



Source details

Journal of Physics: Conference Series

Scopus coverage years: from 2005 to Present

ISSN: 1742-6588 E-ISSN: 1742-6596

Subject area: Physics and Astronomy: General Physics and Astronomy

Source type: Conference Proceeding

CiteScore 2020

0.7



SJR 2020

0.210



SNIP 2020

0.464



[View all documents >](#)

[Set document alert](#)

[Save to source list](#) [Source Homepage](#)

[CiteScore](#) [CiteScore rank & trend](#) [Scopus content coverage](#)

i Improved CiteScore methodology



CiteScore 2020 counts the citations received in 2017-2020 to articles, reviews, conference papers, book chapters and data papers published in 2017-2020, and divides this by the number of publications published in 2017-2020. [Learn more >](#)

CiteScore 2020 ⌵

$$0.7 = \frac{52,411 \text{ Citations } 2017 - 2020}{72,842 \text{ Documents } 2017 - 2020}$$

Calculated on 05 May, 2021

CiteScoreTracker 2021 ⓘ

$$0.8 = \frac{72,838 \text{ Citations to date}}{96,860 \text{ Documents to date}}$$

Last updated on 06 March, 2022 • Updated monthly

CiteScore rank 2020 ⓘ

Category	Rank	Percentile
Physics and Astronomy		
General Physics and Astronomy	#191/233	18th

[View CiteScore methodology >](#) [CiteScore FAQ >](#) [Add CiteScore to your site ↗](#)

[< Back to results](#) | [< Previous](#) 5 of 18 [Next >](#)[Download](#) [Print](#) [E-mail](#) [Save to PDF](#) [Save to list](#) [More... >](#)

Journal of Physics: Conference Series • *Open Access* • Volume 1366, Issue 1 • 7 November 2019 • Article number 012082 • 2nd International Conference on Applied and Industrial Mathematics and Statistics 2019, ICoAIMS 2019 • Kuantan, Pahang • 23 July 2019 through 25 July 2019 • Code 155273

Document typeConference Paper • *Bronze Open Access***Source type**

Conference Proceedings

ISSN

17426588

DOI

10.1088/1742-6596/1366/1/012082

View more [v](#)

The mathematics education department students' ability in mathematical literacy for uncertainty problems on PISA adaptation test

Sanjaya F. [✉](#), Dewa Putu W.P., Julie H., Anggoro A.Y., Rudhito M.A.[Save all to author list](#)

^a Mathematics Education Department, Sanata Dharma University, Yogyakarta, Paingan, Maguwoharjo, Sleman, Indonesia

12

Views count [?](#) [↗](#)[View all metrics >](#)[View PDF](#) [Full text options v](#) [Export](#)**Abstract**

Indexed keywords

Sustainable Development Goals 2021

SciVal Topics

Metrics

Funding details

Abstract

The Programme for International Student Assessment (PISA) is a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students who are nearing the end of their compulsory education. In most of the PISA-related studies, more students as subjects than teachers. Even mathematics education students who are prospective teachers have not got a place in this PISA research. One of goals of this research was to describe mathematics education students' ability on PISA adaptation test. In this research, there were several steps to achieve the goal, that is (1) creating test questions by adapting PISA test, (2) validating test questions using expert validation, (3) asking the students to do the test, and (4) describing the

Cited by 0 documents

Inform me when this document is cited in Scopus:

[Set citation alert >](#)**Related documents**

The teachers' mathematics literacy ability for solving uncertainty problems on a PISA adaptation test

Sanjaya, F. , Anggoro, A.Y. , Julie, H.

(2018) Journal of Physics: Conference Series

The teacher's mathematical literacy for the change and relationship problems on the PISA adaptation test

Anggoro, A.Y. , Julie, H. , Sanjaya, F.

(2018) Journal of Physics: Conference Series

The mathematics education department students' ability in mathematical literacy for the change and relationship problems on the PISA adaptation test

Anggoro, A.Y. , Julie, H. , Sanjaya, F.

(2019) Journal of Physics: Conference Series


View all related documents based on references

Find more related documents in Scopus based on:

Authors [>](#) Keywords [>](#)


students' solution test. The mathematics PISA adaptation test consist of 4 scopes, that is quantity, space and shape, change and relationship, and uncertainty. The test contained 13 questions, three quantity problems, three uncertainty problems, three change and relationship problems, and four space and shape problems. This research used 7 students of Mathematics Education Department of Sanata Dharma University as subject research. This research was a design research which developed by Cobb and Koeno. In the uncertainty area, all students answer correctly at the level 1 problem, six students answer correctly at the level 4 problem, two students answer correctly at the level 5 problem, two students answer correctly at the level 5 second problem, one student answers correctly at the level 6 problem. Therefore, the quality of mathematics education students' needs to be improved to reach the maximum level in PISA. © Published under licence by IOP Publishing Ltd.

Indexed keywords 

Sustainable Development Goals 2021  New 

SciVal Topics 





Metrics 

Funding details 

References (11)

[View in search results format >](#)

All

CSV export   Print  E-mail  Save to PDF

Create bibliography

-
- 1 Campbell, P.F., Nishio, M., Smith, T.M., Clark, L.M., Conant, D.L., Rust, A.H., DePiper, J.N., (...), Choi, Y.
The relationship between teachers' mathematical content and pedagogical knowledge, teachers' perceptions, and student achievement

(2014) *Journal for Research in Mathematics Education*, 45 (4), pp. 419-459. Cited 70 times.

<http://www.nctm.org/publications/archive.aspx?jrn1=jrme>

doi: 10.5951/jresematheduc.45.4.0419

[View at Publisher](#)

-
- 2 Julie, H.
(2017) *International Journal of Science and Applied Science: Conference Series*, 1, p. 55. Cited 7 times.

-
- 3 Julie, H., Marpaung, Y.
(2012) *Widya Dharma*, p. 23. Cited 3 times.

-
- 4 Oecd
(2012) *Assessment Framework. Key Competencies in Reading, Mathematics and Science*. Cited 456 times.

-
- 5 Oecd
(2013) *PISA 2012 Results: What Students Know and Can Do. Student Performance in Mathematics, Reading, and Science*. Cited 1642 times.
-

□ 6 Ojose, B.
(2011) *Journal of Mathematics Education*, 4, p. 89. Cited 78 times.

□ 7 Christiansen, I.B.
(2006) *Pythagoras*, 64, p. 6. Cited 20 times.

□ 8 Stacey, K.
The PISA view of mathematical literacy in Indonesia
([Open Access](#))

(2011) *Journal on Mathematics Education*, 2 (2), pp. 95-126. Cited 102 times.
<https://ejournal.unsri.ac.id/index.php/jme/article/view/746/200>
doi: 10.22342/jme.2.2.746.95-126

View at Publisher

□ 9 Lai, Y., Smith, W.M., Wakefield, N.P., Miller, E.R., Goar, J.S., Groothuis, C.M., Wells, K.M.
Characterizing Mathematics Graduate Student Teaching Assistants'™ Opportunities to Learn from Teaching

(2016) *Association for Women in Mathematics Series*, 7, pp. 73-88.
springer.com/series/13764
doi: 10.1007/978-3-319-44950-0_6

View at Publisher

□ 10 Julie, H., Sanjaya, F., Anggoro, A.Y.
The students' ability in the mathematical literacy for uncertainty problems on the PISA adaptation test ([Open Access](#))

(2017) *AIP Conference Proceedings*, 1868, art. no. 050026. Cited 5 times.
<http://scitation.aip.org/content/aip/proceeding/aipcp>
ISBN: 978-073541548-5
doi: 10.1063/1.4995153

View at Publisher

□ 11 Akker Den, J.V., Gravemeijer, K., McKenney, S., Nieveen, N.
(2006) *Educational Design Research*. Cited 468 times.

© Copyright 2019 Elsevier B.V., All rights reserved.

About Scopus

[What is Scopus](#)

[Content coverage](#)

[Scopus blog](#)

[Scopus API](#)

[Privacy matters](#)

Language

[日本語に切り替える](#)

[切换到简体中文](#)

[切换到繁體中文](#)

[Русский язык](#)

Customer Service

[Help](#)

[Tutorials](#)

[Contact us](#)

ELSEVIER

[Terms and conditions](#) ↗ [Privacy policy](#) ↗

Copyright © Elsevier B.V. ↗. All rights reserved. Scopus® is a registered trademark of Elsevier B.V.

We use cookies to help provide and enhance our service and tailor content. By continuing, you agree to the use of cookies.



Contact us now.

Supply Flocculant, Anti Scalant

PT Adimitra Prima Lestari

[OPEN](#)

Journal of Physics: Conference Series

COUNTRY

United Kingdom



Universities and research institutions in United Kingdom

SUBJECT AREA AND CATEGORY

Physics and Astronomy
Physics and Astronomy
(miscellaneous)

PUBLISHER

IOP Publishing Ltd.

H-INDEX

85

PUBLICATION TYPE

Conferences and Proceedings

ISSN

17426588, 17426596

COVERAGE

2005-2020

INFORMATION

[Homepage](#)

[How to publish in this journal](#)

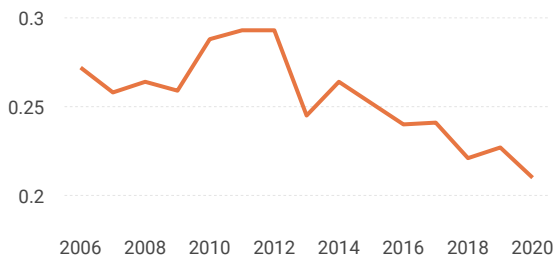
jpcs@iopublishing.org

SCOPE

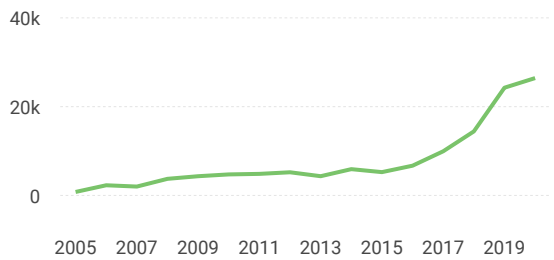
The open access Journal of Physics: Conference Series (JPCS) provides a fast, versatile and cost-effective proceedings publication service.

 Join the conversation about this journal

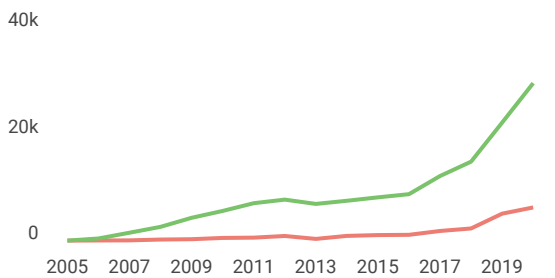
SJR



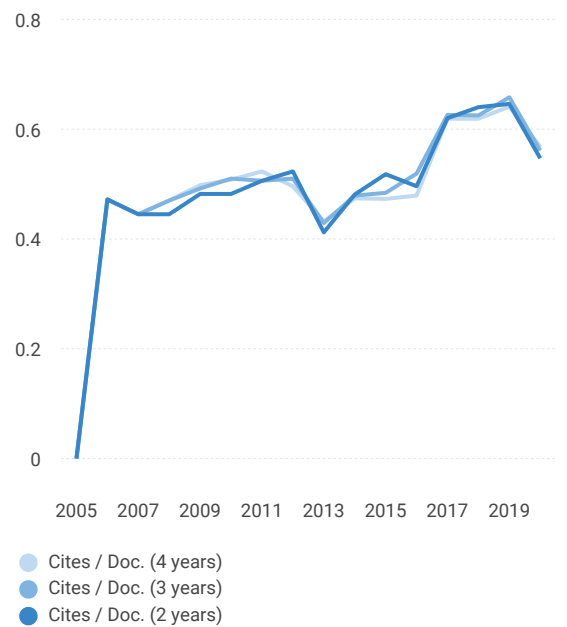
Total Documents



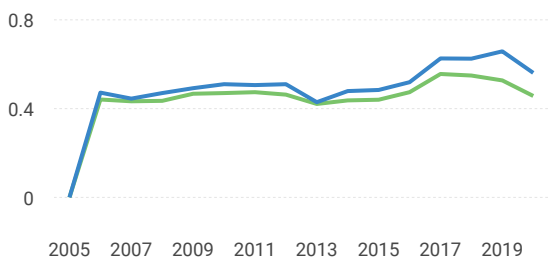
Total Cites Self-Cites



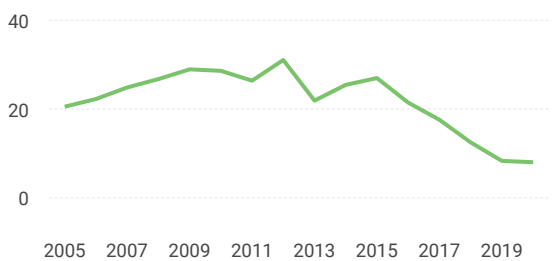
Citations per document



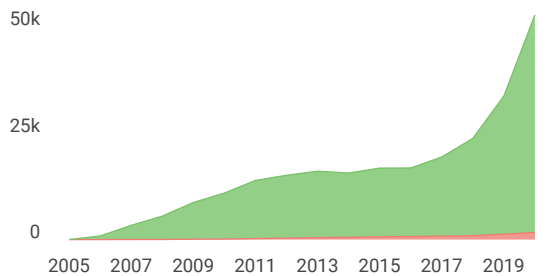
External Cites per Doc Cites per Doc



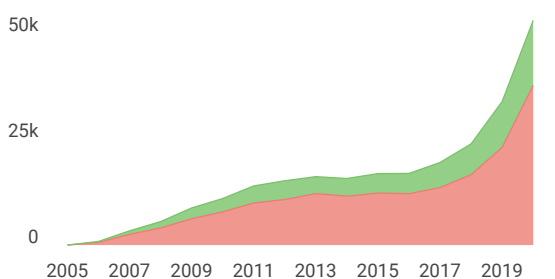
% International Collaboration



Citable documents Non-citable documents



Cited documents Uncited documents



Journal of Physics: Conference Series

Q4 Physics and Astronomy (miscellaneous) best quartile

SJR 2020 0.21

powered by scimagojr.com

Show this widget in your own website

Just copy the code below and paste within your html code:

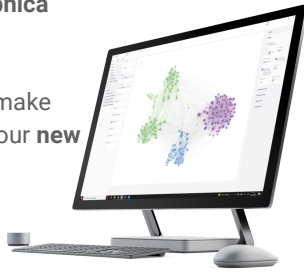
```
<a href="https://www.scimagojr.com" style="color: red; text-decoration: none;">

```



Explore, visually communicate and make sense of data with our **new free tool**.

Get it



Metrics based on Scopus® data as of April 2021

Z **Zainab** 4 weeks ago

hello, is the IOP Journal of Physics: Conference Series of this journal listed in scopus?

reply



Melanie Ortiz 4 weeks ago

SCImago Team

Dear Zainab, thank you very much for your comment. We suggest you consult the Scopus database directly. Keep in mind that the SJR is a static image (the update is made one time per year) of a database (Scopus) which is changing every day.

Best Regards, SCImago Team

D **Dr Girisha A** 1 month ago

Dear sir,

Please inform me, whether Journal of Physics: Conference Series 1767 (2021) 012011 is rated in Q3 or Q4.

reply



Melanie Ortiz 4 weeks ago

SCImago Team

Dear Dr Girisha,

Thank you for contacting us. Please see comments below.

Best Regards, SCImago Team

N **narasiman** 2 months ago

Dear sir,

NOTICE: Ukraine: [Click here to read IOP Publishing's statement.](#)



The open access *Journal of Physics: Conference Series (JPCS)* provides a fast, versatile and cost-effective proceedings publication service.

Latest published conferences

Vol 2237



Go

Conference archive

2019



Go

View forthcoming volumes accepted for publication.

If you would like more detailed information regarding *Journal of Physics: Conference Series* please visit conferenceseries.iop.org, and if you are interested in publishing a proceedings with IOP Conference Series please visit our page for conference organizers.

Conference organizers can use our online form and we will get in touch with a quote and further details.

Most read

Latest articles

JOURNAL LINKS

[Journal home](#)

[Journal Scope](#)

[Information for organizers](#)

[Information for authors](#)

[Contact us](#)

Reprint services from Curran Associates

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our [Privacy and Cookies policy](#).



JOURNAL HISTORY

2004-present Journal of Physics: Conference Series

doi:10.1088/issn.1742-6596

Online ISSN: 1742-6596

Print ISSN: 1742-6588



PAPER • OPEN ACCESS

Preface/Introduction

To cite this article: 2019 *J. Phys.: Conf. Ser.* **1366** 011001

View the [article online](#) for updates and enhancements.

You may also like

- [Preface](#)
- [Preface](#)
- [1st International Conference on Applied & Industrial Mathematics and Statistics 2017 \(ICoAIMS 2017\)](#)



The Electrochemical Society
Advancing solid state & electrochemical science & technology

242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Abstract submission deadline: **April 8, 2022**

Connect. Engage. Champion. Empower. Accelerate.

MOVE SCIENCE FORWARD



Submit your abstract



Preface/Introduction



2nd International Conference on Applied & Industrial Mathematics and Statistics 2019
(ICoAIMS 2019)
23-25th July 2019, The Zenith Hotel, Kuantan, Pahang, Malaysia.

2nd International Conference on Applied & Industrial Mathematics and Statistics 2019 (ICoAIMS 2019) is organised by Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, Malaysia. Our co-organisers are Institut Teknologi Sepuluh (ITS) Nopember, Surabaya, Indonesia, Malaysian Mathematical Sciences Society (PERSAMA) and Kazakh National Agrarian University, Kazakhstan. The main topics of the conference is divided into six categories; Pure Mathematics, Applied Mathematics, Computational Mathematics, Statistics & Applied Statistics, Operational Research and Mathematics Education including Engineering & Industrial Applications.

The ICoAIMS 2019 with the theme *IR 4.0 Through the Eyes of Mathematics* aims to bring together leading academics, scientists, researchers and research scholars to exchange and share their experiences and research results on all aspects related to Mathematics and Statistics. It also provides a premier interdisciplinary platform for researchers, practitioners and educators to present and discuss the most recent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in the fields of Mathematics.

ICoAIMS 2019 was an overwhelming success, attracting the delegates, speakers and sponsors from many countries and provided great intellectual and social interaction for the

participants. Without their support, the conference would not have been the success that it was. We trust that all the participants found their involvement in the Conference both valuable and rewarding. Once again, we would like to convey our deepest appreciation for all contributions and wish you success in the years ahead.

Editors

Dr. Nor Izzati Jaini

Dr. Norazaliza Mohd Jamil

Dr. Anvarjon Ahmedov Ahat Jonovich

Dr. Abdul Rahman Mohd Kasim

Mrs Siti Fatimah Ahmad Zabidi

Mrs Rahimah Jusoh @ Awang

Conference/Sponsor Logo



Organising Committee

Chairman:

Associate Professor Dr. Mohd Zuki Salleh

Co-Chairman:

Dr. Zulkhibri Ismail

Secretary

Dr Norhayati Rosli

Treasurer:

Dr. Muhammad Azrin Ahmad

Dr. Nor Aida Zuraimi Md Noar

Sponsorship:

Miss Rozieana Khairuddin

Dr. Zulkhibri Ismail

Miss Nur Zahirah Md Noor

Logistic:

Mrs Ezrinda Mohd Zaihidee

Dr. Yuhani Yusof

Mr Muhammad Halim Paboh

Keynote/Invited Speaker:

Dr. Noryanti Muhammad

Program Book:

Dr. Norhafizah Md Sarif

Mrs Najihah Mohamed

Proceedings & Journals Publication:

Dr. Norazaliza Mohd Jamil

Dr. Anvarjon Ahmedov Ahat Jonovich

Dr. Nor Izzati Jaini

Dr. Abdul Rahman Mohd Kasim

Mrs Siti Fatimah Ahmad Zabidi

Mrs Rahimah Jusoh @ Awang

Registration & Souvenirs:

Miss Nurfatimah Mohamad Hanafi

Mrs Intan Sabariah Sabri

Protocol:

Ts. Dr. Azlyna Senawi

Dr Siti Roslindar Binti Yaziz

Publicity & Website:

Dr. Nor Alisa Mohd Damanhuri

Miss Laila Amera Aziz

Scientific Committee

Assoc. Prof. Dr. Dumitru Vieru, *Gheorghe Asachi Technical University of Iasi, Romania*

Emeritus Prof. Constantin Fetecau, *Gheorghe Asachi Technical University of Iasi, Romania*

Prof. Frank Coolen, *University of Durham, UK*

Prof. Qi Wang, *University of South Carolina, US*

Prof. Xuerong Mao, *University of Strathclyde, United Kingdom*

Prof. Dr. Ioan Pop, *Babeş-Bolyai University*

Dr. John Boland, *University of South Australia, Australia*

Emeritus Prof. Phil Howlett, *University of South Australia, Australia*

Prof. Serikbayev Abdukarim, *National Algarian University, Kazakhstan*

Dr Sergey Utyuzhnikov, *University of Manchester, United Kingdom*

Prof. Dr. Basuki Widodo, *Sepuluh Nopember Institute of Technology, Indonesia*

Assoc. Prof. Dr. Heri Kuswanto, *Sepuluh Nopember Institute of Technology, Indonesia*

Dr. Imam Mukhlash, *Sepuluh Nopember Institute of Technology, Indonesia*

Dr. Suhartono, *Sepuluh Nopember Institute of Technology, Indonesia*

Prof. Dr. Shaharuddin Salleh, *Universiti Teknologi Malaysia*

Prof. Dr. Muhammad Hisyam Lee, *Universiti Teknologi Malaysia*

Dr. Yeak Su Hoe, *Universiti Teknologi Malaysia*

Prof. Maslina Darius, *Universiti Kebangsaan Malaysia*

Prof Dr Kamarulzaman Ibrahim, *Universiti Kebangsaan Malaysia*

Assoc. Prof. Dr. Maznah Mat Kasim, *Universiti Utara Malaysia*

Assoc. Prof. Dr. Mohd Kamal Mohamad Nawawi, *Universiti Utara Malaysia*

Assoc. Prof. Dr. Mohd Rashid Ab Hamid, *Universiti Malaysia Pahang*

Assoc. Prof. Dr. Anvarjon Ahmedov Ahatjonovich , *Universiti Malaysia Pahang*

Dr. Abdul Rahman Mohd Kasim, *Universiti Malaysia Pahang*

Dr. Roslinazairimah Zakaria, *Universiti Malaysia Pahang*

Dr. Nor Aida Zuraimi Md Noar, *Universiti Malaysia Pahang*

Dr. Mohd Sham Mohamad, *Universiti Malaysia Pahang*

Keynote Speakers

- Dato' Sri. Dr. Mohd Uzir Mahidin
Chief Statistician, Department of Statistics Malaysia
- Emeritus Prof. Dr. Ioan Pop
Faculty of Mathematics and Computer Science, University of Babeş-Bolyai, Romania
- Prof Kalmenov Tynysbek Sharipovich
National Academy of Sciences, Republic of Kazakhstan
- Prof Dr. Mohd Isa Irawan
Faculty of Mathematics Computing and Data Science (FMKSD), Institut Teknologi Sepuluh Nopember Surabaya, Indonesia
- Dr Dzaharudin Mansor
National Technology Officer, Microsoft Malaysia
- Dr Suhartono
Department of Statistics, Institut Teknologi Sepuluh Nopember (ITS) Surabaya, Indonesia

NOTICE: Ukraine: Click here to read IOP Publishing's statement.

Table of contents

Volume 1366

2019

◀ Previous issue Next issue ▶

2nd International Conference on Applied & Industrial Mathematics and Statistics 23–25 July 2019, Kuantan, Pahang, Malaysia

Accepted papers received: 08 October 2019

Published online: 07 November 2019

Open all abstracts

Preface

OPEN ACCESS 011001

Preface/Introduction

+ Open abstract  View article  PDF

OPEN ACCESS 011002

Peer review statement

+ Open abstract  View article  PDF

Papers

Applied Mathematics

OPEN ACCESS 012001

Substitution Box Design Based from Symmetric Group Composition

Muhammad Fahim Bin Roslan, Kamaruzzaman Seman, Azni Haslizan Ab Halim and

M Nor Azizi Syam Mohd Sayuti

+ Open abstract  View article  PDF

OPEN ACCESS 012002

Stagnation-Point Flow and Heat Transfer Over an Exponentially Stretching/Shrinking Sheet in Hybrid Nanofluid with Slip Velocity Effect: Stability Analysis

N S Anuar, N Bachok, N M Arifin, H Rosali and I Pop

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.

+ Open abstract  View article  PDF



[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012076

Fuzzy Analytic Hierarchy Process using Intuitive Vectorial Centroid for Eco-friendly Car Selection

Adam Shariff Adli Aminuddin, Ku Muhammad Na'im Ku Khalif, Fadhilah Che Jamil and Nor Izzati Jaini

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012077

A Preliminary Study of Optimizing Back Pain Medicinal Cupping Points Disease via Graph Colouring

Nurfatihah Mohamad Hanafi, Yuhani Yusof, Mohd Sham Mohamad, Muhamad Faiz Abu Bakar and Mohd Adhha Ibrahim

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012078

A Comparison of Simulated Annealing Cooling Strategies for Redesigning a Warehouse Network Problem

Rozieana Khairuddin and Zaitul Marlizawati Zainuddin

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012079

A Hybrid of Quasi-Newton Method with CG Method for Unconstrained Optimization

N 'Aini, M Mamat, M Rivaie and I M Sulaiman

[+ Open abstract](#) [View article](#) [PDF](#)

Mathematics Education

OPEN ACCESS

012080

Calculus video recommender system

Noor Latiffah Adam, Muhamad Syahmil Aiman Sulaiman and Shaharuddin Cik Soh

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012081

Online learning environment to enhance HOTS in mathematics using Polya's problem solving model

Sudirman Mustapha, Mohd Shafie Rosli and Nor Shela Saleh

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012082

The mathematics education department students' ability in mathematical literacy for

uncertainty problems on PISA adaptation test

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.



[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012083

Pre-Service Mathematics Teachers' Knowledge about Higher-Order Thinking Skills

Veronika Fitri Rianasari and Maria Suci Apriani

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012084

Analysis of student errors in integral concepts based on the indicator of mathematical competency using orthon classification

Yani Ramdani, Nety Kurniati, Erwin Harahap, Euis Setiawati, Nia Kurniati and Henriady de Keizer

[+ Open abstract](#) [View article](#) [PDF](#)

Computational Mathematics

OPEN ACCESS

012085

Direct multistep method for solving delay differential equation with boundary conditions

N T Jaaffar, Z A Majid and N Senu

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012086

Four-Point EGSOR Iteration for the Grünwald Implicit Finite Difference Solution of One-Dimensional Time-Fractional Parabolic Equations

F A Muhiddin, J Sulaiman and A Sunarto

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012087

Staging of breast cancer based on the area of the primary tumour

R Embong, M H Sanuddin and M S Md Ali

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012088

Development and Implementation of Block Unification Multi-step Methods for the Solution of Second Order Ordinary Differential Equations

Umaru Mohammed, Oyelami Oyewole, Mikhail Semenov and Aliyu Ma'ali

[+ Open abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012089

Bat Algorithm for Solving Molecular Docking of Alkaloid Compound SA2014 Towards Cyclin D1 Protein in Cancer

This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our [Privacy and Cookies policy](#).



PAPER • OPEN ACCESS

The mathematics education department students' ability in mathematical literacy for uncertainty problems on PISA adaptation test

To cite this article: Febi Sanjaya *et al* 2019 *J. Phys.: Conf. Ser.* **1366** 012082

View the [article online](#) for updates and enhancements.

You may also like

- [Designing PISA-like task on uncertainty and data using Covid-19 context](#)
Zulkardi, D S Nusantara and R I I Putri
- [Student strategy in solving PISA problem through realistic mathematics education approach](#)
K A Fitri, R Johar, C M Zubainur et al.
- [Designing PISA-like mathematics problem in covid-19 pandemic \(PISAComat\)](#)
D S Nusantara, Zulkardi and R I I Putri



The Electrochemical Society
Advancing solid state & electrochemical science & technology

242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Abstract submission deadline: **April 8, 2022**

Connect. Engage. Champion. Empower. Accelerate.

MOVE SCIENCE FORWARD



Submit your abstract



The mathematics education department students' ability in mathematical literacy for uncertainty problems on PISA adaptation test

Febi Sanjaya¹, Dewa Putu W.P.², Hongki Julie³, Ant. Yudhi Anggoro⁴, and M. Andy Rudhito⁵

^{1,2,3,4,5} *Mathematics Education Department, Sanata Dharma University, Paingan, Maguwoharjo, Sleman, Yogyakarta, Indonesia.*

¹E-mail: febi@usd.ac.id

Abstract. The Programme for International Student Assessment (PISA) is a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students who are nearing the end of their compulsory education. In most of the PISA-related studies, more students as subjects than teachers. Even mathematics education students who are prospective teachers have not got a place in this PISA research. One of goals of this research was to describe mathematics education students' ability on PISA adaptation test. In this research, there were several steps to achieve the goal, that is (1) creating test questions by adapting PISA test, (2) validating test questions using expert validation, (3) asking the students to do the test, and (4) describing the students' solution test. The mathematics PISA adaptation test consist of 4 scopes, that is quantity, space and shape, change and relationship, and uncertainty. The test contained 13 questions, three quantity problems, three uncertainty problems, three change and relationship problems, and four space and shape problems. This research used 7 students of Mathematics Education Department of Sanata Dharma University as subject research. This research was a design research which developed by Cobb and Koeno. In the uncertainty area, all students answer correctly at the level 1 problem, six students answer correctly at the level 4 problem, two students answer correctly at the level 5 problem, two students answer correctly at the level 5 second problem, one student answers correctly at the level 6 problem. Therefore, the quality of mathematics education students' needs to be improved to reach the maximum level in PISA.

1. Introduction

Student achievement is closely related to the teacher's mathematical and pedagogical skills [1, 2]. In addition, teacher knowledge achieved by students has a significant relationship with teachers' perceptions [1, 2]. In this case, teachers' perceptions are defined as (1) teacher paradigms in the learning process of mathematics, and (2) teacher attention to students' math skills [1, 2]. Furthermore, mathematical knowledge of teachers is the main factor of teachers in giving attention to students' math skills [1, 2]. The Programme for International Student Assessment (PISA) is a triennial international survey which aims to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students who are nearing the end of their compulsory education. Based on the opinion, the ability of teachers in managing the process of learning to teach mathematics and solve mathematics



problems is one of the determinants of student success in completing the PISA test. Most of the PISA-related studies, more students as subjects than teachers. Even mathematics education students who are prospective teachers have not got a place in this PISA research.

Therefore, this study aims to describe the solution of mathematics education students on PISA adaptation tests. This PISA adaptation test contains 4 topics, namely quantity, space and form, change and relationship, and area of uncertainty. However, in this paper the researcher will only explain the results of research for mathematics student education solution PISA adaptation test on the topic of uncertainty [3, 4, 5].

Mathematical literacy is the understanding of individual mathematics in applying it in everyday life [6]. Using mathematical literacy, students can understand and apply the role of mathematics in a real-life context. [2, 7, 8]. According to [3], mathematical literacy is the ability of a person to identify and understand the role of mathematics in real life, to make accurate judgments, use and involve mathematics in various ways to meet the needs of individuals as reflective, constructive and devoted citizens. The things that affect the ability of mathematical literacy are: (1) mathematical thinking and reasoning, (2) argument of logical ability, (3) mathematical communication ability, (4) problem modeling ability, (5) proposing and problem solving ability, (6) the ability to represent ideas, and (7) using symbols and formal language skills [7, 9].

In PISA, the problem of students' mathematical literacy is divided into 6 levels [3, 10]. Based on Julie's research [10], 83.33% of students reach level 4 and 38.89% of students reach level 5. Furthermore, this study will also look at the comparison of the results of students' ability to do the test with mathematics education students who are prospective teachers.

2. The research methodology

Design research has two characteristics that are process-oriented and oriented to usability [11]. One of the stages in this study, researchers developed a design of a test adapted from PISA. Researchers also described the mathematics education student's solution for the test. These results will be the basis for creating modules that contains a learning process that can be used to improve PISA competencies. Therefore, this research may be classified in the design research.

One of the study aims was to describe mathematics education student's solution on PISA adaptation test. The steps for research can be seen figure 1. In this paper, the researcher limited the discussion of the results of the study only to the subjects of research in mathematics education students and for uncertainty problems.

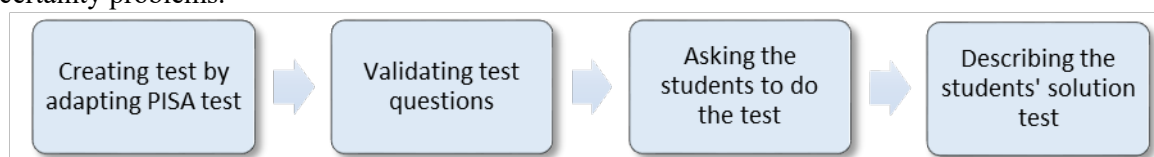


Figure 1. Research steps.

This test contained 13 questions, which consists of three quantity problems, three uncertainty problems, three for change and relationship problems, and four for space and shape problems. The test was done by students within 90 minutes.

This research used 7 students of Sanata Dharma University's Mathematics Education Departments as the subject of the research. The selection of students as the subjects of this study was conducted randomly proportional, then the best 7 student were selected as research subjects. The results will be presented qualitatively.

3. The Results and discussion

In this paper, the research results present the result of the PISA adaptation test on the uncertainty area [3, 4, 5]. The result were described as follow:

Problem 1. The Figure 2 shows information about exports from Zedland, a country that uses zeds as its currency. (see figure 2)

- a. What is the total value (in million zeds) of exports from Zedland in 1998?
- b. What is the value of fruit exported from Zedland in 2000?
 - A. 1.8 million zeds.
 - B. 2.3 million zeds.
 - C. 2.4 million zeds.
 - D. 3.4 million zeds.
 - E. 3.8 million zeds.

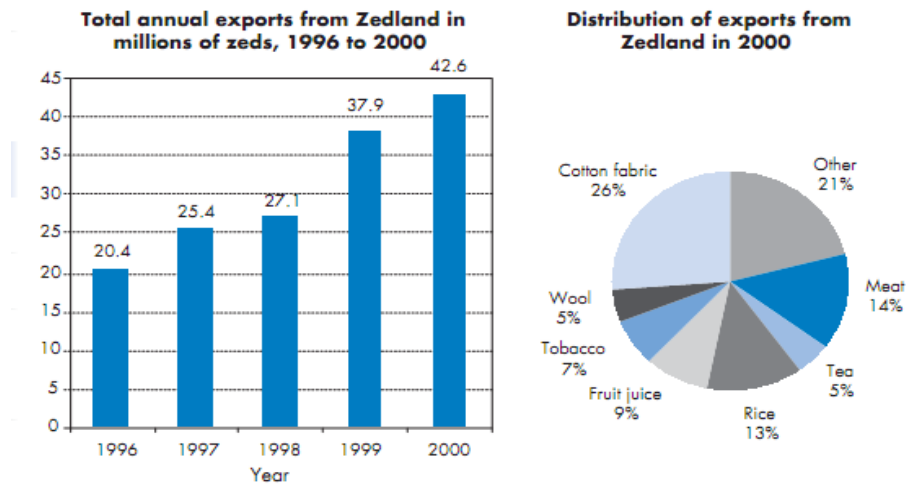


Figure 2. Distribution of exports from Zedland.

Student's answer for problem 1a:

The total value (in million zeds) of exports from Zedland in 1998 was 27.1. The solution was made by all students. Students' answer as above could be categorized as level 4 because the question is explicit and only needs to select relevant information from the chart.

Students' answer for problem 1b:

1. The value of the fruit is exported from Zedland in the year 2000 = $\frac{9}{100} \times 42.6 = 3.834$ million zeds $\approx 3,8$ million zeds. The answer was E. The solution was made by six students. Students' answer as above could be categorized as level 4 because they must understand the data on Figure 2 along with the relationship the two charts. In addition, they must also understand the representation associated with the topic of fractions, especially percent.
2. A. 1.8 juta zeds

$$\frac{1,8}{42,6} \times 100 = 4,1\%$$

The solution was made by one student.

a. Nilai total ekspor dari zedland pada tahun 1998 adalah 27,1 juta zeds

b. Nilai buah yang diekspor dari zedland pada tahun 2000

$$= \frac{9}{100} \times 42.600.000 = 3834000$$

$$= 3.834 \text{ juta zeds}$$

$$\approx 3,8 \text{ juta zeds (E) .}$$

Figure 3. Example of students' solution of problem 1.

Problem 2. Many scientists fear the increasing levels of CO₂ gas in Earth's atmosphere caused by climate change. The Figure 4 shows that the level of CO₂ emissions in 1990 (see bright bars) in some countries (or territories), emissions levels in 1998 (see dark bars), and percentage changes in emission levels between 1990 and 1998 (indicated by arrows and percentage).

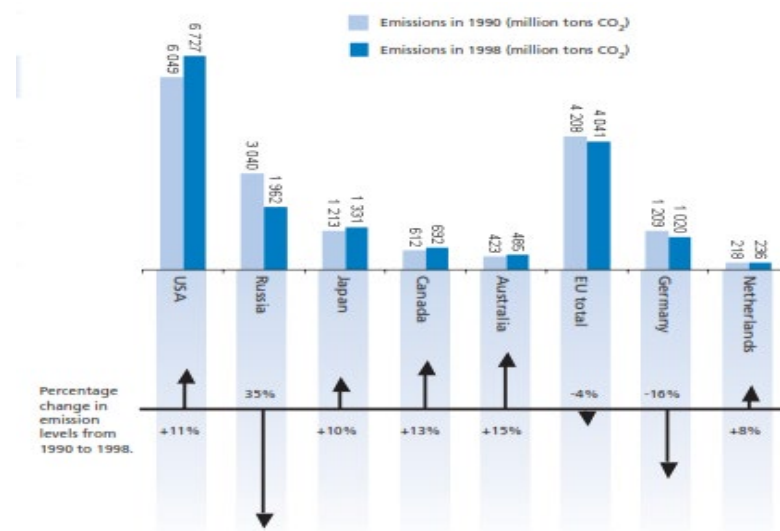


Figure 4. The level of CO₂ emissions in 1990.

- In the diagram you can read that in the USA, the increase in CO₂ emission level from 1990 to 1998 was 11%. Show the calculation to demonstrate how the 11% is obtained.
- Mandy analyzed Figure 4 and claimed she discovered a mistake in the percentage change in emission levels: “The percentage decrease in Germany (16%) is bigger than the percentage decrease in the whole European Union (EU total, 4%). This is not possible, since Germany is part of the EU.” Do you agree with Mandy when she says this is not possible? Give an explanation to support your answer.

Students’ answer for problem 2a:

The increased CO₂ emission levels from 1990 to 1998 is

$$\frac{(6727-6049)}{6049} \times 100\% = \frac{678}{6045} \times 100\% = \frac{67800}{6045}\% \approx 11\%.$$

The solution was made by two students.

Students’ answer as above could be categorized as level 5 because they must did some following action:

- 1) Choose correctly the required data, i.e. emission of CO₂ in 1990 in the USA was 6049 and emission of CO₂ in 1998 in the USA was 6727,
- 2) Choose a formula that suits the real situation, the percentage changing was

$$\frac{\text{new data} - \text{old data}}{\text{old data}} \times 100\%.$$
- 3) Compare and evaluate the result with 11%.
There were five students who didn't solve the problem.

Students' answer for problem 2b:

1. No, because EU is a union of many countries and every country has their enhancement or decline and if we calculate, the answer can be lower than one country (Germany).
The solution was made by one student.
Students' answer as above could be categorized as level 6 because:
 - a. they should be able to read data from a graph
 - b. they can interpret that the percentage of emission reduction data in Germany is 16% while in the EU is 4%
 - c. Understand the reality that Germany is part of the EU
 - d. They can also formulate and communicate their thoughts appropriately and in accordance with the real situation that the percentage decrease in the EU is 4% does not mean that all percentage declines in the EU state are 4%.
2. The student agrees with Mandy opinion because the percentage is calculated based on the region.
The solution was made by one student.
3. There were five students who did not solve the problem.

a. Proses memperoleh 11%

$$\frac{(\text{Emisi CO}_2 \text{ tahun } 1998 - \text{Emisi CO}_2 \text{ tahun } 1990) \times 100\%}{\text{total emisi CO}_2 \text{ tahun } 1998 - 1990}$$

b. Tidak. Karena Uni Eropa adalah gabungan dari banyak negara dan tentu saja dari masing-masing negara yang ada di Uni Eropa kenaikan atau penurunannya berbeda, dan apabila ~~dit~~ dikalkulasikan jatuhnya dapat lebih rendah dibandingkan dengan 1 negara saja (misal Jerman).

Figure 5. Example of students' solution of problem 2.

Problem 3. In a country, a number of polls are conducted to find out much support for an upcoming presidential candidate. Four newspapers conducted a poll with the following results in table 1:

Table 1. Vote result of some newspaper.

Newspaper Name	Vote Result	Information
Newspaper 1	36.5 %	The poll was conducted on January 6th to 500 randomly selected people from voting citizens.
Newspaper 2	41.0 %	The poll was conducted on January 20th to 500 randomly selected people from voting citizens.
Newspaper 3	39.0 %	The poll was conducted on January 20th to 1000 randomly selected people from voting citizens.
Newspaper 4	44.5 %	The poll was conducted on January 20th to 1000 readers by phone

Which newspaper gave the best predictions about the number of voters, if the elections take place on 25 January? Give three reasons to support your answer!

Students' answer for problem 3:

- The best predictions is Newspaper 3. The reason was: (a) the poll was conducted five days before the election time, so the owner have had a plan to choose, (b) the samples is 1000 people, so more samples can reduce errors, and (c) randomly choose. The solution was made by one student. Students' answer as above could be categorized as level 6, because the students:
 - must be able to understand complex problems in the problem associated with the real situation
 - filter information that is relevant to the real situation
 - could compare and evaluate existing data to solve the problem
- The best predictions was Newspaper 2. The reason was: (a) for 500 people, (b) if using 500 people the result is 41% then more people can make the result increase, and (c) respondents were selected randomly from citizens who have voting rights. The solution was made by one student.
- The best predictions was Newspaper 4 because the newspaper call the reader of their newspaper so this will make more effective. The solution was made by one student.
- The best predictions is Newspaper 3.
The reason was: (a) the poll was conducted before the election time, (b) get support from 390 people, and (c) selected from citizens who have voting rights. The solution was made by one student.
- The best predictions was Newspaper 2 because from 500 people, 205 people give the support, it's mean more than half. The solution was made by one student.
- The best predictions is Newspaper 3. The reason was: (a) much samples, (b) the result is not far from newspaper 1 and newspaper 2 which get vote from phone, and (c) randomly selected. The solution was made by one student.
- The best predictions is Newspaper 4. The reason was: (a) the poll was conducted five days before the election time, (b) more samples, that is 1000 people, and (c) call the readers directly so they can find the another reason. The solution was made by one student.

Menurut saya, surat kabar yg memberi prediksi terbaik tentang banyak pemilih adalah surat kabar 4. Karena surat kabar 4 langsung menelpon pembaca surat kabar tsb, sehingga pembaca yg ditelpon akan memilih calon presiden (mau tidak mau), lebih efektif karena hanya menelpon dan pasti akan banyak ^{yes} pemilih calon presiden yang ~~diprediksikan~~ akan datang, ^{ber-partisipasi}

Figure 6. Example of students' solution of problem 3

The following table summarize the results obtained by the student. Information in each level can be seen in Julie [10].

Table 2. The students' ability in the uncertainty area for the PISA adaptation test.

Problem	Student's Achievement Level	The number of student	Percentage
1a	Level 2	7	100,00%
1b	Level 4	6	85.71%
	Could not be leveled	1	14.29%
2a	Level 5	2	28.57%
	Could not answer	5	71.43%
2b	Level 6	1	14.29%
	Could not be leveled	1	14.29%
	Could not answer	5	71.43%
3	Level 5	1	14.29%
	Level 4	2	28.57%
	Could not be leveled	4	57,14%

From table 2, it can be seen that the mathematics education students' have been able to reach level 2 and level 4. This means that students of mathematics education students' have been able to solve complex mathematical problems that are sufficient to relate them to mathematical concepts they have understood. On the other hand, they are still struggling with level 5 and 6 problems. They have not been able to solve complex mathematical problems that contain deep thinking about mathematical concepts, filtering information, and connecting with reality.

The results above also indicate that the suitability of research conducted by Julie [10] related to PISA ability of students in uncertainty area, that is 83.33% of students achieved level 4 and 38.89% of

students achieved level 5. Therefore, it is necessary to improve the quality of mathematics education students' to be able to solve the PISA problem level 5 and 6 so that when they become a teacher, they can guide students in improving quality on problems related to PISA overall.

4. Conclusions

Based on Section 4, it can be concluded that almost all students could solve level 2 and level 4 uncertainty problem. Five of seven students has not been able to complete a first level 5 uncertainty problem. Six of seven students have not been able to complete a second level 5 uncertainty problem. Six of seven students have not been able to complete an uncertainty problem for level 6. This means the students were still having difficulties with the PISA problems level 5 and level 6. Therefore, the quality of mathematics education students' needs to be improved to reach the maximum level in PISA.

Based on our research in 2018, learning approaches that might improve mathematical literacy skills were realistic mathematical approaches and reflective pedagogy. The study related to the influence of realistic mathematical approaches and reflective pedagogies on mathematical literacy skills was being conducted by us.

Acknowledgments

Our thanks to the Ministry of the Research, Technology and Higher Education has been funding this research so we could finish this research and present this publication through Penelitian Strategis Nasional Institusi 2018 grant distributed through the Sanata Dharma University.

References

- [1] Campbell, Patricia F, et all 2014 *Journal for Research in Mathematics Education* **45** 419
- [2] Julie H 2017 *International Journal of Science and Applied Science: Conference Series* **1** 55
- [3] Julie H and Marpaung Y 2012 *Widya Dharma* **23**
- [4] OECD 2012 Assessment Framework. Key Competencies in Reading, Mathematics and Science (Paris: OECD)
- [5] OECD 2013 PISA 2012 Results: What students know and can do. Student Performance in mathematics, reading, and science (Paris: OECD)
- [6] Ojose B 2011 *Journal of Mathematics Education* **4** 89
- [7] Christiansen I B 2006 *Pythagoras* **64** 6
- [8] Stacey K 2011 *Journal Mathematics Education* **2** 95
- [9] Wijaya A 2016 *IndoMS Journal Mathematics Education* **7** 73
- [10] Julie H, Sanjaya F, and Anggoro A Y 2017 *AIP Conf Proc* **1868** 050026
- [11] Akker, Den J V, Gravemeijer K, McKenney S, and Nieveen N 2006 *Educational Design Research* (New York: Taylor and Francis Group)

ICoAIMS2017

Certificate of Participation

This is to certify that

HONGKI JULIE

has actively participated as a

PRESENTER

in

**1st INTERNATIONAL CONFERENCE ON
APPLIED & INDUSTRIAL MATHEMATICS
AND STATISTICS 2017 (ICoAIMS 2017)**

08-10 August 2017

Organised by

**Faculty of Industrial Sciences & Technology
Universiti Malaysia Pahang**



Associate Professor Dr. Mohd Zuki Salleh

Chairman

1st International Conference on Applied & Industrial Mathematics and Statistic 2017
ICoAIMS 2017

