ability Enhancement through Cosmography Constructivism Facilitated Media Learning Management System
Permata Ika Hidayati, Soetjipto..... 188

25. Micro-Hydro Power Plant Realia as Media to Enhance Students' Understanding on Power Plant
Radina Anggun Nurisma, Hendrik Elvian Gayuh Prasetya, Teguh Hady Ari Wibowo..... 197

26. Self-Control and College Adjustment: Aspect and Measurement
Rahmah Hastuti..... 204

27. The Motivation and Performance of Health as Consequence the Welfare Employees
Ratna Wardani..... 213

28. Connection and Mathematical Disposition toward Advanced Mathematical Thinking in APOS Mathematics Learning
Retno Marsitin..... 221

29. An International Group Membership on Facebook and Its Effect on Giving Feedback during Peer Review
Riza Weganofa; Henni Anggraeni; Rofi'ul Huda..... 232

30. Community Service: Empowering the Deaf
Riza Weganofa, Siti Mafulah, Fitri Anggraini..... 239

31. Critical Thinking about Education and Tax Policy in Indonesia: Study on Cases of Tax Evasion in European Countries
Rostamaji Korniawan..... 243

32. Bilingual Concept of Cross-Linguistic Transfer: A Challenge for Contrastive Rhetoric
Rusfandi..... 248

33. The Use of Videos to Improve Students' Ability in Listening to Narrative Texts
Widia Purnamasari; Sakti Nugroho..... 255

34. The Use of Online Media to Enrich Student's Vocabulary
Siti Mafulah, Fitri Anggraini Hariyanto..... 268

35. The Development of Learning Physics Device Based on KKNI to Increase Students' Mastery Concept and Critical Thinking
Sudi Dul Aji, Choirul Huda, Chandra Sundaygara, Muhammad Nur Hudha…… 277

36. A Survey Study on the Independence and the Openness of the Will be Teacher
Sudiyono; Maris Kurniawati…….. 285

37. Arts-based Responses to Cultural and Religion Identity to Inform Initial Teacher Education
Sue Erica Smith; Ratna Suryaratri; Deasyanti Adil…….. 292

38. Economic Empowerment Community to Economic Institutions Pesantren
Supriyanto…….. 300

39. Critical Thinking of the Elementary School Students in Coffee Plantation Area Based on Math Science Exemplars Task through Performance Assessment
Suratno; Dian Kurniati..... 307

40. The Implementation of the Scientific Approach of Curriculum 2013 in English Classes at Sekolah Menengah Atas Negeri 6 Malang
Surya Fajar Cahyo Nuraeni…….. 313

41. Urgency of Education Based Socioecopreneurship in Indonesia (Analysis on Elementary Education)
Susan N H Jacobus..... 324

42. Knowledge Management Model in the Achievement of Effectiveness of the Organization of Private Higher Education in Malang
Tanto Gatot Sumarsono; Abdurrabi…….. 329

43. Self-Assessment of Speaking Proficiency: Students' Criteria and Attitude
Umi Tursini…… 341

44. Managing Instruction: Leadership Practices for Instructional Improvement in Indonesian School Reform
Umiati Jawas…….. 350

45. The Use of Creative Writing Handbook in Developing Ideas and Creativity of English Education Department Students in Writing Class
Uun Muhaji; Irene Trisisca……365

46. The Analysis of Banking Systemic Risk in Indonesia
Vinus Maulina, Riril Mardiana Firdaus…… 372

47. The Analysis of Banking Systemic Risk and Financial Linkages in Indonesia
Vinus Maulina; Sri Wilujeng…… 382

48. Analysis of the Influence of the World's Oil Prices, Inflation, Interest Rate, and Rupiah / US Dollar Exchange Rate on the Return of Mining Sector's Shares Registered in Indonesia Stock Exchange in 2010 – 2015
Waseso Segoro, Andri Kartika……. 390

49. Improvement of Motivation and Learning Outcomes through Assessment of Social Sciences Student Portofolio in State Junior High School 5 Malang
Yuli Ifana Sari, Siti Halimatus Sakdiyah, Hermina Mulyati Sudir……. 398

50. Couched Peer Feedback: Teacher's Intervention in Collaborative Peer Feedback Writing Activities
Annisa Astrid…….. 404

51. The Implementation of Fanpage in Creating Positioning Product for UMKM in Jakarta And Yogyakarta
Tjipto Djuhartono, Annisaa Utami, Wening Estiningsih…….. 416

52. The Implementation of Bureaucracy Reform: Role of Transformational Leadership, Organizational Culture and Employees Quality Competence as the Mediator
Christea Frisdiantara; Harinoto..... 424

53. Knowledge Management and Transformational Leadership on Employees' Performance Mediated by Organizational Culture
Harinoto..... 437

54. Establishing Reading Comprehension on Report Text through the Presence and Absence of the Text Itself
Veranika…… 448

55. Counseling Families through Parenting Positive Techniques in Dealing with Authoritarian Parenting
Wiwit Wahyutiningsih……..... 455

56. I_bW Kecamatan Kedopok Kota Probolinggo
Irma Tyasari, Enike Dwi Kusumawati, Suryaningsih, HB Sujiantoro…… 461

57. Revitalising Anti Corruption Values in Economy Development as The Learning for Pre-service Teachers
Ninik Indawati……. 466

58. Innovation And Business Strategies To Enhance Firm Performance: Study of SMEs Cluster In Malang
Rita Indah Mustikowati, Iva Nurdiana Farida…… 472

59. The Development of Policy Evaluation Model of Bank Indonesia(BI) and Otoritas Jasa Keuangan (OJK) for Mandatory Audit of BPRS
Koenta Adji Koerniawan, Irma Tyasari…….. 481

60. Community as the Actor in Empowerment: The Role of Community Information Group of Surabaya in Building Well-informed Community
Nurul Ratna Sari…….. 487

61. The Air Flow as Function of Temperature in Rectangular Heated Chamber in Solar Thermal Cyclone Wind Turbine Generator
Sugiono, A. Raharjo, Sujatmiko……..… 499

62. Development of Android-Based Blended Learning Accompanied with Video Tutorials To Improve Students' Understanding And Skill Of Computer Programming Course
Choirul Huda, Nurul Ain……. 504

63. Evaluation of Placement Policy: Correlation between Placement Test Score and Students' Achievement in Integrated Course
Ayu Liskinasih, Rizky Lutviana…….. 513

64. Application of Multiculturalism Based Approach to Improve Students' Understanding in Literary Critism (Case Studies in English Literature Department of Kanjuruhan University, Malang)
Sujito……. 519

65. Financial Performance Evaluation Department of Industry, Trade, and District in Indonesian Market Developments in Optimized SMEs
Ida Nuryana……. 527

PROCEEDING
2016 International Conference on Education & Social Science (UK-ICESS)
"Educational and Social Issues in the Changing Asia"
ISBN: 978-602-19859-7-7

CONNECTION AND MATHEMATICAL DISPOSITION TOWARD ADVANCED MATHEMATICAL THINKING IN APOS MATHEMATICS LEARNING

Retno Marsitin
mars.ayuu@gmail.com

Mathematics Education, University of Kanjuruhan Malang

Abstract: This study aimed to analyze the effect of mathematical connection and mathematical dispositions of students towards Advanced Mathematical Thinking in APOS mathematics learning and the most influence on Advanced Mathematical Thinking. This research is quantitative research. The data analysis used multiple linear regression. Variables in the research include dependent variable was the Advanced Mathematical Thinking and independent variables were mathematical connection and mathematical disposition. The research was conducted at the University of Kanjuruhan Malang, Faculty of Science and Technology in Mathematics Education. The respondents were Mathematics Education students who took a course in calculus (limit), the number of students was 30. The results of the research showed that mathematical connections and mathematical dispositions effect on Advanced Mathematical Thinking in APOS mathematics learning with percentage of 88,2%; From those results it can be concluded that mathematical connection and mathematical dispositions influence the Advanced Mathematical Thinking in APOS mathematics learning

Keywords: Mathematical Connection, Mathematical Disposition, Advanced Mathematical Thinking, APOS Mathematics Learning.

INTODUCTION

Mathematics is indispensable to the thinking activity. Thinking is a mental process that goes beyond remembering and comprehending (Sagala, 2003; Suryadi, 2012). Students' understanding of the connections between concepts or ideas of mathematics can facilitate their ability to formulate and verify the conjecture inductively and deductively and very important in the learning of mathematics. Furthermore, concepts, ideas and newly developed mathematical procedure can be applied to solve other problems in mathematics or other disciplines (Permana & Sumarmo, 2007; Wahyudin, 2008).

Mathematics learning in college-level requires the students to have the ability to think mathematically, so that students do not just memorize formulas or simply apply a mathematical formula. Mathematical thinking in college-level is advanced mathematical thinking. Sumarmo (2011) states that Advanced Mathematical Thinking certainly contains a high level of mathematical thinking. But not all high-level mathematical thinking contains advanced mathematical thinking.

ISBN: 978-602-19859-7-7

Advanced mathematical thinking is regarded to the introduction of formal definitions and logical deduction. Advanced Mathematical Thinking Process (AMT) consist of: the representation process, abstraction process, the relationship between representation and abstraction (Dreyfus (Tall, 2002); Sumarmo, 2011). Several studies, including (1) Herlina (2015) in her research stating that there were improvement on students' Advanced Mathematical Thinking (AMT) through APOS learning approach; (2) Suprayana (2012) in his research states that learning mathematics for higher level is not easy, so it takes time to understand mathematics as the logic language and has the ability to representing, abstracting, connecting representation and abstraction, creative thinking, and prove the more complicated facts covered in advanced mathematical thinking skills (AMT); (3) Smith (2004) in her study stated that students should be able to make a shift in Advanced Mathematical Thinking (AMT) to enable the harmonious relationship between the Elementary mathematical thinking (EMT) with Advanced Mathematical Thinking (AMT).

Tall (1999) in his research states that APOS theory has many applications in basic math arithmetic, algebra, and calculus. Advanced Mathematical Thinking needs expression in the actions, objects and schema. Asiala et al., (1997) suggest that there is interaction between students through APOS approach so an exchange of different learning experience is expected therefore mental action can be continued as expected, that has the ability to reflect on the actions that had been done, and students can reached the stage of potential development. Dubinsky & McDonald (2001) states that the theory APOS is an approach to learning that is generally performed for the learning of mathematics at the college level, which integrates the use of computers, discussions in small groups, and pay attention to mental constructions that is undertaken by students in understanding a math concept. The mental constructions are: action, process, object, and the schema which is abbreviated by APOS.

In solving mathematical problems, students are required to have mathematical connection capabilities. This is in accordance with the opinion of (Micovich & Monroe, 1994; NCTM, 2000) who state that there are three kinds of mathematical connections, namely; connections between mathematical topics, connections with other scientific disciplines and the connection with the real world. The ability of mathematical connection has purpose to recognize and use connections between the ideas of mathematics, understand how ideas of mathematical interconnected to produce a coherent (united), identify and apply mathematics both within and outside the context of mathematics (NCTM, 2000). Furthermore, concepts, ideas and newly developed mathematical procedure can be applied to solve other problems in mathematics or other disciplines (Permana & Sumarmo, 2007; Wahyudin, 2008). Mathematical connection ability is the ability to associate mathematical knowledge possessed by students with other mathematical ability and life realities (Ruspiani, 2000; Bahr & Garcia (2010)).

In addition to mathematical connections in enhancing Advanced Mathematical Thinking (AMT), students are required to have a mathematical disposition. Mathematical disposition is an interest and appreciation of mathematics such as the tendency to think and act positively, including self-confidence, curiosity, perseverance, enthusiasm in learning, persevering in facing problems, flexible, willing to share with others and reflective in the activities of mathematics (NCTM, 2000; Wardani, 2009). Measuring mathematical disposition with indicators: indicating passion / enthusiasm in learning mathematics, indicating a serious concern in learning mathematics, showing tenacity in facing problems, indicating confidence in learning and solving problem, showing high curiosity, demonstrating the ability to share with others (Syaban, 2009).

There are lot students who still do not have possitive attitude or a positive outlook on mathematics. The reality is consistent with several studies include Herlina (2013) who states

ISBN: 978-602-19859-7-7

that the disposition of mathematics increases with the learning of mathematics. With regard to the mathematical disposition which is still low, then the mathematical dispositions can be developed through the study of mathematics.

From the description and the above phenomena, efforts to improve the quality of learning by innovating the learning of mathematics through APOS associated with the mathematical connection and mathematical disposition, and formulation of the problem is there any effect of students' mathematical connections and mathematical disposition toward Advanced Mathematical Thinking in APOS mathematics learning? The purpose of this study is to analyze the effects of students' mathematical connections and disposition of toward Advanced Mathematical Thinking in APOS mathematics learning

.

METHOD

The methods in this study focuses on the purpose of research is to analyze the effect of students' mathematical connections and disposition toward Advanced Mathematical Thinking in mathematics APOS. This research is quantitative and the variables in this study are: (a) The independent variables are: mathematical connections as (x_1) and mathematical disposition as (x_2); (b) The dependent variable, namely Advanced Mathematical Thinking (AMT) as (y).

The research was conducted at the University of Kanjuruhan Malang, Faculty of Science and Technology, Mathematics Education Department. The respondents in the study were students of Mathematics Education Department, Faculty of Science and Technology, University of Kanjuruhan Malang who took a course in calculus (limit), the number of students was 30. The research instrument is content validity by a senior lecturer of mathematics education. The data analysis used multiple linear regression analysis with SPSS assited, the stages are: (a) Validity and Reliability; (B) Test requirements analysis is multicollinearity test, autocorrelation test, heteroscedasticity test, test for normality; (C) hypothesis test that test the regression line through the R^2, with a significance test F test, significance test with t test; (D) Draw conclusions from the analysis of data.

FINDINGS AND DISCUSIION

The analysis of the effect of students' mathematical connections and disposition toward Advanced Mathematical Thinking in mathematics APOS using multiple linear regression analysis with SPSS aided covering validity and reliability, the prerequisite test analysis and test of hypotheses.

1. Test Validity and Reliability

Validity and reliability is test of data instrument that is used to determine the accuracy and consistency of measuring devices using a scale, questionnaires. Validity and reliability with SPSS aided by the analysis as follows:

a. Test Validity and reliability of mathematical connections, namely:
   (i) Output case processing summary is to explain the amount of valid data to be processed and the data are released. The valid data is 30 with a percentage of 100%.
   (ii) Output reliability statistics as a result of the analysis of reliability with cronbach alpha technique with cronbach alpha value is 0,833. The Results of cronbach alpha is 0,833 higher than 0,8 then the entire item is reliable.
b. Test Validity and reliability of mathematical disposition:

ISBN: 978-602-19859-7-7

(i) Output case processing summary is to explain the amount of valid data to be processed and the data are released. The valid data is 30 with a percentage of 100%.
(ii) Output reliability statistics as a result of the analysis of reliability with cronbach alpha technique with cronbach alpha value is 0,892. The Results of cronbach alpha is 0,892 higher than 0,8 then the entire item is reliable.

c. Test Validity and reliability of Advanced Mathematical Thinking (AMT), including:
(i) Output case processing summary is to explain the amount of valid data to be processed and the data are released. The valid data is 30 with a percentage of 100%.
(ii) Output reliability statistics as a result of the analysis of reliability with cronbach alpha technique with cronbach alpha value is 0,871. The Results of cronbach alpha is 0,871 higher than 0,8 then the entire item is reliable.

The results of Validity and reliability showed that the mathematical connection, mathematical disposition and Advanced Mathematical Thinking (AMT) in mathematics APOS declared valid and reliable, so that the instrument can be used for data retrieval in research.

2. Prerequisites Test Analysis

Prerequisite test multiple linear regression analysis with SPPS aided include multikoliearitas, autocorrelation, heteroskedasticity and normality as follows:

a. Multikolinearitas, can be seen the value of tolerance and inflation factor (VIF), namely: the output coefficients show that the value of tolerance for both variables is more than 0.10 with details ie mathematical connection with tolerance value is 0.991 and mathematical disposition tolerance value of 0.991. VIF value for the variable mathematical connections at 1,009 and VIF for variable mathematical disposition of 1.009 which means whole VIF obtained less than 10. It can be concluded that there is no multicollinearity between independent variables. It can be concluded that there is no multicolinearity between variables. It can be seen in the table below:

Tabel 1. Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-2.938	2.398		-1.225	.231		
	Koneksi Matematis	.463	.182	.169	2.551	.017	.991	1.009
	Disposisi Matematis	.353	.025	.940	14.159	.000	.991	1.009

a. Dependent Variable: Advanced Mathematical Thinking (AMT)

b. Autocorrelation, using the Durbin-Watson test is the model output summary that indicates that the Durbin-Watson value is 2,195. Durbin-Watson is 2,195 compared with the criteria for acceptance or rejection is made with d_L and d_U value is determined based on the number of independent variables in the regression model (k) and the number of samples (n). The result of output model summary with Durbin-Watson value 2,195 is less than 1,57 $(d_U = 1{,}57)$ and less than 2,43 $(4 - d_U = 4 - 1{,}57 = 2{,}43)$ it means that is the the area of no autocorrelation, thus it can be concluded that there is no autocorrelation. It can be seen in the table below:

ISBN: 978-602-19859-7-7

Table 2. Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.939[a]	.882	.873	1.569	2.195

a. Predictors: (Constant), Disposisi Matematis, Koneksi Matematis

b. Dependent Variable: Advanced Mathematical Thinking (AMT)

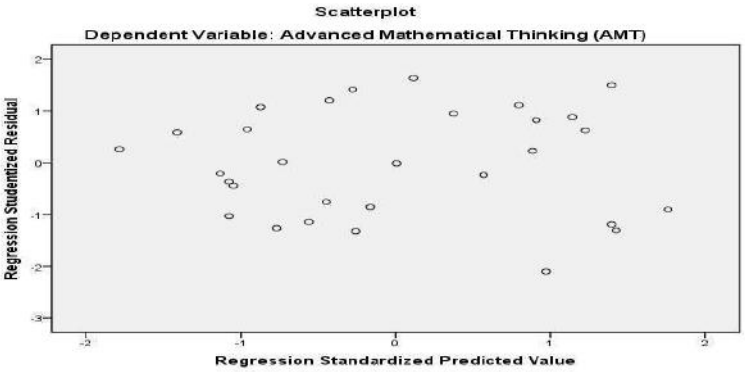
c. Heteroskidastity, using the correlation coefficient Spearman's rho, in the output correlations which shows that the correlation between the independent variables they are mathematical connection with unstandardized residuals have a significance value greater than 0,844 and mathematical disposition with unstandardized residuals have significance value 0.870, which means the significance value greater than 0.05 it can be concluded that there is no heteroscedasticity problem. In addition to the heteroskedastisitas, testing methods of correlation coefficient Spearman "s rho also through observing at the pattern of dots on a scatterplot graph. Output scatterplot on a scatterplot graph show that hot spots do not form a pattern (a certain) groove and the dots spread both above and below the number 0 on the *y* axis. So it can be concluded that there is no heteroscedasticity in the regression. It can be seen in the table below:

Table 3. Correlations

Correlations

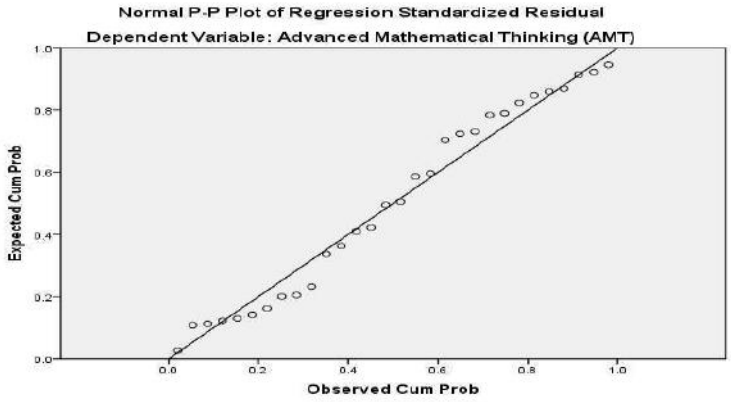
			Unstandardized Residual	Koneksi Matematis	Disposisi Matematis
Spearman's rho	Unstandardized Residual	Correlation Coefficient	1.000	-.038	.031
		Sig. (2-tailed)	.	.844	.870
		N	30	30	30
	Koneksi Matematis	Correlation Coefficient	-.038	1.000	-.100
		Sig. (2-tailed)	.844	.	.599
		N	30	30	30
	Disposisi Matematis	Correlation Coefficient	.031	-.100	1.000
		Sig. (2-tailed)	.870	.599	.
		N	30	30	30

ISBN: 978-602-19859-7-7



Picture 2. Scatterplot

d. Normality, using Normal P-P Plot graphs illustrate normality output that shows dots do not lie more or less in a straight line, so it can be concluded that residual data is normally distributed. It can be seen in the table below:



Picture 3. Normal P-P Plot

The results of prerequisite test analysis can be concluded that the mathematical connection, the mathematical disposition and Advanced Mathematical Thinking (AMT) in mathematics APOS fulfill the prerequisite of the linear regression that is no multikolinearitas, no autocorrelation, no heteroskedastisitas and normally distributed, so that the instrument can be used for data retrieval in research.

2. Hypothesis Testing

Analysis of hypothesis testing with multiple linear regression output aided by SPSS includes the F test and t test as follows:

a. *F* test, it can be seen from the output of ANOVA (analysis of variance) is a regression test together the significance effect of the connection variables influence how much mathematical and mathematical disposition toward the Advanced Mathematical Thinking (AMT) in the learning of APOS mathematics by testing using a 0,05 significance level. Analysis of ANOVA output includes:
   (i) The percentage of the effect of mathematical connections and mathematical disposition toward Advanced Mathematical Thinking in APOS mathematics learning is 88.2%.

ISBN: 978-602-19859-7-7

(ii) Probability value of Anova Output data shows that significance $< 0,05$ is $0,000 < 0,05$ then H_0 rejected.

(iii) The conclusion is mathematical connections and mathematical disposition simultaneously affect the Advanced Mathematical Thinking (AMT).

It can be seen in the table below:

Table 4. Model Summary

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.939[a]	.882	.873	1.569	2.195

a. Predictors: (Constant), Disposisi Matematis, Koneksi Matematis

b. Dependent Variable: Advanced Mathematical Thinking (AMT)

Taeel 5. Anova

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	497.511	2	248.756	101.015	.000[a]
	Residual	66.489	27	2.463		
	Total	564.000	29			

a. Predictors: (Constant), Disposisi Matematis, Koneksi Matematis

b. Dependent Variable: Advanced Mathematical Thinking (AMT)

b. The multiple linear regression equation from the output coefficients indicate that the multiple linear regression model to estimate the effect of mathematical connections and mathematical disposition toward the Advanced Mathematical Thinking (AMT) in the learning of APOS mathematics is: $y = -2,398 + 0,463x_1 + 0,353x_2$. It can be seen in the table below:

Table 6. Coefficients

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-2.938	2.398		-1.225	.231		
	Koneksi Matematis	.463	.182	.169	2.551	.017	.991	1.009
	Disposisi Matematis	.353	.025	.940	14.159	.000	.991	1.009

a. Dependent Variable: Advanced Mathematical Thinking (AMT)

ISBN: 978-602-19859-7-7

c. T test, it seems from the output coefficients show partial regression coefficients test used to determine partially the mathematical connection and mathematical disposition significantly affect the Advanced Mathematical Thinking (AMT) in mathematics. The Test using a significance level of $0,05$ with the analysis:

   (i) The test of mathematical connection Variable toward Advanced Mathematical Thinking (AMT)
      (a) Probability Value of Output coefficients showed that the significance $< 0,05$ is $0,017 < 0,05$ then H_0 rejected.
      (b) The conclusion is mathematical connections effect Advanced Mathematical Thinking (AMT) in APOS mathematics learning.
   (ii) Coefficient testing of mathematical disposition variable toward Advanced Mathematical Thinking (AMT)
      (a) Probability Value of Output coefficients showed that the significance $< 0,05$ is $0,02 < 0,05$ then H_0 rejected.
      (b) The conclusion is mathematical disposition effect Advanced Mathematical Thinking (AMT) in APOS mathematics learning.

The results of Hypothesis test show the data of the effect of students' mathematical connection and mathematical disposition toward Advanced Mathematical Thinking in APOS mathematics learning as follows:

1. The effect of students' mathematical connection toward Advanced Mathematical Thinking in APOS mathematics learning can seen from the output coefficients by t test and the test using a significance level of $0,05$. The Output coefficients result significant value is $0,017$ compared to the $0,05$ thus the significance$< 0,05$ for $0,017 < 0,05$ so H_0rejected. Thus it can be concluded that mathematical connections significantly affect the Advanced Mathematical Thinking (AMT). This is in accordance with the opinion (Ratnaningsih, 2003; Lasmanawati, 2011) that through the process of mathematical connection thus the students' thinking concept and insight on mathematics is getting wider, not only focused on the topic being studied. Additionally, Wahyudin (2008) also found that a good mathematical connection capability result in the high mathematics skills.
2. The effect of students' mathematical disposition toward Advanced Mathematical Thinking in APOS mathematics learning can seen from the output coefficients by t test and the test using a significance level of $0,05$. The Output coefficients result significant value is $0,02$ compared to the $0,05$ thus the significance$< 0,05$ for $0,02 < 0,05$ so H_0 rejected. Thus it can be concluded that mathematical disposition significantly affect the Advanced Mathematical Thinking (AMT). This is in accordance with the opinion of Syaban (2009) which concluded that overall the increase of mathematics disposition of students who receive teaching with model or a particular approach is better than the students who receive conventional learning.
3. The effect of students' connection and disposition toward Advanced Mathematical Thinking in APOS mathematics learning seen from the output of ANOVA (analysis of variance) that is a simultaneous regression test (F test) and test using 0.05 significance level. Anova output significance is $0,000$ compared to the 0.05thus significance $< 0,05$ for $0,000 < 0,05$ so H_0 is rejected. Therefore it can be concluded that the mathematical connections and disposition simultaneously influence on Advanced Mathematical Thinking (AMT).
4. Multiple linear regression equation to estimate the effects of mathematical connections and mathematical disposition toward Advanced Mathematical Thinking (AMT) can be seen

ISBN: 978-602-19859-7-7

from the output coefficients which indicate that the model of multiple linear regression equation is $y = -2{,}398 + 0{,}463x_1 + 0{,}353$. Multiple linear regression equation can be used as a basis to estimate the ability of Advanced Mathematical Thinking (AMT) is affected by mathematical connections and mathematical disposition. The percentage of the effect of mathematical connections and disposition toward Advanced Mathematical Thinking in APOS mathematics learning is 88.2%.Thus it can be concluded that the mathematical connections and disposition of simultaneously affect on the Advanced Mathematical Thinking (AMT). In this regard, to improve the ability of Advanced Mathematical Thinking (AMT) then the ability to connect and mathematical disposition should be improved.

CONCLUSIONS AND SUGGESTIONS

The results of data analysis and discussion that has been presented can be concluded that mathematical connections and mathematical disposition effect on the Advanced Mathematical Thinking in APOS mathematics learning. The percentage of the effect of mathematical connections and mathematical disposition toward Advanced Mathematical Thinking in APOS mathematics learning is 88.2%.

With regard to the results of these studies, the few things that need to be considered as a suggestion in achieving the goals of mathematics learning that the lecturers are expected to provide mathematical problems related to the mathematical connections so that students have Advanced Mathematical Thinking ability and give students the opportunity to connect mathematically so that students can solve mathematical problems well. Further research is considered necessary so that the expected results of this study can be used as reference both theoretically and practically in enhancing the ability to think mathematically.

REFERENCES

Asiala, M. et.al. (1997). "The development of students‟ graphical understanding of the derivative". Journal of Mathematical Behavior, 16(4), 399-431

Bahr, D. L dan Garcia, L. Ann de. (2010). Elementary Mathematics is Anything but Elementary: Content and Methods from a Development Perspective. USA: Wadsworth, Cengage Learning

Dubinsky, E. & McDonald, M. (2001). "APOS: A Constructivist Theory of Learning in Undergraduate Mathematics Education Research". Dalam D. Holton (Ed.). The Teaching and Learning of Mathematics at University Level. Dordrecht: Kluwer Academic Publishers.

Herlina, E. (2013). Meningkatkan Disposisi Berpikir Kreatif Matematis Melalui Pendekatan APOS. Infinity. Jurnal Ilmiah Program Studi Matematika STKIP Siliwangi Bandung, Vol 2, No.2, September 2013-169.

Herlina, E. (2015). Meningkatkan Advanced Mathematical Thinking Mahasiswa. Infinity. Jurnal Ilmiah Program Studi Matematika STKIP Siliwangi Bandung, Vol 4, No.1, Februari 2015, 65-83.

ISBN: 978-602-19859-7-7

Hwang, et.al. (2007). Multiple Representation Skills and Creativity Effect on Mathematical Problem Solving Using a Multimedia Whiteboard System. Educational Technology & society. Vol. 10 No. 2 pp. 191-212

Lasmanawati. (2011). Pengaruh Pembelajaran Menggunakan Pendekatan Proses Berpikir Reflektif terhadap Peningkatan Kemampuan Koneksi dan Berpikir Kritis Matematis Siswa. Tesis SPS UPI. Bandung: tidak diterbitkan

Lestari, W. S. (2014). Penerapan Model Pembelajaran M-APOS Dalam Meningkatkan Pemahaman Konsep Dan Motivasi Belajar Kalkulus II. Jurnal Pendidikan dan Keguruan Vol. 1 No. 1, 2014, artikel 6.

Micovich, A.K. & Monroe, E.E. (1994). Making Mathematical Connection across the Curriculum: Activities to Help Teachers Begin. School Science and Mathematics. 94(7)

NCTM. (2000). Principles and Standards for School Mathematics. Reston, VA: NCTM.

Permana, Y & Sumarmo, U. (2007). Mengembangkan Kemampuan Penalaran dan Koneksi Matematik Siswa SMA Melalui Pembelajaran Berbasis Masalah. Jurnal Educationist Vol. I No. 2. Juli 2007. ISSN: 1907-8838.

Ratnaningsih, N. (2003). Mengembangkan Kemampuan Berpikir Matematik Siswa SMU melalui Pembelajaran Berbasis Masalah. Tesis pada PPS UPI: tidak diterbitkan.

Ruspiani. (2000). Kemampuan Siswa dalam Melakukan Koneksi Matematika. Tesis PPS UPI. Bandung: tidak diterbitkan

Sagala, S. (2003). Konsep dan Makna Pembelajaran. Bandung: Alfabeta.

Siregar, S. (2012). Metode Penelitian Kuantitatif, Jakarta: Penerbit Prenadamedia

Smith, C, J. (20014). A Framework for Characterizing the Transition to Advanced Mathematical Thinking. Proceedings of the Twenty-sixth Annual Meeting North American Chapter of the International Group for the Psychology of Mathematics Education Volume 1 PME-NA XXVI October 21 - 24, 2004 Toronto, Ontario, Canada ISBN 92-990027-0-3, p. 163-170

Suprayana, Andri. (2012). Kemampuan Berpikir Matematis Tingkat Lanjut (Advanced Mathematical Thinking) dalam Mata Kuliah Statistika Matematika I. Makalah dipresentasikan dalam Seminar Nasional Matematika dan Pendidikan Matematika pada tanggal 10 November 2012 di FMIPA UNY. Prosiding ISBN: 978-979-16353-8-7

Suryadi, D (2012). Membangun Budaya Baru dalam Berpikir Matematis. Bandung: Rizqi Press.

Syaban, M. (2009). Menumbuhkembangkankan Daya dan Disposisi Matematis Siswa Sekolah Menengah Atas Melalui Pembelajaran Investigasi. Matematis Siswa. Educationist, III (2), 129-136

ISBN: 978-602-19859-7-7

Tall, D. (2002). Advanced Mathematical Thinking. Boston: Kluwer Academic Publisher

Wahyudin. (2008). Pembelajaran dan Model-Model Pembelajaran. Bandung: UPI.

Wardani, S. (2009). Meningkatkan Kemampuan Berfikir Kreatif dan Disposisi Matematik Siswa SMA Melalui Pembelajaran dengan Pendekatan Model Sylver. Disertasi doktor, tidak diterbitkan. Sekolah Pascasarjana Universitas Pendidikan Indonesia: Bandung

www.uk-icess.org

CERTIFICATE

041/UK-ICESS/UK-ML/XI/2016

This is to certify that:

Dra. Retno Marsitin, M.Pd.

has participated in

2016

INTERNATIONAL CONFERENCE
ON EDUCATION & SOCIAL SCIENCE (UK-ICESS)
"EDUCATIONAL & SOCIAL ISSUES IN THE CHANGING ASIA"

on November 9 - 10, 2016

as

PRESENTER

Chairperson,

Umiati Jawas, Ph.D

unikama
Universitas Kanjuruhan Malang
Jl. S. Supriyadi No. 48 Malang
Telp. +62 341 801488 Fax. +62 341 831532
Website: http://www.unikama.ac.id