

PAPER • OPEN ACCESS

International Joint Conference on STEM Education (IJCSE) 2020

To cite this article: 2021 *J. Phys.: Conf. Ser.* **1957** 011001

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

You may also like

- [Mitigating algorithmic errors in quantum optimization through energy extrapolation](#)
Chenfeng Cao, Yunlong Yu, Zipeng Wu et al.
- [International Workshop on Statistical-Mechanical Informatics 2008 \(IW-SMI 2008\)](#)
Masahito Hayashi, Jun-ichi Inoue, Yoshiyuki Kabashima et al.
- [Mapping of mathematics topics that can be integrated their learning utilizing calculator](#)
H Retnawati, A Wijaya, W Yudianto et al.



Breath Biopsy[®] OMNI[®]

The most advanced, complete solution for global breath biomarker analysis

TRANSFORM YOUR
RESEARCH WORKFLOW



Expert Study Design
& Management



Robust Breath
Collection



Reliable Sample
Processing & Analysis



In-depth Data
Analysis



Specialist Data
Interpretation

International Joint Conference on STEM Education (IJCSE) 2020

U Salmah¹, F Nurhasanah², W Yuniarto³, I Lokutrapol⁴ and R Setiawan⁵

^{1,2,3}SEAMEO Regional Centre for QITEP in Mathematics, Yogyakarta, Indonesia.

⁴Institute for the Promotion of Teaching Science and Technology (IPST), Bangkok, Thailand

⁵SEAMEO Regional Centre for QITEP in Science, Bandung, Indonesia.

E-mail: ummy.salmah@staff.qitepinmath.org

Preface

2020 had brought challenges for everyone and every aspect of life due to the COVID-19 pandemic. People must adapt to social distancing, wearing masks, learning, working from home, and meeting virtually. This situation also impacts our event, International Joint Conference on STEM Education (IJCSE) 2020, which must be held online.

The IJCSE 2020 is a forum for Mathematics and Science educators from various countries to share their research results and best practices related to current issues regarding Science, Technology, Engineering, and Mathematics (STEM) Education. The IJCSE 2020 was held using the blended method: face to face and online. IJCSE 2020 is a collaboration of three international conferences held by three Southeast Asian educational institutions as follows:

- International Symposium on Mathematics Education and innovation (ISMEI) - a biennial symposium held by SEAMEO QITEP in Mathematics (SEAQIM) based in Yogyakarta, Indonesia.
- International Conference on Science Education (ICONS) - a biennial international conference conducted by SEAMEO QITEP in Science (SEAQIS) based in Bandung, Indonesia.
- The International Science, Mathematics and Technology Education Conference (ISMTEC) - initiated in 2013 by the Institute for the Promotion of Teaching Science and Technology (IPST) based in Bangkok, Thailand.

The aims of this conference remain to (1) provide an international platform for educators to share ideas and experiences, learn new knowledge and best practices, and disseminate recent research results in the field of Mathematics Education, Science Education and STEM Education; (2) strengthen STEM education especially in Southeast Asian Region; (3) establish and expand networks of academic cooperation at the international level; promote the organization of online conference platform that corresponds with the time of crisis.



In this conference, the plenary speakers and keynote speakers were given 30 minutes for presentations and Q&A session. It was followed by a parallel session separated into three different rooms based on the main subject: Mathematics Education, Science Education and STEM Education. Each presenter had 15 minutes to present their papers, after which the audience has a chance to ask questions and provide comments or suggestions. The conference ran well, although some technical challenges also happened during the conference.

Finally, we would like to extend our gratitude to everyone who has contributed and supported this conference. Without the hard work of committees, invited speakers, keynote speakers, parallel presenters, reviewers, etc., there would be no conference at all. Thank you very much for all the supports and helps.

Advisory Committee

Name	Affiliation
Dr. Ethel Agnes P Valenzuela	SEAMEO Secretariat (SEAMES)
Dr. Sumadyono	SEAMEO Regional Centre for QITEP in Mathematics (SEAQiM)
Dr. Indrawati	SEAMEO Regional Centre for QITEP in Science (SEAQiS)
Dr. Pornpun Waitayangkoon	SEAMEO Regional Centre for STEM Education (SEAMEO STEM-ED)
Prof. Sukit Limpijumnong	The Institute for the Promotion of Teaching Science and Technology (IPST)

Academic Committee

Name	Affiliation
Nuanwan Sanguansak (Chair)	IPST
Wahid Yunianto (Chair)	SEAQiM
Reza Setiawan (Chair)	SEAQiS
Kusalin Musikul	IPST
Khemwadee Pongsanon	IPST
Supunee Chanprasert	IPST
Ruthai Plengvattana	IPST
Theerapat Wechaprasit	IPST
Alongkorn Tangsa-nguantham	IPST
Somkiat Pentong	IPST
Sornthep Vannarat	IPST
Nantawan Somsook	IPST
Ithipong Lokutrapol	IPST
Somkiat Yangjeen	IPST
Lalida Umbua	IPST
Kessara Amornvuthivorn	SEAMEO STEM-ED
John Stiles	SEAMEO STEM-ED
Uki Rahmawati	SEAQiM
Russasmita Sri Padmi	SEAQiM
Ummy Salmah	SEAQiM
Wisnuningtyas Wirani	SEAQiM
Miftahul Hidayah	SEAQiM
Lukman Nulhakim	SEAQiS

Adella Anfidina Putri	SEAQiS
Harry Firman	SEAQiS
Poppy Kamalia Devi	SEAQiS
Elly Erliani	SEAQiS

Conference Committee

Name	Affiliation
Worawarong Rakreungdet (Chair)	IPST
Farida Nurhasanah (Chair)	SEAQiM
Lily Indarti (Chair)	SEAQiS
Susetyo Widyasmoro	SEAQiM
Chaiwuti Lertwanasiriwan	IPST
Nutthaporn Ruchikachorn	IPST
Pleumrudee Chartwanchai	IPST
Narong Saengkaew	IPST
Praweena Tira	IPST
Samart Kongtaweelert	IPST
Somnuek Tidla	IPST
Nanyarat Wichitrattakarn	IPST
Thitiporn Pornsookrattanakul	IPST
Malatip Jangprai	IPST
Sucharat Tubtimcharoon	SEAMEO STEM-ED
Suhananto	SEAQiM
Rachma Noviani	SEAQiM
Agus Limbang Wardani	SEAQiM
Caecilia Cahyaningsih Kristilestari	SEAQiM
Febriarto Cahyo Nugroho	SEAQiM
Mutiatul Hasanah	SEAQiM
Lukman Nulhakim	SEAQiS
Rizwan Darmawan	SEAQiS
Zuhe Safitra	SEAQiS
Octo Litadiputra Reinaldy	SEAQiS
Nurul Khosiyah	SEAQiS
Tika Karlina	SEAQiS
Lintang Ratri Prastika	SEAQiS
Prima Dermawan	SEAQiS
M. Firman Sujana	SEAQiS
Amalia Yuliana	SEAQiS

Plenary Speakers

Name	Affiliation
Nadiem Makarim	Minister of Education and Culture of The Republic of Indonesia
H.E. Nataphol Teepsuwan	Ministry of Education of the Kingdom of Thailand
Dr. Iwan Syahril	Directorate General, Teachers and Education Personnel Ministry of Education and Culture of The Republic of Indonesia

Invited and Keynote Speakers

Name	Affiliation
Prof. Sukit Limpijumnong	IPST, Thailand
Prof. Lew Hee Chan	Korean National University of Education, South Korea
Prof. Minoru Itoh	Tokyo University of Science, Japan
Assoc. Prof. Ho Weng Kin	National Institute of Education, Singapore
Prof. Dato Dr Noraini Binti Idris	University of Malaya, Malaysia
Assoc. Prof. Rekha Koul	Curtin University, Australia
Dr. Xingfeng Huang	Shanghai Normal University, China
Dr. Yaacov Hecht	Founder of Democratic School and Education Cities, Israel
Prof. Lyn D English	Queensland University of Technology, Australia
Dr. Edward Reeve	Utah State University and SEAMEO Regional Centre for STEM Education
Dr. Farida Nurhasanah	SEAMEO QITEP in Mathematics (SEAQiM), Indonesia.

PAPER • OPEN ACCESS

Peer review declaration

To cite this article: 2021 *J. Phys.: Conf. Ser.* **1957** 011002

You may also like

- [Peer review declaration](#)
- [Peer review declaration](#)
- [Peer review declaration](#)

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



Breath Biopsy[®] OMNI[®]

The most advanced, complete solution for
global breath biomarker analysis

TRANSFORM YOUR
RESEARCH WORKFLOW



Expert Study Design
& Management



Robust Breath
Collection



Reliable Sample
Processing & Analysis



In-depth Data
Analysis



Specialist Data
Interpretation

Peer review declaration

All papers published in this volume of Journal of Physics: Conference Series have been peer reviewed through processes administered by the Editors. Reviews were conducted by expert referees to the professional and scientific standards expected of a proceedings journal published by IOP Publishing.

- **Type of peer review: Double-blind**
- **Conference submission management system:**

The submission process was proceeded in the Open Conference System (OCS). Authors, who has problem with the OCS were allowed to send their papers through conference email.

- **Number of submissions received: 194**
- **Number of submissions sent for review: 108**
- **Number of submissions accepted: 79 (48 papers are accepted to be submitted in Journal of Physics - IOP Conference Series)**
- **Acceptance Rate (Number of Submissions Accepted / Number of Submissions Received X 100): 40,72%**
- **Average number of reviews per paper: 2 reviewers**
- **Total number of reviewers involved: 31 reviewers**
- **Any additional info on review process:**
- **Contact person for queries:**

Dr Farida Nurhasanah; SEAMEO QITEP IN MATHEMATICS;
nurhasanahfarida@gmail.com.

Ummy Salmah; SEAMEO QITEP IN MATHEMATICS;
ummy.salmah@staff.qitepinmath.org ; ummysalmah87@gmail.com



Table of contents

Volume 1957

2021

[Previous issue](#)[Next issue](#)

International Joint Conference on STEM Education (IJCSE) 2020, 18-19 November 2020, Yogyakarta, Indonesia

Accepted papers received: 15 June 2021

Published online: 06 August 2021

[Open all abstracts, in this issue](#)

Preface

011001

THE FOLLOWING ARTICLE IS OPEN ACCESS

[International Joint Conference on STEM Education \(IJCSE\) 2020](#)

[Open abstract](#), International Joint Conference on STEM Education (IJCSE) 2020 [View article](#), International Joint Conference on STEM Education (IJCSE) 2020 [PDE](#), International Joint Conference on STEM Education (IJCSE) 2020

011002

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Peer review declaration](#)

[Open abstract](#), Peer review declaration [View article](#), Peer review declaration [PDE](#), Peer review declaration

Mathematics Education

012001

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Learning dilation through Lawang Sewu context](#)

F Nursyahidah, I U Albab and B A Saputro

[Open abstract](#), Learning dilation through Lawang Sewu context [View article](#), Learning dilation through Lawang Sewu context [PDE](#), Learning dilation through Lawang Sewu context

012002

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Analysis of Engineering Students' Understanding in Differentiate Derivative and Integral](#)

R A Funny

[Open abstract](#), Analysis of Engineering Students' Understanding in Differentiate Derivative and Integral [View article](#), Analysis of Engineering Students' Understanding in Differentiate Derivative and Integral [PDF](#), Analysis of Engineering Students' Understanding in Differentiate Derivative and Integral

012003

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Developing the scripting task for mathematical connection between the university and school mathematics content](#)

A S Pramasdyahsari

[Open abstract](#), Developing the scripting task for mathematical connection between the university and school mathematics content [View article](#), Developing the scripting task for mathematical connection between the university and school mathematics content [PDF](#), Developing the scripting task for mathematical connection between the university and school mathematics content

012004

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Reflective Practice of Pre-Service Mathematics Teacher on Online Learning](#)

Z Abidin, I K Budayasa and S Khabibah

[Open abstract](#), Reflective Practice of Pre-Service Mathematics Teacher on Online Learning [View article](#), Reflective Practice of Pre-Service Mathematics Teacher on Online Learning [PDF](#), Reflective Practice of Pre-Service Mathematics Teacher on Online Learning

012005

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Development of Pop-up Book Mathematics Learning Media on Polyhedron Topics](#)

S K Fazira and A Qohar

[Open abstract](#), Development of Pop-up Book Mathematics Learning Media on Polyhedron Topics [View article](#), Development of Pop-up Book Mathematics Learning Media on Polyhedron Topics [PDF](#), Development of Pop-up Book Mathematics Learning Media on Polyhedron Topics

012006

THE FOLLOWING ARTICLE IS OPEN ACCESS

[The impact of interactive online learning by Pear Deck during COVID-19 pandemic era](#)

F Haryani and N Ayuningtyas

[Open abstract](#), The impact of interactive online learning by Pear Deck during COVID-19 pandemic era [View article](#), The impact of interactive online learning by Pear Deck during COVID-19 pandemic era [PDF](#), The impact of interactive online learning by Pear Deck during COVID-19 pandemic era

012007

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Promoting Prezi-PowerPoint presentation in mathematics learning: the development of interactive multimedia by using ADDIE model](#)

U Rosmiati and N Siregar

[Open abstract](#), Promoting Prezi-PowerPoint presentation in mathematics learning: the development of interactive multimedia by using ADDIE model [View article](#), Promoting Prezi-PowerPoint presentation in mathematics learning: the development of interactive multimedia by using ADDIE model [PDF](#), Promoting Prezi-PowerPoint presentation in mathematics learning: the development of interactive multimedia by using ADDIE model

012008

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Enhancing students' level of thinking skills through integrative multi-Modal strategy in teaching mathematics](#)

A B Asotigue

[Open abstract](#), Enhancing students' level of thinking skills through integrative multi-Modal strategy in teaching mathematics [View article](#), Enhancing students' level of thinking skills through integrative multi-Modal strategy in teaching mathematics [PDE](#), Enhancing students' level of thinking skills through integrative multi-Modal strategy in teaching mathematics

012009

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Applying Mamdani's method to categorize mathematical literacy of public middle school students in Kupang](#)

D W Fointuna

[Open abstract](#), Applying Mamdani's method to categorize mathematical literacy of public middle school students in Kupang [View article](#), Applying Mamdani's method to categorize mathematical literacy of public middle school students in Kupang [PDE](#), Applying Mamdani's method to categorize mathematical literacy of public middle school students in Kupang

012010

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Analyzing students' achievement and attitude through the Frankards context in learning probability](#)

F A Fran

[Open abstract](#), Analyzing students' achievement and attitude through the Frankards context in learning probability [View article](#), Analyzing students' achievement and attitude through the Frankards context in learning probability [PDE](#), Analyzing students' achievement and attitude through the Frankards context in learning probability

012011

THE FOLLOWING ARTICLE IS OPEN ACCESS

[The design of mathematics learning using didactical engineering to develop the mathematical comprehension ability and self-confidence of elementary students](#)

R A Silo, T Herman and A Jupri

[Open abstract](#), The design of mathematics learning using didactical engineering to develop the mathematical comprehension ability and self-confidence of elementary students [View article](#), The design of mathematics learning using didactical engineering to develop the mathematical comprehension ability and self-confidence of elementary students [PDE](#), The design of mathematics learning using didactical engineering to develop the mathematical comprehension ability and self-confidence of elementary students

012012

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Students' higher-order thinking skills in discrete mathematics during covid-19 pandemic](#)

I P A A Payadnya and **K A Wibawa**

[Open abstract](#), Students' higher-order thinking skills in discrete mathematics during covid-19 pandemic [View article](#), Students' higher-order thinking skills in discrete mathematics during covid-19 pandemic [PDE](#), Students' higher-order thinking skills in discrete mathematics during covid-19 pandemic

012013

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Using technology in young children mathematical learning: a didactic perspective](#)

R Novita and T Herman

[Open abstract](#), [Using technology in young children mathematical learning: a didactic perspective](#) [View article](#), [Using technology in young children mathematical learning: a didactic perspective](#) [PDF](#), [Using technology in young children mathematical learning: a didactic perspective](#)

012014

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Discovery learning rise student's activeness and understanding compound figure area](#)

J Subagis

[Open abstract](#), [Discovery learning rise student's activeness and understanding compound figure area](#) [View article](#), [Discovery learning rise student's activeness and understanding compound figure area](#) [PDF](#), [Discovery learning rise student's activeness and understanding compound figure area](#)

012015

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Designing teaching materials based on process skills approach to mathematical representation ability in polyhedron](#)

L Sagita, Setiyani and Sumiarsih

[Open abstract](#), [Designing teaching materials based on process skills approach to mathematical representation ability in polyhedron](#) [View article](#), [Designing teaching materials based on process skills approach to mathematical representation ability in polyhedron](#) [PDF](#), [Designing teaching materials based on process skills approach to mathematical representation ability in polyhedron](#)

012016

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Variation theory-based mathematics teaching: The new method in improving higher order thinking skills](#)

I Baskoro

[Open abstract](#), [Variation theory-based mathematics teaching: The new method in improving higher order thinking skills](#) [View article](#), [Variation theory-based mathematics teaching: The new method in improving higher order thinking skills](#) [PDF](#), [Variation theory-based mathematics teaching: The new method in improving higher order thinking skills](#)

012017

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Mathematics teacher professional development program: fostering the skills for teaching meaningful mathematics through active learning during pandemic era](#)

F Nurhasanah, B Usodo, C H Ekana, Y Kuswardi, Sutopo and S Lestari

[Open abstract](#), [Mathematics teacher professional development program: fostering the skills for teaching meaningful mathematics through active learning during pandemic era](#) [View article](#), [Mathematics teacher professional development program: fostering the skills for teaching meaningful mathematics through active learning during pandemic era](#) [PDF](#), [Mathematics teacher professional development program: fostering the skills for teaching meaningful mathematics through active learning during pandemic era](#)

STEM Education

012018

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Perceptions of pre-service teachers about outdoor learning for STEM Education in early childhood education](#)

V Khwaengmek, S Pitipornatapin, P Pimthong and O Bukatunyoo

[Open abstract](#), [Perceptions of pre-service teachers about outdoor learning for STEM Education in early childhood education](#) [View article](#), [Perceptions of pre-service teachers about outdoor learning for STEM Education in early childhood education](#) [PDF](#), [Perceptions of pre-service teachers about outdoor learning for STEM Education in early childhood education](#)

012019

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Students' statistical literacy through lab school car model in STEM activity](#)

I M A Purwadi

[Open abstract](#), [Students' statistical literacy through lab school car model in STEM activity](#) [View article](#), [Students' statistical literacy through lab school car model in STEM activity](#) [PDF](#), [Students' statistical literacy through lab school car model in STEM activity](#)

012020

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Promoting the middle school students' engineering skills and conceptual understanding through STEM-based learning](#)

A N Rusmana, A Widodo and W Surakusumah

[Open abstract](#), [Promoting the middle school students' engineering skills and conceptual understanding through STEM-based learning](#) [View article](#), [Promoting the middle school students' engineering skills and conceptual understanding through STEM-based learning](#) [PDF](#), [Promoting the middle school students' engineering skills and conceptual understanding through STEM-based learning](#)

012021

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Vietnamese pre-service teachers and in-service teachers' conception of STEM Education](#)

N T T Hang

[Open abstract](#), [Vietnamese pre-service teachers and in-service teachers' conception of STEM Education](#) [View article](#), [Vietnamese pre-service teachers and in-service teachers' conception of STEM Education](#) [PDF](#), [Vietnamese pre-service teachers and in-service teachers' conception of STEM Education](#)

012022

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Pre-service teachers' integrated curriculum approaches to STEM education in classrooms](#)

N Jun-On and J Kaya

[Open abstract](#), [Pre-service teachers' integrated curriculum approaches to STEM education in classrooms](#) [View article](#), [Pre-service teachers' integrated curriculum approaches to STEM education in classrooms](#) [PDF](#), [Pre-service teachers' integrated curriculum approaches to STEM education in classrooms](#)

012023

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Designing STEM-based AjarMat activities for the study from home program](#)

A Susanto and S W Danoebroto

[Open abstract](#), [Designing STEM-based AjarMat activities for the study from home program](#) [View article](#), [Designing STEM-based AjarMat activities for the study from home program](#) [PDF](#), [Designing STEM-based AjarMat activities for the study from home program](#)

012024

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Using technology, hands-on, and fieldwork activity for GLOBE learning in secondary school](#)

L Umbua

[Open abstract](#), [Using technology, hands-on, and fieldwork activity for GLOBE learning in secondary school](#) [View article](#), [Using technology, hands-on, and fieldwork activity for GLOBE learning in secondary school](#) [PDF](#), [Using technology, hands-on, and fieldwork activity for GLOBE learning in secondary school](#)

012025

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Integrated STEM education in the thai secondary schools: challenge and addressing of challenges](#)

A Suriyabutr and J Williams

[Open abstract](#), [Integrated STEM education in the thai secondary schools: challenge and addressing of challenges](#) [View article](#), [Integrated STEM education in the thai secondary schools: challenge and addressing of challenges](#) [PDF](#), [Integrated STEM education in the thai secondary schools: challenge and addressing of challenges](#)

012026

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Implementing the Earth System Science Curriculum in School through Research-Based Learning and Technology Enhancing 21st Century Skills](#)

S Mongkonthan

[Open abstract](#), [Implementing the Earth System Science Curriculum in School through Research-Based Learning and Technology Enhancing 21st Century Skills](#) [View article](#), [Implementing the Earth System Science Curriculum in School through Research-Based Learning and Technology Enhancing 21st Century Skills](#) [PDF](#), [Implementing the Earth System Science Curriculum in School through Research-Based Learning and Technology Enhancing 21st Century Skills](#)

012027

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Trend of environmental science project: A reflection of Thailand GLOBE student research competition](#)

Y Laplai

[Open abstract](#), [Trend of environmental science project: A reflection of Thailand GLOBE student research competition](#) [View article](#), [Trend of environmental science project: A reflection of Thailand GLOBE student research competition](#) [PDF](#), [Trend of environmental science project: A reflection of Thailand GLOBE student research competition](#)

012028

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Embedding STEM in the mathematics classroom: A case study of vocational high school teacher's practice](#)

M Marfuah

[Open abstract](#), [Embedding STEM in the mathematics classroom: A case study of vocational high school teacher's practice](#) [View article](#), [Embedding STEM in the mathematics classroom: A case study of vocational high school teacher's practice](#) [PDF](#), [Embedding STEM in the mathematics classroom: A case study of vocational high school teacher's practice](#)

012029

THE FOLLOWING ARTICLE IS **OPEN ACCESS**

[Indonesian students' STEM career motivation: a study focused on gender and academic level](#)

Y Sya'bandari, R Q Aini, A N Rusamana and M Ha

[Open abstract](#), Indonesian students' STEM career motivation: a study focused on gender and academic level [View article](#), Indonesian students' STEM career motivation: a study focused on gender and academic level [PDF](#), Indonesian students' STEM career motivation: a study focused on gender and academic level

012030

THE FOLLOWING ARTICLE IS **OPEN ACCESS**

[Students' perspectives on Batik Cirebon for high school chemistry embedded STEM learning](#)

I R Anugrah

[Open abstract](#), Students' perspectives on Batik Cirebon for high school chemistry embedded STEM learning [View article](#), Students' perspectives on Batik Cirebon for high school chemistry embedded STEM learning [PDF](#), Students' perspectives on Batik Cirebon for high school chemistry embedded STEM learning

012031

THE FOLLOWING ARTICLE IS **OPEN ACCESS**

[STEM partnership for design-based learning in PM 2.5 crisis for high school](#)

P Pimthong, S Kityakarn, R Munprom, T Lertcharoenrit and S Ugsonkid

[Open abstract](#), STEM partnership for design-based learning in PM 2.5 crisis for high school [View article](#), STEM partnership for design-based learning in PM 2.5 crisis for high school [PDF](#), STEM partnership for design-based learning in PM 2.5 crisis for high school

012032

THE FOLLOWING ARTICLE IS **OPEN ACCESS**

[The Effects of a professional development on teachers' self-efficacy in promoting thinking and problem-solving skills](#)

A Tongchai

[Open abstract](#), The Effects of a professional development on teachers' self-efficacy in promoting thinking and problem-solving skills [View article](#), The Effects of a professional development on teachers' self-efficacy in promoting thinking and problem-solving skills [PDF](#), The Effects of a professional development on teachers' self-efficacy in promoting thinking and problem-solving skills

012033

THE FOLLOWING ARTICLE IS **OPEN ACCESS**

[Improving the ability of Miftahul Huda Islamic elementary school students to face the 21st century with the application of STEM in learning curriculum 2013](#)

T Susilowati

[Open abstract](#), Improving the ability of Miftahul Huda Islamic elementary school students to face the 21st century with the application of STEM in learning curriculum 2013 [View article](#), Improving the ability of Miftahul Huda Islamic elementary school students to face the 21st century with the application of STEM in learning curriculum 2013 [PDF](#), Improving the ability of Miftahul Huda Islamic elementary school students to face the 21st century with the application of STEM in learning curriculum 2013

012034

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Analysing thai curriculum indicators on the basis of pisa competencies in science and mathematics](#)

S Yangjeen, N Angboonpong and S Chaiwongsurarit

[Open abstract](#), [Analysing thai curriculum indicators on the basis of pisa competencies in science and mathematics](#) [View article](#), [Analysing thai curriculum indicators on the basis of pisa competencies in science and mathematics](#) [PDF](#), [Analysing thai curriculum indicators on the basis of pisa competencies in science and mathematics](#)

012035

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Entering 21st century skills: teacher and junior high school student's perspective about science learning media' scope](#)

M C Tapilouw, L Dewi and S P Hastuti

[Open abstract](#), [Entering 21st century skills: teacher and junior high school student's perspective about science learning media' scope](#) [View article](#), [Entering 21st century skills: teacher and junior high school student's perspective about science learning media' scope](#) [PDF](#), [Entering 21st century skills: teacher and junior high school student's perspective about science learning media' scope](#)

012036

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Analogy Educational Comics to Overcome Students' Misconception on Simple Electricity Circuit Material](#)

R Hesti

[Open abstract](#), [Analogy Educational Comics to Overcome Students' Misconception on Simple Electricity Circuit Material](#) [View article](#), [Analogy Educational Comics to Overcome Students' Misconception on Simple Electricity Circuit Material](#) [PDF](#), [Analogy Educational Comics to Overcome Students' Misconception on Simple Electricity Circuit Material](#)

012037

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Improving effectiveness learning solar system through mind mapping strategy with mase paper ball and flashcard](#)

R Priyatin

[Open abstract](#), [Improving effectiveness learning solar system through mind mapping strategy with mase paper ball and flashcard](#) [View article](#), [Improving effectiveness learning solar system through mind mapping strategy with mase paper ball and flashcard](#) [PDF](#), [Improving effectiveness learning solar system through mind mapping strategy with mase paper ball and flashcard](#)

012038

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Applying home based STEM activities to promote students learning motivation during Covid-19 pandemic](#)

H Yunita

[Open abstract](#), [Applying home based STEM activities to promote students learning motivation during Covid-19 pandemic](#) [View article](#), [Applying home based STEM activities to promote students learning motivation during Covid-19 pandemic](#) [PDF](#), [Applying home based STEM activities to promote students learning motivation during Covid-19 pandemic](#)

012039

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Identifying teacher understanding of phenomena-based learning after professional development](#)

K Hongyim and E Brunsell

[Open abstract](#), Identifying teacher understanding of phenomena-based learning after professional development [View article](#), Identifying teacher understanding of phenomena-based learning after professional development [PDF](#), Identifying teacher understanding of phenomena-based learning after professional development

012040

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Science teachers' professional development program for designing stem integrated lesson plan](#)

W Srikoom

[Open abstract](#), Science teachers' professional development program for designing stem integrated lesson plan [View article](#), Science teachers' professional development program for designing stem integrated lesson plan [PDF](#), Science teachers' professional development program for designing stem integrated lesson plan

012041

THE FOLLOWING ARTICLE IS OPEN ACCESS

[The impact of STEM-based independent learning unit on students' mastery of the respiratory system topic](#)

A R Puspaningsih

[Open abstract](#), The impact of STEM-based independent learning unit on students' mastery of the respiratory system topic [View article](#), The impact of STEM-based independent learning unit on students' mastery of the respiratory system topic [PDF](#), The impact of STEM-based independent learning unit on students' mastery of the respiratory system topic

012042

THE FOLLOWING ARTICLE IS OPEN ACCESS

[The implementation of discovery learning using personal site in physics online classroom](#)

L L Sarah

[Open abstract](#), The implementation of discovery learning using personal site in physics online classroom [View article](#), The implementation of discovery learning using personal site in physics online classroom [PDF](#), The implementation of discovery learning using personal site in physics online classroom

012043

THE FOLLOWING ARTICLE IS OPEN ACCESS

[Development of USA method \(understanding, sketching, analysing\) as practical way to resolving classical mechanics problems for physics lesson](#)

Rabiudin and E H Nurafifi

[Open abstract](#), Development of USA method (understanding, sketching, analysing) as practical way to resolving classical mechanics problems for physics lesson [View article](#), Development of USA method (understanding, sketching, analysing) as practical way to resolving classical mechanics problems for physics lesson [PDF](#), Development of USA method (understanding, sketching, analysing) as practical way to resolving classical mechanics problems for physics lesson

PAPER • OPEN ACCESS

Students' higher-order thinking skills in discrete mathematics during covid-19 pandemic

To cite this article: I P A A Payadnya and K A Wibawa 2021 *J. Phys.: Conf. Ser.* **1957** 012012

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

**240th ECS Meeting**
Oct 10-14, 2021, Orlando, Florida
**Register early and save
up to 20% on registration costs**
Early registration deadline Sep 13
REGISTER NOW



Students' higher-order thinking skills in discrete mathematics during covid-19 pandemic

I P A A Payadnya and K A Wibawa

Departements of Mathematics Education, Faculty of Teacher Training and Education,
Universitas Mahasaraswati Denpasar, Denpasar, Bali, Indonesia

E-mail: adeandre@unmas.ac.id

Abstract. Mathematics learning in the era of 4.0 must be oriented to the aspects of higher-order thinking skills that important for any mathematics subject including discrete mathematics. The online learning caused Covid-19 pandemic influence many aspects of mathematics learning and skills. The purpose of this study was to analyse students' higher-order thinking skills in the discrete mathematics subject during COVID-19 Pandemic using Two-Tier Multiple Choice (TTMC) instrument. This research was conducted from March to May 2020. Subjects in this study were 11 students of class IIB of Mathematics Education Study Program Universitas Mahasaraswati Denpasar. This study used descriptive analysis techniques. Data collected through tests, interviews, observations, and documentation. The results of the data analysis showed that the higher-order thinking skills percentage of students with very low categories of 18.18%, low 36.36% and moderate 45.45%. Online learning due to COVID-19 Pandemic also causes the difficulties for students to do group discussion as well as the decrease in student motivation. In contrast, students are more familiar with discrete mathematics concepts in their environment such as graph concepts and can use internet facilities in learning more effectively. Some solutions for the problems occurred are: 1) Using interactive learning, 2) Using Project-Based learning (PBL), 3) Discussing current trends in learning, 4) Demonstrating assertiveness, and establishing learning rules, and 5) Supporting students to get better internet facilities.

Keywords: Higher-order thinking skills, Two-tier Multiple Choice, Qualitative Analysis, COVID-19 Pandemic

1. Introduction

Mathematics learning in the era of 4.0 must be emphasized by the aspects of students' higher-order thinking skills [1]. Higher-order thinking skills are a thinking process of students at a higher cognitive level developed from various cognitive concepts and methods and learning taxonomies such as problem-solving methods, bloom taxonomy, and learning, teaching, and assessment taxonomies [2].

Higher-order thinking skills are very important for students to learn mathematical concepts. One of the mathematical concepts or material that really requires higher order thinking skills is Discrete Mathematics.

Discrete mathematics has many uses in various fields. Discrete mathematics is very important because the concept is contained in various fields of application; one of the most important is the field of computers. The concept of Discrete Mathematics is the basis for compiling computer algorithms that require good logic and reasoning. Discrete mathematics is a part of mathematics that studies



different and separated objects. Generally, discrete mathematics is used to count many objects, study the relationship between finite sets and analyze process that engages infinite steps [3]. Therefore, in order to understand the concept of Discrete Mathematics well, students must have a high level of thinking ability [3].

The emergence of the 2019 Corona Virus Disease (COVID-19) Pandemic in early 2020 has had a profound impact on people's lives. The sudden wave of online learning caused by the Covid-19 Pandemic has changed the face of education in Indonesia and is causing unpreparedness from both teachers and students. [4] state that online learning causes students to be difficult to cause a decrease in student understanding because of the difficulties faced by students to adapt to accessing learning content properly. Learning Discrete Mathematics that are usually done face-to-face must be affected by this change, causing a major change in the thinking ability of students who are accustomed to follow learning directly and take advantage of direct social interaction with teachers and other students.

There are some research conducted to describe relation between higher-order thinking skills and discrete mathematics. One of that reserach is from [3] that found that the student with middle level of HOTS is able to identify the main idea, analyze an argument, and show the usage of the thing known to answer some questions, so she has quiet good analysis skill while study discrete mathematics. Students are also able to give assessment to the solution and methods used and recheck the questions, it means that the student has quite good evaluation skill. The student also can design how to answer and show well to the questions. While on their logic and reasoning skill, the student can write the answer content, evidence and language style clarity logically, well and effectively. It is also found that students who are classified as having higher-order thinking skills with low levels are less able to identify main ideas, analyze arguments, and show the usefulness of things that are known to answer several questions, so they have poor analytical skills [3]. These students are also less able to evaluate the solutions and methods used and carry out re-examination of the questions, so they have poor evaluation skills.

From some of these studies, there has been no research that specifically analyzes the effect of higher-order thinking skills on discrete mathematics material during the pandemic. This is very important considering that there are many changes in student learning systems which will certainly affect the level of ability and knowledge of students. For these reasons, researchers are interested in examining how students' higher-order thinking skills in Discrete Mathematics in the middle of COVID-19 Pandemic. The Two-Tier Multiple-Choice question (TTMC) form was developed by [5]. [6] states that two tier tests can determine the level of understanding of an individual sign using a lot of wasted time and a lot of paper, and it takes great effort to analyze the data. Treagust uses multilevel multiple-choice questions to diagnose students' ability to understand science concepts [7]. He used the TTMC assessment instrument to measure students' higher order thinking skills. The form of the question consists of two levels of questions, the first level is the content of the question which has two alternative answers, and the second level is the reason for the answer chosen on the basis of the first choice. [8] used Two-Tier Multiple Choices Diagnostic instrument to analyze the misconceptions of junior high school students on bull number material The development of the TTMC assessment instrument can be applied to measure students' science process skills by changing the pattern of questions and there are parts that need to be developed or adjusted.

The purpose of this study is to investigate how students' higher-order thinking skills in the subject of Discrete Mathematics using Two-Tier Multiple Choice (TTMC) instrument in the online learning period due to the COVID-19 Pandemic. The results of this study will be used as a reference for educators in the future to be able to arrange appropriate online learning during the COVID-19 Pandemic period to improve students' higher-order thinking skills.

2. Method

The research design in this study is a qualitative descriptive study, which seeks to describe a symptom of an event or incident systematically according to the circumstances in a population [9].

This research was conducted at the Mathematics Education Study Program, Mahasaraswati University, Denpasar. The subjects in this study were 11 students of Class IIB Mathematics Education

Study Program Mahasaraswati University Denpasar. The study period is from April to May, even semester 2019/2020.

Data collection techniques used are test based on Two-Tier Multiple Choice (TTMC) Instrument, interview, observation, and documentation. The test is used to see the extent to which students' 'metaphorical thinking skills and the impact caused by online learning due to the COVID-19 Pandemic on students' higher-order thinking skills. The interview used in this study was an unstructured interview to find out more about the obstacles faced by students in online learning in the middle of the COVID-19 Pandemic. The observation and documentation are used to strengthen and describe the results obtained.

Data in the form of test results were analyzed in-depth to obtain results in the form of portrayals of students' high order thinking abilities. Two-Tier Multiple Choice (TTMC) instrument are not only used as a basis for the preparation of test descriptions, but they are also used as a reference to describe the extent of the higher-order thinking skills students have. Besides, various obstacles and learning difficulties faced by students, especially in showing their higher-order thinking skills during the learning period of discrete mathematics online due to the COVID-19 Pandemic will also be described in depth.

3. Result and Discussion

The achievement of higher-order thinking skills of Class IIB Mathematics Education Study Program Mahasaraswati University Denpasar students can be seen from the two tier multiple choice test scores obtained. The categories of high-order thinking skills of students in the discrete mathematics subject are presented in table 1 below.

Table 1. Summary of results of student answers

Categories	Number of Students	Percentage
<i>Very High</i>	0	0%
<i>High</i>	0	0%
<i>Moderate</i>	5	45,45%
<i>Low</i>	4	36,36%
<i>Very Low</i>	2	18,18%

The data shows that the students' higher-order thinking skills are very low, even if there are no students who reach the high or very high categories. Several causes are the lack of student motivation and interaction in participating in online learning.

The results of the analysis of the answers of students who are at a low level also show a lack of analytical power, understanding, and higher-order thinking skills possessed by students. This can be seen from the students' lack of ability in choosing answers to questions and in determining the reasons for choosing these answers. The following is an example of student answers to the Two Tier Multiple Choice questions given.

Manakah dari graf berikut yang merupakan Graf Euler sekaligus Semi-Euler?

Untuk mendukung jawaban anda, pilihlah salah satu atau beberapa alasan berikut..

- ☒ a. Karena graf tersebut memiliki lintasan euler
- ☒ b. Karena graf tersebut memiliki sirkuit euler
- ☐ c. Karena graf tersebut merupakan graf sederhana
- ☐ d. Karena graf tersebut semua simpulnya berderajat genap
- ☐ e. Karena graf tersebut dua simpulnya berderajat ganjil

Keterangan jawaban:

(a) merupakan Graf Semi-Euler, dan (c) merupakan Graf Euler. Alasan (a) untuk graf (a), alasan (b) untuk graf (c).

Figure 1. Student's answer

Based on these answers, it can be seen that students do not understand the questions given. Students choose two answers that are considered correct where Graph (a) is a Semi-Eulerian Graph and Graph (c) is a Eulerian Graph. This shows that students do not understand the questions given where students should only choose one graph that meets these two criteria, namely graph (c). Students are also unable to analyze in depth the characteristics of an Eulerian graph which is a graph containing an Eulerian circuit. According to the Theorem, a graph which has two vertices of odd degree or no vertices of odd degree is a Semi-Eulerian graph (containing Euler trajectory), while a graph with all vertices with even degree is an Eulerian graph. The conclusion of these two theorems means that an Eulerian Graph which only has even-degree vertices is also a Semi-Eulerian Graph, or a graph that has Eulerian Circuits must also have Eulerian Paths. So, the correct answer is graph (c) in the answer choices, as well as (a) and (d) on the reason. The answer chosen by the student shows that the student does not understand the question given and cannot understand the concept of the theorem well. The inability of students to conclude the relationship between the two theorems shows a lack of analytical power and higher-order thinking power of students. This is in line with [3] who also found that students who are classified as having higher-order thinking skills with low levels are less able to identify main ideas, analyze arguments, and show the usefulness of things that are known to answer several questions, so they have poor analytical skills.

According to the interview, students stated that the absence of group formation and discussion made it difficult for them to exchange ideas with colleagues in working on problems. They said online learning that was carried out in the middle of the COVID-19 Pandemic limited cooperative discussion that they could do with other students to avoid the process of sharing and exchanging opinions in solving problems. The rest also claimed to have decreased learning motivation during the online learning period. In contrast, students are more familiar with discrete mathematics concepts in their environment such as graph concepts and can use internet facilities in learning more effectively. These findings are in line with [10] added that online lectures conducted by lecturers were accompanied by assignments that were numerous in the outbreak of COVID-19 Pandemic, making it difficult for students to move in completing their assignments through interactions between students as usual.

According to observation, students look less enthusiastic during online lessons. Students also lack focus in paying attention to the explanation regarding the discrete mathematics material obtained so that students do not understand the material well. Uncomfortable conditions, difficulties in obtaining a good internet signal, as well as student limitations in financial matters also lead to less effective online learning. This causes students not to have the opportunity to practice their thinking skills in understanding the material and solving problems in discrete mathematics courses.

In contrast to the negative impacts, students are more familiar with discrete mathematics concepts in their environment such as graph concepts. Students also state the positive effects that were felt during the online statistics lecture. Students are more flexible in accessing the internet so that when viewed from the duration of the test, the average student answers questions more quickly than face-to-face learning.

The low higher-order thinking skills of students in online learning during the COVID-19 Pandemic period should be a concern in mathematics education. This causes teachers and lecturers to be smart in preparing effective and interactive online-based learning. Some solutions that can be taken by mathematics educators to this conditions are:

- Using interactive learning. Interactive included here is learning that can attract interest and increase student motivation. As is well known, online learning due to the COVID-19 Pandemic gives many temptations to students. Learning that is not directly supervised by the teacher will make students free and can do other activities so they are less interested in participating in learning. This causes the teacher to design learning that is not monotonous, teachers should not only do the learning by lecture method only. The provision of learning videos, animations, and the use of interactive e-learning are solutions that can be used.
- Using Project-Based learning (PBL). PBL can direct students to be active in learning not just to listen to the teacher's explanation. The project provided can stimulate students' thinking abilities and provide fun activities for students, coupled with internet facilities that are freely accessed by students, PBL can direct students to utilize their internet facilities efficiently and positively.
- Discussing current trends in learning. By creating contemporary learning, students will be able to be more interested and serious in learning. Students who are on average young are certainly very updated with current issues such as the Pandemic COVID-19. Linking learning with current issues will increase students' motivation and mathematical thinking skills that are very dependent on the contextual domain. One example is making questions related to the COVID-19 Pandemic.
- Demonstrates assertiveness and sets learning rules. Lack of student motivation in online learning due to the COVID-19 pandemic which has caused a lack of students' higher-order thinking skills, one of which is caused by the difficulty in providing supervision to students when learning online. This situation can be improved by giving strict rules to students in participating in online learning so that the rest do not underestimate online learning and can feel if the teacher is always watching and paying attention to learning that takes place.
- Supporting students to get better internet facilities. The big cause of the ineffectiveness of online learning is the limited internet facilities that students have due to the financial limitations of students. This problem requires institutional and government policies to help students, for example, with the free internet quota that has been given by the government and universities recently which can be used by underprivileged students to continue to be able to participate in online learning properly.

4. Conclusion

From the tests, interviews, and observations made, several conclusions were obtained which showed the lack of students' higher-order thinking skills in the subject of Discrete Mathematics during the COVID-19 Pandemic where the higher-order thinking skills percentage of students with incredibly low categories of 18.18%, low 36.36% and moderate 45.45%. Students that are mostly have low level highe-order thinking skills shows less ability to understanding the problems, identify main ideas, and poor analytical skills.

Online learning due to COVID-19 Pandemic also causes the difficulties for students to do group discussion as well as the decrease in student motivation. In contrast, students are more familiar with discrete mathematics concepts in their environment such as graph concepts and can use internet facilities in learning more effectively. Some solutions for the problems occurred are: 1) Using interactive

learning, 2) Using Project-Based learning (PBL), 3) Discussing current trends in learning, 4) Demonstrating assertiveness, and establishing learning rules, and 5) Supporting students to get better internet facilities.

5. References

- [1] Gradini E, Lubis N, Firmansyah F, Yusriningrum B and Gemasih R 2019 Analyzing students' higher order thinking skills using timss-like questions *Proc. of the 5th Annual International Seminar on Trends in Science and Science Education* (Medan, Indonesia)
- [2] Saputra H 2016 *Pengembangan Mutu Pendidikan Menuju Era Global: Penguatan Mutu Pembelajaran dengan Penerapan HOTS (High Order Thinking Skills)* (Bandung: SMILE's Publishing)
- [3] Rahmawati N D, Amintoko G, and Faizah S 2018 Kemampuan berpikir tingkat tinggi mahasiswa dalam memecahkan masalah fungsi pembangkit *Jurnal Elektronik Pembelajaran*, **5** 21-31
- [4] Farida I, Rahmawati R, Aisyah R, and Helsy I 2020 *Pembelajaran Kimia Sistem Daring di Masa Pandemi Covid-19 Bagi Generasi Z (Karya Tulis Ilmiah (KTI) Masa Work From Home (WFH) Covid-19)* (Bandung: UIN Sunan Gunung Djati)
- [5] Treagust D F 2006 Diagnostic assessment in science as a means to improving teaching, learning and retention *UniServe Science Assessment Symposium Proc.*
- [6] Lin Y C, Yang D C, and Li M N 2016 *Eurasia J. of Math., Science and Tech. Educ.* **12** 41-55
- [7] Ramadhan G, Dwijananti P, and Wahyuni S 2018 *Unnes Phys. Edu. J.* **7** 85-90
- [8] Mahfuzhoh 2019 *PEDIAMATIKA: J. of Mathematical Sci. and Math. Edu.* **01** 115-22.
- [9] Dantes N 2012 *Metode Penelitian* (Yogyakarta: ANDI)
- [10] Kusnayat A, Muiz M H, Sumarni N, Mansyur A S, Zaqiah Q Y 2020 *EduTeach: Jurnal Edukasi dan Teknologi Pembelajaran* **1** 153-65.



KEMENTERIAN PENDIDIKAN DAN KEBUDAYAAN
SOUTHEASTASIAN MINISTER OF EDUCATION ORGANIZATION
(SEAMEO) REGIONAL CENTRE FOR QUALITY IMPROVEMENT OF
TEACHERS AND EDUCATION PERSONNEL (QITEP) IN MATHEMATICS

Jalan Kaliurang Km. 6, Sambisari, Condongcatur, Depok, Sleman, D.I.Y. 55281

Telepon: (0274) 889955, Faksimile: (0274) 887222

Laman: www.qitepinmath.org, E-mail: secretariat@qitepinmath.org

Nomor : 1083/QiM.21/PP/2020
Lampiran : 1 berkas
Hal : **Surat Panggilan Paper Presenter**

10 November 2020

Yth.

Paper Presenter (Daftar nama terlampir)

Sejalan dengan mandat dan komitmen untuk meningkatkan mutu pendidikan matematika di lingkup Asia Tenggara, SEAMEO Regional Centre for QITEP in Mathematics (SEAQiM - Indonesia) bekerjasama dengan SEAMEO Regional Centre for QITEP in Science (SEAQiS - Indonesia), dan Institute for the Promotion of Teaching Science and Technology (IPST - Thailand) akan menyelenggarakan **International Joint Conference on STEM Education "STEM Education Pathway Through the Crisis"** pada tanggal 18 s.d. 19 November 2020 di The Alana Yogyakarta Hotel & Convention Centre, Yogyakarta.

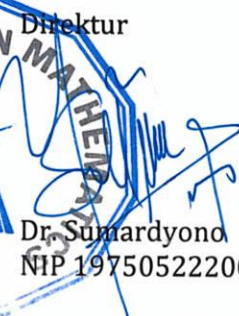
Sehubungan dengan hal tersebut dan berdasarkan hasil seleksi, kami mengharapkan Saudara sebagai **Paper Presenter** untuk mengikuti kegiatan tersebut pada:

Hari/Tanggal : Rabu s.d. Kamis/18 s.d 19 November 2020
Waktu : Pukul 07.30-16.30 WIB
Tempat : The Alana Yogyakarta Hotel & Convention Center
Jl. Palagan Tentara Pelajar KM 7, Ngaglik, Sleman, Yogyakarta.

Berkaitan dengan ketentuan administrasi, kami mohon **Paper Presenter** untuk membawa:

1. **Surat Tugas** dari instansi masing-masing;
2. **Hasil Rapid Test** (yang dilaksanakan pada tanggal 16 atau 17 November 2020).

Demikian surat ini kami sampaikan, atas perhatian dan kerja sama yang diberikan kami mengucapkan terima kasih.

Direktur

Dr. Sumardiyono
NIP 197505222001121004

Lampiran 1

Daftar Paper Presenter

No : 1083/Q.M.21/PP/2020
 Tanggal : 10 November 2020

NO.	NAME	INSTITUTION	COUNTRY
1.	AI NURLAELASARI RUSMANA	KANGWON NATIONAL UNIVERSITY	INDONESIA
2.	ANANG SUSANTO	SD N JATEN	INDONESIA
3.	ATIK RODIAWATI	UNIVERSITAS NEGERI YOGYAKARTA	INDONESIA
4.	AULIA PUTRI	UNIVERSITAS PENDIDIKAN INDONESIA	INDONESIA
5.	BAYU SUKMAANGARA	MA SIDIK JAHRA	INDONESIA
6.	DANIEL WILLIAMS FOINTUNA	UNIVERSITAS KATOLIK WIDYA MANDIRA	INDONESIA
7.	FARADILLAH HARYANI	SAMPOERNA UNIVERSITY	INDONESIA
8.	FARIDA NURSYAHIDAH	UNIVERSITAS PGRI SEMARANG	INDONESIA
9.	FIFIN AISYAH	UNIVERSITAS PGRI SEMARANG	INDONESIA
10.	I MADE ARI PURWADI	SMP LABORATORIUM UNDIKSHA	INDONESIA
11.	I PUTU ADE ANDRE PAYADNYA	MAHASARASWATI UNIVERSITY DENPASAR	INDONESIA
12.	INDAH RIZKI ANUGRAH	IAIN SYEKH NURJATI CIREBON	INDONESIA
13.	IRHAM BASKORO	SMK CIPTA BHAKTI HUSADA	INDONESIA
14.	JABAL SUBAGIS	SD N WONOKERTO	INDONESIA
15.	JEOVANNY ALABATA MARTICION	ZAMBOANGA DEL NORTE NATIONAL HIGH SCHOOL	FILIPINO
16.	LAELA SAGITA	UNIVERSITAS PGRI YOGYAKARTA	INDONESIA
17.	LUTHFI NUR AZIZAH	YOGYAKARTA STATE UNIVERSITY	INDONESIA
18.	MARFUAH	PPPPTK MATEMATIKA	INDONESIA
19.	MHARTA ADJI WARDANA	INSTITUT TEKNOLOGI BANDUNG	INDONESIA
20.	MUHAMMAD AGUS SUPRIYANTO	UNIVERSITAS PGRI SEMARANG	INDONESIA
21.	REZA HESTI	MTS N 32 JAKARTA	INDONESIA
22.	RUCIANA GALUNGGUNG	SDI AISYIAH JATINOM	INDONESIA
23.	TRI SUSILOWATI	ISLAMIC ELEMENTARY SCHOOL OF MIFTAHUL HUDA	INDONESIA
24.	ZAINAL ABIDIN	STKIP AL HIKMAH	INDONESIA



<https://es.qitepinmath.org/20wyTXBM>



Certificate of Appreciation

Awarded to

I Putu Ade Andre Payadnya

Mahasaraswati University Denpasar

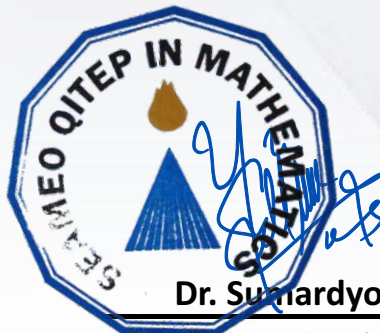
as

Presenter (online)

for his/her outstanding contribution

in the International Joint Conference on STEM Education 2020

conducted by SEAMEO Regional Centre for QITEP in Mathematics, SEAMEO Regional Centre for QITEP in Science, Indonesia
and The Institute for the Promotion of Teaching Science and Technology, Thailand
from 18 to 19 November 2020.



Dr. Sumardiyono

Director of SEAMEO Regional Centre
for QITEP in Mathematics



Dr. Indrawati

Director of SEAMEO Regional Centre
for QITEP in Science



Prof. Dr. Sukit Limpijumrong

President of The Institute for the Promotion
of Teaching Science and Technology