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Mathematical Reasoning Ability on PACE Learning Model assisted by Ispring

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Abstrak

This study aims to (1) analyze the effectiveness of the PACE learning model assisted by Ispring media on students' mathematical reasoning ability; (2) describe the pattern of students' mathematical reasoning on the PACE learning model assisted by Ispring media. The method was mixed method with embedded concurrent design. The population in this study were eighth grade students of SMP Negeri 2 Cilimus 2018/2019 and the sample were two selected classes namely VIII F and VIII G. Quantitative data collection was done by mathematical reasoning ability tests and students' worksheets, While the qualitative data was done by the results of testing mathematical reasoning ability. The results of the mathematical reasoning ability test were analyzed to know the effectiveness of mathematics learning by using individual completeness test, classical completeness test, influence test, and achievement test. Students are grouped based on groups I, II, and III, which each of them got the scores 80-87, 73-79, and 68-72. The results of the study were (1) the PACE learning model assisted by Ispring media was effective; (2) the students in Group I were able to change the problems into a mathematics model, there was no difficulty in connecting mathematical situations, were able to compile evidence directly and then explain although there were still difficulties in connecting mathematical situations, and were able to compile evidence directly, and examine arguments to provide an explanation even though there were still shortcomings. The students in Group II have not been able to convert real problems into mathematical form, but were able to connect mathematical situations and compile evidence directly, were able to explain arguments quickly and precisely even though there were still some difficulties. The students in Group III were able to change it into the mathematical model, the students in this group still faced difficulties.

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INTRODUCTION

Mathematical reasoning is one of aspects that is very considered even reasoning and mathematics cannot be separated each other, it is because in solving mathematical problems needs reasoning, besides that the are many problems in mathematics and in everyday life that require reasoning to solve them (Dewi & Kusumah, 2017), while reasoning ability can be trained by learning mathematics (Kusumawardani, et al., 2018), so it can be concluded that reasoning ability is needed by students to solve problems but besides that reasoning can also be trained by learning mathematics.

According to NCTM (National Council of Teachers of Mathmatics) (Arivina, et al., 2017) reasoning ability have a role in understanding mathematics. Mathematical reasoning is a habit of thinking and like a habit, so reasoning becomes a part of consistency in each students' mathematical experiences, because in reasoning someone tries to associate facts, concepts, or principles with one another; look for patterns to emerge and make efforts to generalize or logical conclusions, and make predictions and proofs at the same time. This leads individuals to be able to associate mathematical problems with everyday life and recognize the role of mathematics in life and make conclusions and guesses that are equipped with logical proof, but to do so is not easy for the teacher.

According to NCTM, 2000; O'Daffer & Thornquist (Napitupulu, 2017) reasoning is the main and continuous tool used when trying to understand or to solve problems in mathematics. Therefore, reasoning ability is very important for students, but students still have difficulties for understanding questions related to this mathematical reasoning ability. The results of the study (Sulistiawati, et al., 2016) showed that students still had difficulties in mathematical reasoning ability with a percentage of 76.87%, even the increasing in this class was in the medium category.

Based on the result of interview with one of the mathematics teachers at SMP Negeri 2 Cilimus in 2016, he gave the information that students did not fully understand if the questions need more reasoning so the students found it difficult to answer the questions. In addition, the researcher also asked some points of problems to him, then he explained that the weaknesses of students in SMP Negeri 2 Cilimus were indeed on reasoning questions. Even from 30 students, only 3 students can solve the questions that need more reasoning correctly even the average score of all students only reaches 60,17.

One of alternative to improve reasoning, mastery of material and student learning achievement is choosing learning models and media used. The learning process can run well if supported by various components of learning that run synergistically to achieve learning goals. One of this component is learning media. According to Anitah (Alfiyansah, 2016) learning media is every person, material, tool, or event that can create conditions that allow learners to receive knowledge, skills and attitudes. So, it can be said that learning media can help students to receive knowledge, skills, and attitudes.

The learning model chosen in this study is PACE (Project, Activity, Cooperative, Excersice). The PACE model was developed by Lee (1999). Projects are an important component of the PACE Model (Lee, 1999). The media used in this study is Ispring. According to (Hernawati, 2010) Ispring presenter is one of tool that converts presentation files into flash form and SCORM / AICC form, which is a form commonly used in learning with e-learning LMS (Learning Management System). Ispring is software that can convert presentation files into flash form and can be integrated easily into Microsoft Powerpoint.

PACE learning assisted by ispring requires students to be more active in finding solutions in every mathematical problems. Of

course, in finding a solution students are not just released by the teacher but the teacher also helps students, in other words the teacher as a facilitator, the teacher guides the students by media that is interactive powerpoint so that the process of mentoring to students is more interesting, and students are more enthusiastic in taking lessons, so the learning goals can be achieved as teacher's expectations.

This study aims to (1) analyze the effectiveness of the PACE learning model assisted by Ispring media on students' mathematical reasoning ability; (2) describe the pattern of students' mathematical reasoning on the PACE learning model assisted by Ispring media.

METHOD

This study used mixed methods with concurrent embedded design. The population in this study were eighth grade students of SMP Negeri 2 Cilimus 2018/2019 and samples in this study were two selected classes namely VIII F and VIII G. In qualitative data, students were selected from class VIII F, the consideration of this sampling was based on group I which is the group got the score of 80-87, group II which is the group got the score of 73-79, and group III which scores 68-72. For quantitative data, the sample used 2 classes with one class as the experimental class and one class as the control class. The research sample was selected by cluster random sampling technique. Quantitative data was obtained from the documentation of the test results of mathematical reasoning ability and students's worksheets. The results of mathematical reasoning test were analyzed to determine the effectiveness of learning mathematics by individual completeness tests, classical completeness tests, influence tests, and achievement tests.

RESULT AND DISCUSSION

Result

Learning Effectiveness

Quantitative research was conducted to analyze the effectiveness of learning through PACE learning model assisted by Ispring on mathematical reasoning ability. After carrying out the research and analyzing the data the results of the research obtained information that: (1) based on the results of calculations with the One-sample Test, the significance value $(\alpha) = 0{,}000 < 0{,}05$, then H0 was rejected. This means that the value of the mathematical reasoning ability of the experimental class students reached the minimum completeness criteria (KKM = 65); (2) based on the calculation results with the proportion test of one party, obtained $z_{value} = 1{,}73 > z_{table} = 1{,}64$, then H0 is rejected. So it can be concluded that the proportion of completeness of students who are subject to the PACE model assisted by Ispring has reached 75%; (3) based on the results of calculations using the Independent Samples Test, the significance value of the effect test was $0{,}000 < 0{,}05$, then H0 was rejected. This means that there was a significant effect of PACE learning on students' mathematical reasoning ability; (4) based on the calculation results obtained $t_{value} = 3{,}06 > t_{table} = 2{,}048$ then H0 was rejected. This means that the achievement of students' mathematical reasoning ability in the class using the PACE model assisted by Ispring media is better than the achievement of students in the class using school learning, based on the results of calculations.

Students' Mathematical Reasoning Pattern

Qualitative research was conducted to describe students' mathematical reasoning patterns based on group I as many as 11 students. Based on the analysis, students in group I were able to change problems into mathematical models, have no difficulty in connecting mathematical situations, were able to compile evidence directly and then explain arguments quickly and precisely even though

there were still some difficulties. But overall it was useful in planning strategies and linking problems to obtain solutions to be achieved. Group II students as many as 11 students. Based on the analysis, the students in group II were able to change into a mathematical model even though there were still difficulties in connecting mathematical situations, and were able to compile evidence directly, and examine arguments to provide an explanation even though there were still shortcomings. Group III students as many as 8 students. Based on the analysis of students in group III, they have not been able to change real problems into mathematical form, but they were able to connect mathematical situations and compile evidences directly but in explaining the arguments, the students in this group still faced the difficulties that prevent students to get solutions that they want achieved

Discussion

The results of analysis the effectiveness of PACE learning on mathematical reasoning ability found that the significance value $(\alpha) = 0{,}000 < 0{,}05$, so it can be said that it has reached the minimum completeness criteria (KKM). The number of students who reached KKM in the experimental class were 30 students from 30 students in the class, this means that the proportion of completeness in the experimental class had reached 75%. This is because, using PACE learning students will be more active, interactive, and students will feel interested in learning.

This statement is also supported by the results of Rahman (2018) and Raharjo (2017) who concluded that through PACE learning, students can achieve classical and individual completeness as well as the results of Suprapti's study (2016) and Afandi (2017) stating that learning with ispring media achieves completeness classical.

The next results of analysis about effectiveness was that there was influence of PACE learning on mathematical reasoning 60.9%, it means that there are still 39.1% which influence mathematical reasoning other than PACE learning. This result is in line with the research of Rahmawati (2017), Lestari (2018) and Suryana (2015) who concluded that there was a positive effect of PACE learning that was significant for students' mathematical ability.

Based on the analysis obtained also the average mathematical reasoning ability of the experimental class was 77.39 higher than the control class which 72.28 so that it can be said that the students' mathematical reasoning ability in the experimental class is better than the control class. The results of the same study were also obtained from Rahman (2018), Raharjo (2017) and Suryana (2015), the mathematics learning achievement of students who used the PACE model were higher than the students who did not use the PACE model.

This is also supported by the results of research on ispring media conducted by Sastrakusumah (2018) and Suprapti (2016) which concluded that student learning outcomes in the class using ispring media were higher than those that did not use Ispring media. The use of ispring media supports the development of students' mathematical ability because by using ispring media the students can experience learning processes such as discussing, understanding material and doing problem training in interesting ways, this is in line with Noor (2017) that e-learning can streamline time and can be delivered interestingly.

The use of PACE learning model also supports the creation of effective learning because according to Rahman (2018) one of the advantages in the learning process is that students are able to discover and understand mathematical concepts or principles through the project steps in PACE learning, so students are required to construct their own knowledge by constructing own knowledge is expected that students do not forget the material quickly. This is in line with Asyrofi's statement (2016) that students who are able to construct their own knowledge will remember longer. PACE learning also gives students freedom to understand and solve a problem through making a project that has an impact on students

able to develop their reasoning ability. This is in accordance with the results of Wicaksana (2017) and Sofri (2014) who concluded that by implementing project-based learning can improve students' mathematical ability.

CONCLUSION

Based on the results of the study the following conclusions were obtained (1)) the PACE learning model assisted by Ispring media was effective; (2) based on the analysis of mathematical reasoning ability based on groups I, II, and III obtained the following results. The students in Group I in mathematical reasoning were able to change problems into mathematical models, have no difficulty in connecting mathematical situations, were able to compile evidence directly and then explain arguments quickly and precisely even though there were still some difficulties. Group II students in mathematical reasoning were able to transform into mathematical models even though they were still having difficulties in connecting mathematical situations, and were able to compile evidence directly, and examine arguments to provide explanations even though there were still shortcomings. Group III students in mathematical reasoning have not been able to change real problems into mathematical form, but were able to connect mathematical situations and compile evidences directly but in explaining the arguments, students in this group still having difficulties.

REFERENCES

Afandi, A. 2017. "Media ICT dalam Pembelajaran Matematika Menggunakan Powerpoint Interaktif dan Ispring Presenter". *Jurnal Terapan Abdimas*, 2: 19-26.

Alfiyansah, R. 2016. "Penggunaan Media Pembelajaran Ispring Presenter untuk Meningkatkan Motivasi dan Hasil Belajar Pada Mata Kuliah Keperawatan Dasar Nutrisi". *Pedagogia*, 14(2): 363–369.

Arivina, A. N., Masrukan, & Prabowo, A. 2017. "Kemampuan Penalaran Matematika di SMK Kelas X dengan Model LAPS – Heuristik Menggunakan Asesmen Unjuk Kinerja". *Unnes Journal of Mathematics Education*, 6(3): 318–324.

Asyrofi, M., & Junaedi, I. 2016. "Kemampuan Representasi Matematis Ditinjau dari Multiple Intellingence pada Pembelajaran Hybrid Learning Berbasis Konstruktivisme". *Unnes Journal of Mathematics Education Research*, 5 (1): 32-39.

Dewi, N. R. 2017. "Meningkatkan Kemampuan Berpikir Matematis Tingkat Tinggi dan Self-Efficacy Mahasiswa melalui Brain-Based Learning Berbantuan Web". *Disertasi*. Bandung: Universitas Pendidikan Indonesia.& Kusumah, Y. S. 2017. "Implementasi Brain-Based Learning Berbantuan Web Terhadap Peningkatan Kemampuan Penalaran Matematis Mahasiswa". *Unnes Journal of Mathematics Education*, 6(1): 128-133.

Hernawati, K. 2010. "Modul Pelatihan Ispring Presenter". *Modul*. Disampaikan dalam Kegiatan PPM dengan judul : Pelatihan Pembuatan Media Pembelajaran Interaktif dengan Perangkat Lunak Ispring Presenter Bagi Guru Sekolah Menengah pada Tanggal 23 Juli 2010 di Laboratorium Komputer Jurdik Matematika FMIPA UNY.

Kusumawardani, D. R., Isnarto, & Junaedi, I. 2018. "Mathematical Reasoning Based on Belief in PBL with Dyadic Interaction Approach". *Unnes Journal of Mathematics Education Research*, 7(1): 48–53.

Lee, C. 1999. *"An Assesment of the PACE Strategi for an Introduction Statistic Course"*. USA: Central Michigan University.

Lestari, N. A. 2018. "Implementasi Pembelajaran Matematika Model PACE Untuk Meningkatkan Kemampuan Pembuktian Matematis Pada Mata Kuliah Aljabar Abstrak Mahasiswa S1 Pendidikan Matematika FKIP

Universitas Bengkulu". *Jurnal Equation*, 1(1): 81-94.

Napitupulu, E. E. 2017. "Analyzing the Teaching and Learning of Mathematical Reasoning Skills in Secondary School". *Asian Social Science*, 13(12): 167–173.

Noor, M.E., Hardyanto, W., & Wibawanto, H. 2017. "Penggunaan e-Learning dalam Pembelajaran Berbasis Proyek di SMA Negeri 1 Jepara". *IJCET*, 6(1): 17-26.

Raharjo, J. F., & Sulaiman, H. 2017. "Mengembangkan Kemampuan Pemahaman Konsep Matematika Diskrit Dan Pembentukan Karakter Konstruktivis Mahasiswa Melalui Pengembangan Bahan Ajar Berbantuan Aplikasi Education Edmodo Bermodelkan Pogresif PACE". *Jurnal Teori Dan Riset Matematika (TEOREMA)*, 2(1): 47–62.

Rahman, A. A., & Yunita, A. 2018. "Penerapan Modul Pembelajaran PACE untuk Menignkatkan Kemampuan Pembuktian Matematika Siswa di Kelas VII SMP Materi Geometri". *MAJU*, 5(1): 27–38.

Rahmawati, I. 2016. "Pembelajaran Geometri Melalui Model PACE Berbantuan Geogebra Sebagai Upaya Meningkatkan Kemampuan Penalaran Matematis Siswa SMP". J*urnal Matematika Ilmiah STKIP Muhammdiyah Kuningan*, 2(1): 56-69.

Sastrakusumah, E.,N., Suherman, U., Darmawan, D., Jamilah. 2018. "Pengaruh Media Pembelajaran Interaktif Berbantuan Aplikasi Ispring Presenter terhadap Kemampuan Berpikir Kritis". *Jurnal Teknologi Pendidikan dan Pembelajaran*, 3(1): 462-485.

Sofri, R., Zaenuri, M., & Rochmad. 2014. "Model Project Based Learning Bermuatan Etnomatematika Untuk Meningkatkan Kemampuan Koneksi Matematika". *Unnes Journal of Mathematics Education Research*, 3(2): 72-78.

Sugiyono. 2015. *"Metode Penelitian Kuantitatif, Kualitatif, dan R&D"*. Bandung: Alfabeta.

Sulistiawati, Suryadi, D., & Fatimah, S. 2016. "Peningkatan Kemampuan Penalaran Matematis Menggunakan Desain Didaktis Berdadasarkan Kesulitan Belajar pada Materi Luas dan Volume Limas". *JPPM*, 9(1): 175–188.

Suprapti, E. 2016. "Pengembangan Perangkat Pembelajaran Matematika Model Kooperatif Tipe STAD dengan Media Powerpoint Ispring pada Materi Jajar Genjang, Layang-Layang, dan Trapesium di Kelas VII SMP". *Journal of Mathematics Education, Science and Technology*, 1(1): 57–68.

Suryana, A. 2015. "Analisis Implementasi Model PACE pada Mata Kuliah Statistika Matematika". *JKPM*, 1(1): 91–105.

Wicaksana, Y., Wardono, & Ridlo, S. 2017. "Analisis Kemampuan Literasi Matematika dan Karakter Rasa Ingin Tahu Siswa pada Pembelajaran Berbasis Proyek Berbantuan Schoology". *Unnes Journal of Mathematics Education Research*, 6(2): 167-174.