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# ICOSETH 2021

## *Certificate*

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This certificate is presented to

**Astuti Muh. Amin**

as

**Presenter**

**The 3<sup>rd</sup> International Conference on Science Education and Technology**

*“Science Literation, Learning, and Innovation of Science  
Education and Technology in The Digital Era”*

Doctorate Program of Science Education, Faculty of Teacher Training and Education  
Universitas Sebelas Maret

Surakarta, October 16<sup>th</sup> 2021



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Dean of Teacher Training and Education Faculty UNS



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Chairman of 3<sup>rd</sup> ICOSETH 2021



# **The 3<sup>rd</sup> International Conference on Science Education and Technology (ICOSETH 2021)**

*“Science Literation, Learning, and Innovation of  
Science Education and Technology in The Digital Era”*

**Saturday, October 16<sup>th</sup> 2021  
Surakarta, Central Java, Indonesia**

**Topic:**

- *Physics*
- *Computer science*
- *Natural science*
- *Mathematics and modelling*
- *Teaching and learning in science, technology, engineering, and mathematics*
- *STEM-based classroom management*
- *Robotic and game teaching in science education*
- *Instructional technology and application in science education*
- *Training and professional development for STEM teachers*
- *STEM curriculum in science education*
- *Computer-based learning*
- *Learning Innovations and Evaluation*
- *Design and implementation of a technology-rich learning environment*
- *Distance learning on education*

**Organized by:**

Doctorate Program of Science Education,  
Faculty of Teacher Training and Education,  
Universitas Sebelas Maret Surakarta  
Jawa Tengah, Indonesia

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## **Rules of Plenary Session**

- Please join Zoom **15 minutes** before the event starts.
- Participants are expected to **turn off the sound (mute)** during the Conference process
- All participants who take part in the Conference through Zoom can ask questions by: **raise your hand** or **Type QUESTION, then proceed with writing the name, origin of the agency and the question briefly.** The moderator will ask the speaker a number of questions because the time for discussion is limited.
- Certificates will be distributed to participants who took part in the event and present the manuscript.

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## **Rules of Parallel Session**

- Please join Zoom **15 minutes** before the event starts.
- Each presenter **must be** in the **virtual room throughout the session**.
- One presentation is allocated 12 minutes, with 9 minutes for the presentation and 3 minutes for the Question & Answer session. Presenters have to close the presentation strictly within 9 minutes.
- Session chairs need to strictly control the start and closing times of each session. During your presentation, the session chair will give you notification via zoom chat two times (indicating that your time allocation is coming to an end) :
  - First notification: **THREE** minutes presentation time remaining
  - Second notification: time is over; finish your sentence and **STOP** your presentation
- The Question & Answer session :
  - Participants give questions through chat that will be read by chair or directly unmute your microphone. But please ask permission the Chair first.
- If there is some trouble with the connection or the technical from the presenters, it will be skipped and will be continued by the next presenter. The skipped presenter can present the manuscript at the end of each session in each room.

## **The Dos in the Virtual Conference**

- Do have proper equipment and the right technology.
- Do test your microphone before you video call. Test it by video conferencing your colleague before the conference.
- Do test your hardware and internet connection beforehand.
- Do turn off all notifications and make sure your cell phone is on silent.
- Do mute yourself when not talking.
- Do give your full attention to the participants as you would if you were in the same room.
- Do give everyone a chance to participate.
- Do wait for your turn to speak.
- Do speak clearly, concisely and use good manners.
- Do listen attentively to everyone.
- Do limit meeting distractions.
- Do respect everyone's time.
- Do be courteous to other participants
- Do keep body movements minimal.
- Do maintain eye contact by looking into the camera.
- Do dress appropriately.
- Do make sure your room is well lit (side lighting is the best).
- Do set up a virtual background
- Do be careful about the documents or screens you're sharing.
- Do stick to the time frames.
- Do be aware of potential cultural differences. It's important to be prepared for communication challenges that may arise as a result of language barriers or differences in etiquette.
- Do be patient when things get complicated.
- Do make sure password protection is enabled.

## **The Don'ts in the Virtual Conference**

- Don't wait until the session time to log in.
- Don't position your camera too low, too high or hooked onto a different monitor. Weird camera angles can be very distracting and unflattering during video conference calls.
- Don't invite unnecessary people.
- Don't make distracting sounds.
- Don't interrupt other speakers.
- Don't multitask.
- Don't shout.
- Don't make distracting movements.
- Don't carry on side conversations.
- Don't talk over each other. Use the chat function to ask questions.
- Don't wear "noisy" jewelry.
- Don't open the irrelevant programs.

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# CONFERENCE SCHEDULE

## International Conference on Science Education and Technology (ICOSETH 2021)

Saturday, October 16<sup>th</sup> 2021  
 Faculty of Teacher Training and Education  
 Universitas Sebelas Maret, Central Java, Indonesia

Time	Program
07.30-08.00	<b>Registration</b>
08.00-08.35	Opening Ceremony National Anthem Welcome Address by Chairperson Welcome Address by Rector Universitas Sebelas Maret
08.35-09.10	<b>Vicente A. Talanquer</b> Department of Chemistry and Biochemistry, University of Arizona
09.10-09.45	<b>Hsin-Kai Wu</b> National Taiwan Normal University
09.45-10.15	<b>Discussion 1</b>
10.15-10.50	<b>Xiaoming Zhai</b> Assistant Professor Department of Mathematics and Science Education Mary Frances Early College of Education University of Georgia
10.50-11.25	<b>Prof. Dr. Ir. Ahmad Yunus, M.S.</b> Vice-Rector for Academic and Student Affairs, Universitas Sebelas Maret, Indonesia
11.25-11.55	<b>Discussion 2</b>
11.55-12.40	<b>Break</b>
12.40	Breakout room opened
13.00-16.20	<b>Parallel Session</b> (Breakout room)
16.20	<b>Closing ceremony</b> (in parallel session)

Parallel Session						
Room	1	2	3	4	5	6

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# **PARALLEL SESSION**

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## ROOM 1

Time	ID	Title of Article	Presenter
13.00-13.12		<b>Briefing</b>	Moderator
13.12-13.24	243	<b>Promoting Higher Qualification for Chemistry Teacher through Distance Education in Indonesia</b> <i>Sandra S. Adji<sup>1</sup>, Udan Kusmawan<sup>2</sup> and Hartinawati<sup>3</sup></i>	<i>Sandra Sukmaning Adji</i>
13.24-13.36	251	<b>Effectiveness PhET Colorado in Virtual Physics Learning Experiments during the Covid-19 Pandemic: A Systematic Review based on the Five Stages Framework</b> <i>Frendi Ihwan Syamsudin<sup>1</sup>, Sukarmin<sup>2</sup>, Sarwanto</i>	<i>Frendi Ihwan Syamsudin</i>
13.36-13.48	263	<b>Implementation of Practical Lectures during The Covid 19 Pandemic</b> <i>Sufiana, J. M.<sup>1</sup>, Sari, D.K.<sup>2</sup>, and Hadel M<sup>3</sup></i>	<i>Jejem mujamil sufiana</i>
13.48-14.00	264	<b>Distance learning using the DingTalk app provides flexibility for international students: A Phenomenological Case Study</b> <i>N Irawan<sup>1,2</sup>, P Retnaningdyah<sup>1</sup>, and A Mustofa<sup>1</sup></i>	<i>Nico Irawan</i>
14.00-14.12	271	<b>Global Trends of Distance Learning in Science Education: A Bibliometric Study</b> <i>Oka Irmade<sup>1*</sup>, Suwarno<sup>2</sup> and Amalia Khalifah<sup>3</sup></i>	<i>Oka Irmade</i>
14.12-14.24	273	<b>Critical Thinking Skills and Student Scientific Attitudes in IPA Learning during the Covid-19 Pandemic</b> <i>Indarini Dwi Pursitasari<sup>1</sup>, Bibin Rubini<sup>2</sup>, and Mohamad Iqbal Suriansyah<sup>3</sup></i>	<i>Indarini Dwi Pursitasari</i>
14.24-14.36	277	<b>Research Trends of Online Teaching and Learning from 2016 to 2020: A Bibliometrics Analysis</b> <i>Ratna Widyaningrum<sup>1</sup>, Anggit Grahito Wicaksono<sup>2*</sup>, Jumanto<sup>3</sup>, Ema Butsi Prihastari<sup>4</sup>, Ani Restuningsih<sup>5</sup></i>	<i>Ratna Widyaningrum</i>
14.36-14.48	327	<b>Mental Model Profile of Indonesian Class X High School Students on the Concept of Covalent Bonds in the Era of the Covid-19 Pandemic</b> <i>Dominikus Djago Djoa<sup>1*</sup>, Sunyono<sup>2</sup></i>	<i>Dominikus Djago Djoa</i>
14.48-15.00	289	<b>Analysis of Elementary School Teachers' ICT Literacy Towards Online Learning in The Special Region Province of Yogyakarta</b> <i><sup>1</sup> Ainun Mahfuzah, and <sup>2</sup> Ratna Hidayah</i>	<i>Ainun Mahfuzah</i>
15.00		<b>Closing</b>	Moderator

## ROOM 2

Time	ID	Title of Article	Presenter
13.00-13.12		<b>Briefing</b>	Moderator
13.12-13.24	235	<b>Research Trends in Technological Pedagogical Content Knowledge (TPACK) Reflective Practitioners in Higher Education</b> <i>Reni Marlina<sup>1</sup>, Hamdani<sup>2</sup>, Erwina Oktaviany<sup>3</sup>, Haratua Tiur Maria Silitonga<sup>4</sup>, Afandi<sup>5</sup></i>	<i>Reni Marlina</i>
13.24-13.36	244	<b>Development of Local History Teaching Materials Based on Android Integrated Values of Sultan Syarif Kasim II</b> <i>Ahmal<sup>1</sup>, Piki Setri Pernantah<sup>2</sup>, Nurdiansyah<sup>3</sup>, Amirul Syafiq<sup>4</sup></i>	<i>Ahmal</i>
13.36-13.48	270	<b>Parents' And Teachers' Perceptions of Mobile Game-Based Learning in Integrated Thematic Learning in Elementary School</b> <i>R Eliyasni, M Habibi*, Masniladevi, Reinita</i>	<i>Rifda Eliyasni</i>
13.48-14.00	257	<b>Developing Grammar Mastery through Listening and Reading Skills of TOEFL: A Correlational Study</b> <i>Jimmy Sapoetra, Suwarno, Freddy Widya Ariesta</i>	<i>Jimmy Sapoetra</i>
14.00-14.12	297	<b>The Increase of Online Learning System in Indonesia During COVID-19 Pandemic: A Systematic Literature Review Using VOSviewer</b> <i>Kurnia Ningsih<sup>1</sup>, Afandi<sup>2*</sup>, Krisensia Edria Penampe<sup>3</sup>, Dina Nurfitriani<sup>4</sup> and Erica Ikramunnisa<sup>5</sup></i>	<i>Krisensia Edria Penampe</i>
14.12-14.24	300	<b>The effect of problem solving and cooperative learning models on students' attitudes and social interactions in chemical equilibrium learning</b> <i>Budi Utami</i>	<i>Budi Utami</i>
14.24-14.36	301	<b>The Conceptual of Research-Based Learning Through Collaborative Approach to Improve Student's Critical Thinking Skills</b> <i>Yetty Isna Wahyuseptiana<sup>1</sup>, Munawir Yusuf<sup>2</sup>, Gunarhadi<sup>3</sup>, Roemintoyo<sup>4</sup></i>	<i>Yetty Isna Wahyuseptiana</i>
14.36-14.48	303	<b>Analysis of Students Argumentation Skills in Biotechnological Socioscientific Issue for Designing Innovative Learning</b> <i>Anwari Adi Nugroho<sup>1</sup>, Sajidan<sup>2</sup>, Suranto<sup>3</sup>, Mohammad Masykuri<sup>4</sup></i>	<i>Anwari Adi Nugroho</i>
14.48-15.00	308	<b>Meta-Analysis of The Effectiveness of Project-Based Learning Towards Creative Thinking Skills in Science learning</b> <i>Luvia Ranggi Nastiti<sup>1</sup>, Widha Sunarno<sup>2</sup>, Sulisty Saputro<sup>3</sup>, Sukarmin<sup>2</sup>, Muhammad Minan Chusni<sup>4</sup>, Zaitun Qamariyah<sup>5</sup></i>	<i>Luvia Ranggi Nastiti</i>
15.00-15.12	340	<b>Science Teacher Perception and Readiness Toward Minimum Competency Assessment (AKM)</b> <i>S Yamtinah*, B Utami, B Mulyani, M Masykuri, M Ulfa and A S Shidiq</i>	<i>Sri Yamtinah</i>
15.12		<b>Closing</b>	Moderator

### ROOM 3

Time	ID	Title of Article	Presenter
13.00-13.12		<b>Briefing</b>	Moderator
13.12-13.24	236	<b>Web-Based Cash Management Application At Al'quran Educational Institutions</b> <i>Muhammad Syahid Pebriadi<sup>1</sup>, Phaureula Artha Wulandari<sup>2</sup> and Rizky Amelia<sup>3</sup></i>	<i>Muhammad Syahid Pebriadi</i>
13.24-13.36	237	<b>Web-Based Cash Receipt and Disbursement Application For Shipping Companies</b> <i>Muhammad Syahid Pebriadi<sup>1</sup>, Phaureula Artha Wulandari<sup>2</sup> and Noormadani Safitri<sup>3</sup></i>	<i>Muhammad Syahid Pebriadi</i>
13.36-13.48	304	<b>Bibliometric Analysis of Environmental Literacy: A Systematic Literature Review using VOSviewer</b> <i>Afandi<sup>1</sup>, Kurnia Ningsih<sup>2</sup>, Mustika Sari<sup>3</sup>, Syavira Indriyani<sup>4</sup>, Eflin Djaroneh<sup>5</sup></i>	<i>Afandi</i>
13.48-14.00	332	<b>Students' and Teachers' Needs Analysis for the Development of Augmented Reality Learning Media</b> <i>Sri Yamtinah<sup>1*</sup>, Deiya Gama Ilyasa<sup>1</sup>, Elfi Susanti Vh<sup>1</sup>, Sulisty Saputro<sup>1</sup>, Sri Retno Dwi Ariani<sup>1</sup></i>	<i>Deiya Gama Ilyasa</i>
14.00-14.12	255	<b>Development of Video Tutorial Operating CNC Machine Using Nanjing Swansoft Simulator Based on Youtube Chanel as an Alternative Media On Network Learning</b> <i>Muslim, Nur Basuki, Selamat Riadi</i>	<i>Muslim</i>
14.12-14.24	278	<b>Analysis on the Signal to Noise Ratio Use 15% kV Rule Method in the Radiography Examination Supine AP Chest</b> <i>Shinta Gunawati S<sup>1*</sup>, Muhammad Irsal<sup>1</sup>, Shofiyah Hasna F<sup>1</sup>, Claricia Alamanda K<sup>1</sup>, Andri Yansyah<sup>2</sup></i>	<i>Shinta Gunawati Sutoro</i>
14.24-14.36	324	<b>Effect of Online Learning on Laboratory Skill's Student in Indonesia during the Pandemic of Covid-19</b> <i>Batulieu M Y P<sup>1*</sup>, Budiwawanti S<sup>2</sup> and Wahyuningsih D<sup>3</sup></i>	<i>Muhammad Yoggi Prastya Batulieu</i>
14.36-14.48	295	<b>"Time bomb" deactivating game to support students' mastery of Kirchhoff's voltage law</b> <i>B Wikara<sup>1*</sup>, S Sutarno<sup>2</sup>, S Suranto<sup>3</sup> and S Sajidan<sup>4</sup></i>	<i>Bertha Wikara</i>
14.48-15.00	242	<b>The Prospect of Game-Based Discussion on Online Learning</b> <i>Maulinia Ceisar Aksara Aji<sup>1</sup>, S Sajidan<sup>2*</sup>, S Suranto<sup>3</sup> and S B Rahardjo<sup>4</sup></i>	<i>Maulinia Ceisar Aksara Aji</i>
15.00		<b>Closing</b>	Moderator



## ROOM 4

<b>Time</b>	<b>ID</b>	<b>Title of Article</b>	<b>Presenter</b>
13.00-13.12		<b>Briefing</b>	Moderator
13.12-13.24	323	<b>The effect of inquiry-based blended learning on observation report making skills viewed from learning interest in elementary schools</b> <i>Muh Ridwan Febrian<sup>1*</sup>, Slamet Subiyantoro<sup>2</sup> and Idam Ragil Widiyanto Atmojo<sup>3</sup></i>	<i>Muh Ridwan Febrian</i>
13.24-13.36	260	<b>Development of Media Video Quiz (VIDKU) based on Science Literacy on Monocots and Dicots Materials for Elementary School Students</b> <i>Shandy Novilya Purwanti<sup>1</sup>, and Anatri Desstya<sup>2</sup></i>	<i>Shandy Novilya Purwanti</i>
13.36-13.48	282	<b>The Effectiveness of the Virtual Tour Museum on Student Involvement in Social Studies Learning in Primary Schools</b> <i>Freddy Widya Ariesta<sup>1</sup> and Jimmy Sapetra<sup>2</sup></i>	<i>Freddy Widya Ariesta</i>
13.48-14.00	283	<b>The Development of Mopan Educational Game to Building the Nationalism Character for Primary School Student</b> <i>Freddy Widya Ariesta<sup>1</sup> and Angela Anggraeni<sup>2</sup></i>	<i>Freddy Widya Ariesta</i>
14.00-14.12	320	<b>RPG Video Games and Loneliness: An Analysis of 'Finding Paradise' Narrative</b> <i>Muhammad Farhan<sup>1</sup>, Listya Ayu Saraswati<sup>2*</sup> and Irfan Rifai<sup>3</sup></i>	<i>Muhammad Farhan</i>
14.12-14.24	291	<b>The Effectiveness of Hypermedia Articulate Storyline in Science Learning on Critical Thinking Skills</b> <i>Freddy Widya Ariesta<sup>1</sup> and Kevin<sup>2</sup></i>	<i>Freddy Widya Ariesta</i>
14.24-14.36	281	<b>A Study of Student's Independence in Online Learning with Flipped Classroom in the Covid-19 Era</b> <i>Freddy Widya Ariesta<sup>1</sup> and Sa'ifah Nurti<sup>2</sup></i>	<i>Freddy Widya Ariesta</i>
14.36-14.48	239	<b>Identifying Research Competencies Among Pre-Service Teachers</b> <i>Sri Sumarni<sup>1</sup>, Muhammad Akhyar<sup>2</sup>, Muhammad Nizam<sup>3</sup>, Herry Widyastono<sup>4</sup></i>	<i>Sri Sumarni</i>
14.48-15.00	253	<b>Self-Efficacy of Biology Students In An RQANI Classroom During The Covid-19 Pandemic</b> <i>Astuti Muh. Amin<sup>1, a)</sup>, Samlan Hi Ahmad<sup>2, b)</sup>, Zulkarnaim<sup>3, c)</sup></i>	<i>Astuti Muh. Amin</i>
15.00		<b>Closing</b>	Moderator

## ROOM 5

Time	ID	Title of Article	Presenter
13.00-13.12		<b>Briefing</b>	Moderator
13.12-13.24	254	<b>Early geoscience literacy skills assessment based on TIMSS's view</b> <i>Desy Suryani<sup>1,*</sup>, Eko Hariyono<sup>2</sup>, Tjipto Prastowo<sup>3</sup></i>	<i>Desy Suryani</i>
13.24-13.36	261	<b>Detection of Food-Borne Pathogens Bacteria <i>Staphylococcus aureus</i> in Contaminated Meat and Milk Product by Real Time PCR</b> <i>M Nurjayadi<sup>1, a) *</sup>, H Muslimah<sup>1, b)</sup>, P A N Auni<sup>1, c)</sup>, F Kurniadewi<sup>1, d)</sup>, D Sukmawati<sup>2, e)</sup>, V Saamia<sup>3, f)</sup>, I M Wiranatha<sup>3, g)</sup>, and L Nastassya<sup>4, h)</sup>, H A EL-Enshasy<sup>5,6, i)</sup></i>	<i>Muktiningsih Nurjayadi</i>
13.36-13.48	268	<b>The Development of Articulate Storyline-based Learning Media to Optimize the 4C Aspects of Heat Material</b> <i>Isnanik Juni Fitriyah<sup>1,*</sup>, Cica Adelia Permatasari<sup>2</sup> and Ribut Suprihatin<sup>3</sup></i>	<i>Isnanik Juni Fitriyah</i>
13.48-14.00	285	<b>Acceptance Analysis of The Progress of Geothermal Energy in Dieng Indonesia</b> <i>Kukuh Mukti Wibowo<sup>1</sup>, Syamsul Hadi<sup>3</sup>, Nugroho Agung Pambudi<sup>2</sup></i>	<i>kukuh mukti wibowo</i>
14.00-14.12	315	<b>Bioenergy Generating from Wastewater Treatment by Photosynthetic Microbial Fuel Cell (PMFC) System with <i>Chlorella vulgaris</i> as Bio-Cathodic</b> <i>Farhan Fikri Safii<sup>1,*</sup>, Siti Qalimatus Zahra<sup>2</sup> and Mohammad Ali Sofyan<sup>3</sup></i>	<i>Farhan Fikri Safii</i>
14.12-14.24	274	<b>The relationship between the patient's body weight and the value of the Specific Absorption Rate (SAR) on Thoracal-Lumbar MRI examination</b> <i>Tri Asih Budiati<sup>1,2,3</sup>, Lukman Ruskanda<sup>3</sup>, Kodrat Pramudho<sup>3</sup>, Abdul Gamal<sup>1</sup>, Shinta Gunawati S<sup>4</sup>, Muhammad Irsal<sup>4</sup></i>	<i>Tri Asih Budiati</i>
14.24-14.36	275	<b>Optimization of Exposure Factors on radiographic Examination Chest AP Supine with 15% kV Rule Method</b> <i>Muhammad Irsal<sup>1,*</sup>, Shinta Gunawati S<sup>1</sup>, Claricia Alamanda K<sup>1</sup>, Shofiyah Hasna F<sup>1</sup>, Andri Yansyah<sup>2</sup></i>	<i>Muhammad Irsal, M.Si</i>
14.36-14.48	311	<b>Kinetic Studies on Conversion of <i>Mischantus Giganteus</i> to Levulinic Acid</b> <i>R Febrino, A A Anugrah, M E Toif, R Ringgani, and A Budiman</i>	<i>Ryan Febrino</i>
14.48-15.00	312	<b>Kinetic Studies of Levulinic Acid Production from Acid-Catalyzed Hydrolysis of Sugar Cane Bagasse</b> <i>A A Anugrah, R Febrino, M E Toif, R Ringgani and A Budiman<sup>*</sup></i>	<i>Anya Arqia Anugrah</i>
15.00		<b>Closing</b>	Moderator

## ROOM 6

Time	ID	Title of Article	Presenter
13.00-13.12		<b>Briefing</b>	Moderator
13.12-13.24	331	<b>The effectiveness of making a portable laboratory integrated with local wisdom using a project-based learning approach to improve student learning outcomes</b> <i>Rudi Susanto<sup>1,2</sup>, Mohd Nizam Husen<sup>1</sup>, Adidah Lajis<sup>1</sup>, Wiji Lestari<sup>2</sup>, Herliyani Hasanah<sup>2</sup></i>	<i>Rudi Susanto</i>
13.24-13.36	234	<b>E-module Development for Vector Calculus Courses Based on Problem Based Learning</b> <i>Tjang Daniel Chandra<sup>1*</sup>, Vita Kusumasari<sup>2</sup>, Azizah<sup>3</sup>, Santi Irawati<sup>4</sup></i>	<i>Tjang Daniel Chandra</i>
13.36-13.48	247	<b>The Need Analysis of Learning Media With Film Based as Multimedia for College Students</b> <i>Ninik Sudarwati<sup>1</sup>, Chalimah<sup>2</sup></i>	<i>Ninik Sudarwati</i>
13.48-14.00	256	<b>The Effect of The Google Classroom-Based Flipped Model on The Learning Outcomes of Machinery Theory in The Covid-19 Pandemic</b> <i>Muslim, Nur Basuki, Marlan, Sarwa</i>	<i>Muslim</i>
14.00-14.12	262	<b>The Development of Hydrocarbon's Electronic Module for Science Student 11<sup>th</sup> Grade with PQ4R (Preview, Question, Read, Reflect, Recite, Review) Strategy</b> <i>R Ma 'shumah<sup>1</sup>, A Rahman<sup>1</sup> and M Nurjayadi<sup>1*</sup></i>	<i>Rayhanah Ma'shumah</i>
14.12-14.24	266	<b>Students' Perspectives in Facing Difficulties Towards Online Learning In Higher Education</b> <i>Verawati<sup>1*</sup>, Nurun Ni'mah<sup>2</sup></i>	<i>Verawati</i>
14.24-14.36	293	<b>Characterizing Biology Teachers' Practices in Developing Secondary School Students' Scientific Explanation</b> <i>F N Ferosa<sup>1</sup>, M Ramli<sup>2*</sup>, B Sugiharto<sup>3</sup></i>	<i>Findyta Novia Ferosa</i>
14.36-14.48	296	<b>Computational Thinking Skills Identification among Students of Physics Education Department using Rasch Model Analysis</b> <i>Maria Lerisa Putri Naingalis<sup>1*</sup>, Ahmad Fauzi<sup>2</sup> and Wahyuni Purnami<sup>3</sup></i>	<i>Maria Lerisa Putri Naingalis</i>
14.48-15.00	319	<b>Strengthening Civic Literacy in Civic Education Learning Using The Flipped Classroom Model</b> <i>Maulidyanawati Aqmarina Ma'ruufah<sup>1</sup>, Triyanto<sup>2</sup>, and Riyadi<sup>3</sup></i>	<i>Maulidyanawati Aqmarina Ma'ruufah</i>
15.00-15.12	280	<b>Vocational High School Students' Readiness and Response Analysis in HOTS-Based Learning: A Case Study in Central Java Province, Indonesia</b> <i>Dainita Rachmawati<sup>1</sup>, Suharno<sup>2</sup>, Roemintoyo<sup>3</sup>, and Natalya Lomovtseva<sup>4</sup></i>	<i>Dainita Rachmawati</i>
15.12		<b>Closing</b>	Moderator

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# **ABSTRACT**

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# **ABSTRACT**

# **ROOM 1**

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## **Promoting Higher Qualification for Chemistry Teacher through Distance Education in Indonesia**

**Sandra S. Adji<sup>1</sup>, Udan Kusmawan<sup>2</sup> and Hartinawati<sup>3</sup>**

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**Abstract.** A higher degree for a chemistry teacher education program is often considered idealistic. This opinion mainly refers to the characteristics of chemistry itself. On the other hand, distance education promotes open and flexible characteristics in services. As one of the study programs in Universitas Terbuka, the chemistry department offers more flexible services to students to reach their competencies as a bachelor's degree compared with the traditional study program in Indonesia. However, due to its abstract and requiring hands-on activities in understanding chemistry, the distance education system requires more rich approaches to facilitate student learning on chemistry ideally. To meet the standard of the higher degree education system, the Study Program has made several efforts to fulfill significant achievement in implementing an educational program, namely 1) accreditation, 2) flexibility, 3) personal support and services, 4) study material, and the digital learning environment. Study Program continuously carries out efforts to improve the learning program

# **Effectiveness PhET Colorado in Virtual Physics Learning Experiments during the Covid-19 Pandemic: A Systematic Review based on the Five Stages Framework**

**Frendi Ihwan Syamsudin<sup>1</sup>, Sukarmin<sup>2</sup>, Sarwanto<sup>3</sup>**

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**Abstract.** Learning Physics Experiments during the Covid-19 Pandemic is carried out online. In accordance with the 2013 curriculum that learning is holistic, it requires strategies in the form of approaches, models, and methods so that students remain active in online learning. Virtual experiment is one of the online practicum learning methods with the help of simulations. Phet Colorado is a software that provides a variety of real learning simulations. The research method is a review of literature studies. The research methodology is the Five Stages Framework. There are 43 articles published in international journals and proceedings in 2019-2021 for systematic review. The purpose of the review is to determine the scenario of the application of Phet Colorado which includes (1) research approach, (2) research model, (3) measured dependent variables, and (4) the effectiveness of the application of Phet Colorado in physics learning during online learning. Data were analyzed qualitatively with systematic analysis. The results of the study show that of the 43 articles reviewed, there are 55% of articles using Classroom Action Research designs, 93% of articles using the Scientific approach, 37% of articles using Problem Based Learning models, 65% measuring Cognitive aspects, and 51.16% of articles stating that learning using PhET Colorado is effective in virtual experiments during the Covid-19 Pandemic.



## **Implementation of Practical Lectures during The Covid 19 Pandemic**

**Sufiana, J. M. <sup>1</sup>, Sari, D.K. <sup>2</sup>, and Hadeli M <sup>3</sup>**

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**Abstract.** This study aims to determine the implementation of practical lectures during the covid 19 pandemic. This research is a qualitative descriptive study. Data was collected by observing, documenting, and using student questionnaires. Data analysis using data analysis techniques Miles and Huberman models and using descriptive statistical data analysis techniques. The results showed that the implementation of practicum lectures during the covid 19 pandemic at Sriwijaya University Chemistry Education had been carried out well with a percentage of learning implementation of 78,44% with an average score of 40. The results of the study were supported by student perceptions of the implementation of online practicum lectures with a strong category by 78,44%, very strong category by 9,8%, and moderate category by 11,76%. The implementation of practicum lectures during the COVID-19 pandemic is classified as good category and students' perceptions of online practicum implementation are categorized as strong.

## **Distance learning using the DingTalk app provides flexibility for international students: A Phenomenological Case Study**

**N Irawan<sup>1,2</sup>, P Retnaningdyah<sup>1</sup>, and A Mustofa<sup>1</sup>**

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**Abstract.** This research aims to investigate international students' experiences using the DingTalk app during their study from their home country, i.e., mainland China, Cambodia, and Thailand. The researchers analyzed data collected from international students studying at a Thai public university. There are around 100 international students from three different countries, but only five students can be optimized to provide more information with interviews and discuss this research. This research employs a phenomenological approach to observe and analyze how international students express their perceptions of learning from a distance by using the DingTalk app as a multimodal of learning. Virtual communication in a synchronous way via the DingTalk app as an online platform can be beneficial for data collection, data analysis, and a reflection of each student while engaging in online learning in both synchronous and asynchronous ways. This research implies that learning from a distance can shape students' perceptions and experiences while using the DingTalk app to communicate and interact with faculty members and friends during virtual class. However, this research is still in its early stages in Thailand, and the researchers are eager to finish it optimally.

## **Global Trends of Distance Learning in Science Education: A Bibliometric Study**

**Oka Irmade<sup>1\*</sup>, Suwarno<sup>2</sup> and Amalia Khalifah<sup>3</sup>**

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**Abstract:** Distance education refers to students who are not always physically present in a classroom setting, such as online students. The modern use of educational technology facilitates distance learning and independent learning through the extensive use of Information and communications technology (ICT). It is predicted that distance learning in science education would continue to grow in research publications in the next years. It is also possible to see this growth throughout a wide variety of scientific disciplines. 3,486 authors' (218 single-authored documents and 3,268 multi-authored documents) have contributed to 1,276 publications on the use of distance learning in science education, published in 521 sources (journals, books, etc.). Therefore, the purpose of this research is to define the current research trends in distance education, particularly in science education. With the help of the Scopus database, we obtained bibliographic information that we then evaluated with the Bibliometrix tool in R software and the VOSviewer software package. Based on citation analysis criteria, we have selected the most significant articles, journals, authors, nations, and affiliations globally and the most productive countries in the world. While keywords and phrases are likely to be the most relevant themes and results of the research, it is conceivable that many of the major patterns and problems that have been covered across the whole text have not been well reflected in our study. Future research should also analyze important research clusters for creating patterns in distant learning in science education to make suggestions based on the findings.

## **Critical Thinking Skills and Student Scientific Attitudes in IPA Learning during the Covid-19 Pandemic**

**Indarini Dwi Pursitasari <sup>1</sup>, Bibin Rubini <sup>2</sup>, and Mohamad Iqbal Suriansyah <sup>3</sup>**

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**Abstract.** Critical thinking skills and science attitudes are skills that are necessary in the 21st century. During pandemics, students learn online with various limitations so as not to develop 21st century skills well. The aim of this study is to explore students' critical thinking skills and science attitudes during pandemics. The number of respondents involved in the study was 206 students and the number of teachers was 20. The data was collected using critical thinking skills tests, science attitude questionnaires, and questionnaires for teachers. Data analysis is done descriptively statistics by giving categories to the average acquisition. Research data shows students' critical thinking skills are still in the low category with the highest gains on the aspect of regulating strategies and tactics. The attitude of science students belongs to the category of enough. The highest aspect of science attitude is the interest in science with the good category.

## **Research Trends of Online Teaching and Learning from 2016 to 2020: A Bibliometrics Analysis**

**Ratna Widyaningrum<sup>1</sup>, Anggit Grahito Wicaksono<sup>2\*</sup>, Jumanto<sup>3</sup>, Ema Butsi Prihastari<sup>4</sup>, Ani Restuningsih<sup>5</sup>**

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**Abstract.** The COVID-19 pandemic has had a significant impact on the education sector. Educational institutions must respond immediately to the transition from face-to-face learning to distance learning (including online learning and online teaching). Online learning and teaching analysis continue to grow considerably, numerous measures are explored and applied in learning. Trends and issues have emerged, indicating the variability and growth of online learning and teaching research. Therefore, this analysis aims to investigate online learning and teaching research from a bibliometric. Another objective of this research is to contribute to making the roadmap by providing information to people who will work in this field in the future. This study uses a bibliometric analysis method based on the Scopus database. Based on the title, abstract, keywords, and author, 276 research documents were successfully obtained from 2016 to 2020 for further review. This research uses bibliometric standards as a measurement of research reports, such as documents by year, documents by affiliation, documents by author, documents per year by source, documents by country or territory, documents by type, documents by finding sponsor, documents by subject area, keyword co-occurrences analysis, and author collaboration analysis. The results showed that online learning and teaching analysis has raised since 2016 and has exponentially raised considerably in 2019. The rise within the range of studies shows the importance of implementing online learning and teaching in overcoming the impact of the Covid-19 pandemic on education. The implications of this analysis area unit the mixing of online learning and teaching in varied frameworks, though several studies are conducted.

# **Mental Model Profile of Indonesian Class X High School Students on the Concept of Covalent Bonds in the Era of the Covid-19 Pandemic**

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**Abstract.** This research describes the mental model of covalent bonding for high school and vocational high school students involving 240 respondents from 5 provinces in Indonesia, namely Sumatera Utara, Lampung, Bali, Kalimantan Timur, and Nusa Tenggara Timur. The results of this study are very useful for knowing the mental models of students, especially in the era of the COVID-19 pandemic. Students' mental model on understanding covalent bonds in this study, obtained by distributing questions to students, aims to determine the level of understanding of each student by involving three levels of chemical phenomena, namely macroscopically by explaining a brief description of the questions in each question, then sub macroscopic by asking students to describe the Lewis structure, as well as the symbolic level by solving the equation for the formation of compounds. Data obtained from the covalent bond mental model results and the results of interviews with student representatives. Based on Park's mental model classification (2009) found that 32% of students had a second intermediate mental model, while 29% of pupils had the first intermediary mental model, and 39% of pupils had an initial mental model or an unformed mental model.

# **Analysis of Elementary School Teachers' ICT Literacy Towards Online Learning in The Special Region Province of Yogyakarta**

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**Abstract.** Information and Communication Technology (ICT) literacy is the ability to understand, access, manage, and use digital technology. ICT literacy plays a vital role in the online learning process. This study aims to analyze and determine the level of ICT literacy of elementary school teachers grouped by; gender, age, and educational background. The number of subjects in this study was 162 respondents spread across 58 elementary schools in the Province of the Special Region of Yogyakarta. The method used is a descriptive quantitative approach with data collection techniques using a questionnaire. The results showed that 93% of teachers already understood using ICT in the online learning process, only 7% of teachers did not use ICT in the learning process. It is known that teachers who have not used ICT still use the manual method, namely giving assignments for one week and collecting them one week later. As for gender, there was no significant difference between the abilities of male and female teachers, and by age and educational background, younger teachers and postgraduate teachers had higher levels of ICT skills. This study suggests the need for support from schools for teachers to master ICT literacy and support from the government and educational institutions to conduct more training to improve the ICT literacy skills of teachers in elementary schools.

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# **ABSTRACT**

## **ROOM 2**

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## **Research Trends in Technological Pedagogical Content Knowledge (TPACK) Reflective Practitioners in Higher Education**

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**Abstract.** The current development of TPACK has been used to study the integration of technology related to pedagogic of reflective practitioners. Before becoming a teacher, a reflective practitioner needs to be familiar with technology and identify how the description of the pedagogical competencies acquired during higher education is. Especially for the curriculum implemented for science teacher candidates, technology integration is emphasized on material development which includes mastery of concepts, interaction during learning, feedback provision, as well as connecting science concepts with everyday life. This study aims to identify research trends related to TPACK involving reflective practitioners in universities. This study employs the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) method with 5 stages consisting of determining eligibility criteria, determining sources of information, selecting literature, collecting data, and selecting data items. At the eligibility criteria stage, it is important to note that the article is original research that has been reviewed and written in English. Likewise, at the definition stage, it is very important to search for literature on online databases that have large repositories for academic studies such as Scopus and ScienceDirect. Meanwhile, at the literature selection stage, the keywords used are Social Studies, education, and TPACK. From the results of the analysis 64 articles obtained are in line with the research of TPACK reflective practitioners in universities. The articles were analyzed using 5 (five) indicators: TPACK implementation, TPACK instrument development, TPACK relationship with other variables, TPACK development strategy, and TPACK identification. The findings indicate that the research theme on TPACK identification is the most popular theme and becomes the current trend of TPACK research. Overall, the highest percentage of research themes is the theme of TPACK implementation and identification (21.88%). This is due to the increasing awareness of reflective practitioners to apply TPACK in learning in universities. Along with the development of science and technology, the application of TPACK also occurs. Meaning, when compared to the other four themes, the theme of developing TPACK instrument has been the least researched in the last 4 years (14.06%). Thus, this opens up opportunities for further researchers to conduct research on the role of TPACK in the learning community in universities.

## **Development of Local History Teaching Materials Based on Android Integrated Values of Sultan Syarif Kasim II**

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**Abstract.** This study aims to develop android-based digital teaching materials in local history courses at the University of Riau. This Android-based local history teaching material integrates the character values of Sultan Syarif Kasim II which are in accordance with the needs of history education students. This development research uses a 4D model, developed by Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel. This research model consists of 4 steps, namely: define, design, develop, and disseminate. The first step is to conduct a preliminary study with a qualitative descriptive approach. The second step is to design an android-based teaching material product. The third step is product printing, product validation by experts, feasibility trials, and product revisions. The fourth step is to disseminate the product so that it can be used as lecture material by students of history education in Faculty of Teacher Training and Education, University of Riau.

## **Parents' And Teachers' Perceptions of Mobile Game-Based Learning in Integrated Thematic Learning in Elementary School**

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**Abstract.** Mobile game-based learning (MGBL) was a type of educational adaptation for the 21st-century learning system and industry 4.0. The massive media coverage of the harmful effects of smartphones on children, on the other hand, has influenced parents' and teachers' perceptions. As a result, the goal of this study was to examine parents' and teachers' perceptions towards MGBL in integrated thematic learning and to identify the appropriate criteria for MGBL acceptance. This study took a quantitative approach, including mixed methods correlation research. 32 teachers and 120 parents from eight primary schools in Padang, West Sumatra, took part in the study. The study's findings are as follows: (1) The Independent Samples T-Test revealed a significant difference in attitudes toward using smartphones as a learning platform between parents and teachers (2) The Independent Samples T-Test revealed significant differences between parents who are familiar with MGBL and teachers who are familiar with MGBL (3) After being introduced, 76.8% of parents and 89.2% of teachers agreed that MGBL should be used in integrated thematic learning (4) According to Linear Regression Analysis, every aspect that influences MGBL acceptance was positively connected with parents' and teachers' perceptions (5) According to Linear Regression Analysis, teachers' perceptions of MGBL were positively correlated with parents' perceptions.

## **Developing Grammar Mastery through Listening and Reading Skills of TOEFL: A Correlational Study**

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**Abstract:** Grammar is the language foundation and supports the language skills: listening, reading, speaking, and writing. A good grammar mastery will enhance the language skills not only the productive skills (speaking and writing) but also the receptive skills (listening and reading). In this study, the researcher is trying to investigate whether there is a strong correlation between the grammar mastery and the listening and reading skills as well as between listening and reading skills. A sample of EFL classroom consists of 67 students was used with a diagnostic pre-test to get the TOEFL score. The test has 3 (three) parts: listening, grammar, and reading. The results show that there is a strong correlation between grammar and listening, grammar and reading, as well as between listening and reading skills. It shows that the grammar mastery is essential and it needs to be developed in such a way that the EFL learners will gain the utmost benefit from the learning process.

# **The Increase of Online Learning System in Indonesia During COVID-19 Pandemic: A Systematic Literature Review Using VOSviewer**

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**Abstract:** This study aims to determine the trend of research developments related to the online learning system during the COVID-19 pandemic in Indonesia. The research uses 5 relevant keywords, namely "Asynchronous Learning Indonesia COVID-19", "Blended Learning Indonesia COVID-19", "e-learning Indonesia COVID-19", "Synchronous Learning Indonesia COVID-19", and "Online Learning Indonesia COVID-19" which is indexed by Crossref for the 2020-2021 period. This research was conducted in August-September 2021 by searching through Harzing's Publish or Perish application. In this study, the researchers use the quantitative descriptive method with bibliometric analysis. Bibliometrics is a method for measuring literature in which assessment applications are related to statistics. To analyze the relationship between research trend topics and the most frequently researched research topics, the researchers used the VOSviewer application. Then, the Microsoft Excel application was used to analyze the number of publications, author productivity, and the most cited articles. The results showed that scientific publications related to the online learning system during the COVID-19 pandemic in Indonesia had increased with a total of 2608 scientific publications in 2020-2021. Based on the result of the analysis, the highest number of publications is in 2021 with 1358 publications (52.07%), and the types of scientific publications are 2068 journals and 540 proceedings. Next, the most productive authors are Agustino and Rahmawati with 3 published articles each, the most cited journal is the Journal of Pedagogical Sociology and Psychology which cited 105 times, and the journal with the most publications is the SSRN Electronic Journal with 65 publications. Lastly, the most researched topics are online learning, e-learning, blended learning, and education.

# **The effect of problem solving and cooperative learning models on students' attitudes and social interactions in chemical equilibrium learning**

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**Abstract.** The purpose of this study was to determine the effect of the application of problem solving and cooperative learning models on the affective abilities and social interactions of students in chemical equilibrium learning. This study uses an experimental method comparing the experimental class that applies problem solving and cooperative learning models and the control class with the discussion method. The population of this study were three high schools in Surakarta, Central Java. The data includes affective values and social interactions obtained through questionnaires and observations. The results showed that the application of problem solving and cooperative learning models could provide better affective and social interaction skills than the control class in Chemistry equilibrium learning.

## **The Conceptual of Research-Based Learning Through Collaborative Approach to Improve Student's Critical Thinking Skills**

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**Abstract.** Thinking skills are indispensable in finding solutions to life's challenges. These skills include critical thinking, creative thinking, the ability to work well together, and the ability to communicate. Critical thinking skills are skills that enable students to overcome and find solutions to problems that occur in the environment. This study aims to produce conceptual models in learning to improve the critical thinking skills of early childhood education students. The method used in this research is a qualitative method with the main source of literature review. Data collection techniques using literature studies through books and journals. The results of this study indicate the conceptual framework of a research-based learning model with collaborative approach. This modified learning model has the potential to improve the critical thinking skills of early childhood education students. This study illustrates that a research-based learning model with collaborative approach can help improve critical thinking skills. Furthermore, the validity and practicality of the research-based learning model will be tested through collaborative approach.

## **Analysis of Students Argumentation Skills in Biotechnological Socioscientific Issue for Designing Innovative Learning**

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**Abstract.** Argumentation has an important role to assist students in developing, developing, and validating scientific knowledge. The purpose of this study is to analyze the profile of students' argumentation skills through socioscientific issue discourse in biology learning. This study also analyzes the learning that has been done by biology lecturers to provide alternative innovative learning designs. This research method is quantitative and qualitative to calculate and analyze argumentation skills and describe innovative learning alternatives to empower argumentation. The research samples were students and lecturers of biology education which were taken randomly from the population of students and lecturers of biology education in the residency of Surakarta. The data of argumentation was obtained with an instrument in the form of essay questions that were opened concerning the TAP, namely claim, evidence, warrant, backing, and qualifier. While the learning data was obtained from written interviews with biology lecturers. The data were analyzed by percentage description for skill argumentation and qualitative description for learning data. The results showed that the aspects of claims, evidence, supporters, and qualifications were categorized as sufficient, while aspects of guarantees and disclaimers were categorized as poor. The poor argument was caused by the learning carried out that had not fully developed the argumentation. Argument development can be done by designing innovative learning with inquiry and socio-scientific issues.



## **Meta-Analysis of The Effectiveness of Project-Based Learning Towards Creative Thinking Skills in Science learning**

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**Abstract:** Students in 21<sup>st</sup>-century learning must be equipped to face the world of work, which necessitates a variety of skills, one of which is creative thinking. The purpose of this metaanalysis is to estimate the effectiveness of project-based learning on creative thinking skills. This meta-analysis research method consists of steps, namely problem formulation, data collection (study), data coding, and data analysis and interpretation. From the journal search results obtained 74 journals of creative thinking skills. 22 articles met the criteria for inclusion: an empirical study on project-based learning in higher and secondary education conducted in a classroom setting. This review reveals that there is a strong positive effect of PjBL on creative thinking skills. The research findings reveal that the results of the meta-analysis obtained that the effect size of PjBL's influence on the dependent variable of creative thinking skills is 1,3 which is relatively high where the effect of PjBL's influence on the dependent variable of creative thinking skills is 90%.

## **Science Teacher Perception and Readiness Toward Minimum Competency Assessment (AKM)**

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**Abstract.** Teacher perception and readiness to implement the Minimum Competency Assessment (*AKM*) in Indonesia will affect the way they conduct learning. Teachers who are not ready and have negative perceptions usually transfer their negative perceptions to students. Therefore, this study aims to investigate science teacher readiness and perceptions toward *AKM*. The survey method was used in this study. A total of 35 questions were used to reveal teacher readiness and perceptions of *AKM*. This question was developed based on the five indicators: knowledge, behaviour, skills, perceptions, and teachers' attitudes towards *AKM*. These questions are shared with respondents online using Google Forms. Ninety junior high school teachers participated as respondents. The results of this study indicate that teachers have rare exposure to the *AKM*. In addition, they find it challenging to use a contextual assessment that leads to Higher Order Thinking Skills such as the *AKM* instrument. Training and socialization are needed relating to the context and types of questions in the *AKM*. This study is expected to reveal the teachers' perceptions and readiness to provide learning and assessment in accordance with the demands of the *AKM*.

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# **ABSTRACT**

## **ROOM 3**

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**DRAFT**

## **Web-Based Cash Management Application At Al'quran Educational Institutions**

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**Abstract.** The purpose of this study was to determine the appropriate Cash Management Accounting Information System at TPQ Berkat Ilahi and to build a Web-Based Cash Management Application Program. The theoretical framework of this research is to analyze the Cash Management Accounting Information System that runs on TPQ Berkat Ilahi, namely by analyzing the information needed by management, related functions, accounting documents and records used, document flowcharts (flowchart), and internal control systems that are running. The application program developed is the first step that is carried out with relations between tables, designing interfaces, and designing outputs. The results of this study can be concluded that all daily recording of cash receipts and disbursements transactions at TPQ Berkat Ilahi still uses the manual system. The author suggests using a cash management application program using PHP in order to help TPQ Berkat Ilahi to record cash receipts and disbursements transactions.

## **Web-Based Cash Receipt and Disbursement Application For Shipping Companies**

**Muhammad Syahid Pebriadi<sup>1</sup>, Phaureula Artha Wulandari<sup>2</sup> and Noormadani Safitri<sup>3</sup>**

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**Abstract.** The purpose of this research is to find out the current accounting information system of cash receipts and disbursement at PT Borneo Arta Mandiri Banjarmasin in accordance with the Internal Control System (SPI) and to build web-based cash receipt and expenditure applications at Borneo Arta Mandiri Banjarmasin. The (theoretical) framework of this research is to analyze the Accounting Information System running on the company's agencies, namely by analyzing the information required by management, related functions, documents and accounting records used, and flowcharts. MySQL is used as a database and PHP as a programming language. The findings and results of this study are that PT Borneo Arta Mandiri Banjarmasin during the recording in its cash receipts and disbursement has been computerized but only uses Ms.Excel. The downside of this implementation is that it takes time for the transaction recording process and the possibility of corrupt data. Therefore, with the application program made in this study, it is expected that the company is helped in producing reports of receipts and cash disbursement effectively and efficiently.

## **Bibliometric Analysis of Environmental Literacy: A Systematic Literature Review using VOSviewer**

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**Abstract:** This study aims to determine scientific research trends on environmental literacy through bibliometric studies in Scopus indexed journals or proceedings from 2010-2020. Data collection was carried out using the Publish or Perish application with environmental education and environmental literacy keywords. To analyze the development of the number of publications, author productivity, and the most cited articles using Microsoft Excel application, while to analyze the relationship between research trend topics and research topics most frequently researched using VOSviewer application. The results of the study reveal that scientific publications on environmental literacy are increasing every year on average. The highest publication occurred in 2019, with 314 publications (10.4%). The 4 most productive researchers are Liu, X, who produced 6 journal articles, and Zhang, X; Wang, Y; and Goldman, D, who produced 5 journal articles. Journal of Cleaner Production is the journal that publishes the most documents on environmental literacy, with 104 publications. The latest topics based on article data in this research include environmental health literacy, environmental awareness, environmental behavior, and environmental sustainability, which were published in 2017-2020. The most frequently researched topic is education, followed by environment, literacy, and environmental literacy.

## **Students' and Teachers' Needs Analysis for the Development of Augmented Reality Learning Media**

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**Abstract.** This article discusses the needs analysis of teachers and students for learning media used in chemistry learning. This type of research is research and development. Primary data were obtained from 36 high school students and 24 chemistry teachers in East Java. This research was conducted by providing student questionnaires consisting of: (1) the use of learning media that are usually used; (2) how students learn in understanding the material; (3) students' opinions regarding the material of chemical equilibrium in chemistry learning; and (4) students' general system thinking skills, and teacher questionnaires consisting of: (1) the use of learning media that are usually used; (2) the characteristics of the chemical equilibrium material; and (3) learning using Augmented reality media based on multiple chemical tetrahedral representations and students' systems thinking. The results of the questionnaire show that students and teachers need learning media to support teaching and learning activities for chemistry subjects. The conclusion of this study is to develop technology-based learning media in the form of Augmented reality that links the four levels of chemical tetrahedral representation which aims to improve student learning outcomes and systems thinking skills.

## **Development of Video Tutorial Operating CNC Machine Using Nanjing Swansoft Simulator Based on Youtube Chanel as an Alternative Media On Network Learning**

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**Abstract:** This study examines the limitations of CNC (Computer Numerical Control) machine facilities owned by the Department of Mechanical Engineering Education, Faculty of Engineering, State University of Medan (JPTM FT UNIMED) which are obstacles for students in improving competence. From these problems, alternatives and solutions are needed, namely, utilizing the Nanjing Swansoft simulator software to improve the competence of CNC machining techniques. The lack of CNC machine facilities used in learning CNC machining engineering courses at JPTM FT UNIMED so research on this problem is still needed. This study aims to produce a video tutorial on how to operate a CNC machine using a Nanjing Swansoft simulator based on a YouTube channel. The type of research used is research and development (Research and Development) from Borg and Gall. The feasibility of the product is carried out by validating material experts, media experts, individual tests, small group tests, and practicality tests of educators and students of JPTM FT UNIMED respondents which are then tested on the effectiveness of JPTM FT UNIMED student respondents for even semesters. Based on the results of product validation, the percentage of media expert assessment results is 92%, a material expert is 91%, and a learning design expert is 92%. Student responses in small group trials obtained a percentage of 92% and 93% in field trials. Based on these results, it can be concluded that the CNC Practice Video Tutorial Using the Nanjing Swansoft Simulator Based on the YouTube Channel that has been developed is feasible to be used as an alternative media for online learning for students of the Department of Mechanical Engineering Education, Faculty of Engineering, State University of Medan.



## **Analysis on the Signal to Noise Ratio Use 15% kV Rule Method in the Radiography Examination Supine AP Chest**

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**Abstract.** The exposure factor is one of the important parameters in optimizing the radiographic examination. The purpose of this study was to analyze the value of the *Signal To Noise Ratio* (SNR) against the use of the 15% kV rule method in the examination *Chest AP Supine*. Descriptive quantitative research method conducted in the laboratory of the Department of diagnostic imaging and radiotherapy, Health Polytechnic of the Ministry of Health, Jakarta 2 using *computer radiography*, X-rays, piranha radiation detectors, and anthropomorphic phantoms, with statistical analysis of the Pearson test to determine the level of relationship between SNR and Exposure Index (EI). against the 15% Kv rule method, then the one-way ANOVA test to determine the effect of the 15% method on changes in value. The results of the Pearson test obtained a p-value of 0.820 with a strong relationship between SNR and EI against the 15% kV method. Therefore, by using an exposure factor of 15% kV rule method, it is possible to control the SNR and EI values. The one way ANOVA test has a p-value of 0.943, so there is no significant difference in the SNR value to changes in the exposure factor with the 15% kV rule method so that the optimization of the exposure factor with the 15% kV rule method can reduce the radiation dose while maintaining the image quality radiographic.

## **Effect of Online Learning on Laboratory Skill's Student in Indonesia during the Pandemic of Covid-19**

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**Abstract.** Online learning is implemented in order to continue educational activities which are caused by the Covid-19 pandemic. The aim of this research is to find out the impact of online learning on students' laboratory skills during the covid-19 pandemic in senior high schools in Indonesia through a questionnaire survey. An online-based questionnaire was used for senior high school students in 32 regions in Indonesia. Overall, the 5 criteria that have been analyzed show that students' laboratory skills are in the low category during the covid-19 pandemic. This is due to online learning which makes laboratory activities unavailable so that laboratory skills cannot be empowered.

## **”Time bomb” deactivating game to support students’ mastery of Kirchhoff’s voltage law**

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**Abstract.** Kirchhoff’s voltage law is considered as fundamental concept in physics. This research was aimed to find out students’ problems in mastering the law, develop a product to overcome the problems and find out students’ opinion about design of the product. A questionnaire was used as research instrument and 138 students from 2 education levels (associate and bachelor) of orthotic prosthetic department were used as sample. The result showed that 63% of them did not master the Kirchhoff’s voltage law and the causes were: they had forgotten about the law (66,3%), the explanation about the law was difficult to be understood (30,3%) and they were not motivated to study the law (3,4%). Therefore, “time bomb” deactivating game was developed here to overcome those problems. In the game, an electronic device that pretend to be a time bomb should be deactivated by students. They ordered to read the device’s circuit diagram and determine which wires should be cut by using Kirchhoff’s voltage law. The other students then cut the determined wires - with the risk that the device will (pretend) explode if the wires were wrong choices. Design of the game was assessed by the students above and the results were: learn Kirchhoff’s voltage law by using the game would be something joyful (87,7%) - and this believed would promote the law to be remembered longer, the explanation about the law by the game was easily understood (69,6%) and the game provoked their curiosity to study the law (93,5%). Based on the results, it is believed that the game has a potency to support students’ mastery of Kirchhoff’s voltage law.

## **The Prospect of Game-Based Discussion on Online Learning**

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**Abstract.** Discussion is categorizing as one of learning methods. Since online learning is required to suppress the spread of COVID-19 in schools, discussion implementation already changed. This paper aimed to reveal students' opinion about online discussion by using games. Hence, a questionnaire consisted of five questions with multiple choice answers shared to 138 1<sup>st</sup> semester student at a state vocational college in Central Java. The students answered it based on their online learning experiences during the outbreak. Students' answers then grouped based on the percentage of the chosen answers. The highest percentage answer question were discussion often used as learning method in students' classes (58, 7%). Sadly, the discussion topics were less passionate for them (28, 3%) and in addition, the discussion itself did not have attractive form (27, 5%). When allowed to choose, students preferred some games as discussion media (34, 1%). The games should be challenging so they would be fun to play (46, 4%). The games more preferred containing discussion topics that related to school or college life (34, 1%). Therefore, the conclusion is students prefer to use games, as a medium of discussion and it would be better if the game contains interesting discussion topics.

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**ABSTRACT**  
**ROOM 4**

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## **The effect of inquiry-based blended learning on observation report making skills viewed from learning interest in elementary schools**

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**Abstract.** This research aims to analyze (1) the effect of inquiry-based blended learning and offline learning model on observation report making skills, (2) the effect of learning interest on observation report making skills, and (3) the interaction between learning models and learning interest on observation report making skills. This research design is quasi-experiment with 2x2 factorial design. This research was conducted in 4 public elementary school in Andong, Boyolali, Indonesia. The sample consisted of 90 students selected using cluster random sampling technique. The instruments used in this research are performance appraisal tests and learning interest questionnaires. Prerequisite tests were conducted, namely normality test, homogeneity test, and balance test. Hypothesis testing was tested using a two-way ANOVA test. It was found that there was a significant effect on the hypothesis and post-hoc test with a comparison of the average observation report making skills and interest in learning between the experimental and control classes. It was concluded that: (1) the learning model had an effect; (2) influential learning interest; and (3) there is no interaction between the learning model, and interest in learning, on the observation report making skills.

## **Development of Media Video Quiz (VIDKU) based on Science Literacy on Monocots and Dicots Materials for Elementary School Students**

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**Abstract:** Science literacy-based science learning requires various appropriate means, but in reality there is no media that facilitates science literacy-based science learning in various schools. The research objective is to develop a scientific literacy-based video quiz (VIDKU) consisting of learning videos using the sparkol videoscribe application and quizzes as learning evaluations that support students to learn monocot and dicot material in audio-visual media. The research and development (RnD) of the ADDIE model is limited to three stages, namely the analysis, design, and development stages which are carried out from June to August 2021. The subjects and locations of this research are fourth grade educators at Muhammadiyah 1 Tegal Elementary School, PUI Tegal Elementary School, Tegalsari 3 Tegal Elementary School, and Kraton 1 Tegal Elementary School. Data collection techniques using interview techniques and questionnaires. Data validity applies triangulation of data sources. The data analysis technique is an interactive and descriptive quantitative model. The results of the average validity value obtained from media, material, and language experts found 86.97% converted in the very valid category and very feasible to be applied in teaching and learning activities. Thus, this media can be recommended for use in science learning which includes scientific literacy.

## **The Effectiveness of the Virtual Tour Museum on Student Involvement in Social Studies Learning in Primary Schools**

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**Abstract.** The acceleration of the flow of information technology in the era of globalization requires all areas of life to formulate a vision, mission, goals, and strategies to suit today's life and not to be out of date. The development of a variety of instructional media is in line with the rapid technological advances. The dynamic of today's technology has achieved remarkable acceleration. In the digital era, teachers are required to plan and create learning in accordance with the needs of students as the native generation. Virtual Reality technology-based media is a form of Multimedia Learning process that can be viewed as the acquisition of information or as the construction of knowledge of students. The purpose of this study is to how the media characteristics and effectiveness of the Virtual Tour history museum are used as an innovative form of learning social studies in elementary school. The design of this study uses ex post facto correlation, which is a systematic empirical investigation in which the researcher does not control the variables and basically, they cannot be manipulated. The conclusion about the relationship between these variables is made based on the differences that accompany the independent variable and the dependent variable, without direct intervention. The study was conducted in three schools in the fifth-grade elementary school students in West Jakarta. More pervasive understanding of this occurs because Virtual Reality provides the user experience as a first-person or the circumstances in which the user as if it were in its natural environment, thereby creating the perception of the first. This condition is the strength of Virtual Reality as a media learning because users will have a complete experience. The learning process should be oriented in all aspects of the individual to develop all areas of development such as physical, emotional, social, and cognitive.



## **The Development of Mopan Educational Game to Building the Nationalism Character for Primary School Student**

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**Abstract.** This study aims to develop a multimedia application of MOPAN (Monopoli Pancasila) educational game learning in the scope of Pancasila & Civics Education at the primary school level which has validity, practicality, and potential impact on the development of student character. Mopan educational game apps developed using Adobe software animate that can be accessed through a variety of mobile platforms apps. This study uses research and development (R & D), which refers to the model of the Borg and Gall. The research data using instruments of observation sheets and questionnaires and then analyzed using quantitative descriptive percentages. This study resulted in the MOPAN educational game which has been validated by media experts with a percentage of 93% (very valid), material experts 86% (very valid), and linguists 88% (very valid). Besides the practical educational games, MOPAN otherwise is used to build the character of nationalism of primary school students, this can be seen from the student and teacher response questionnaire which obtained an average score of 82.5% (practical), so that the MOPAN educational game is feasible to be used as a multimedia learning in schools. The results of the study imply that through Pancasila & Civics Education learning by using interactive multimedia learning the MOPAN educational game, students can build their nationalist character, besides those educational games can also have an impact on the formation of other good characters.

## **RPG Video Games and Loneliness: An Analysis of ‘Finding Paradise’ Narrative**

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**Abstract.** Loneliness is a rapidly expanding problem in modern artificial-intelligent society that is often stigmatized, trivialized, or neglected. It is a profound emotion of distress and discomfort that occurs when there is a gap between the desire for and the experience of social connection. In the twenty-first century, video games are the new medium for storytelling. They're not just relevant to students' lives and interests; they also represent society's efforts to a meaningful storytelling. In this study, we argue that ‘Finding Paradise’, the third installment of adventure RPG video games developed and published by Freebird Games, is a great medium for storytelling and depiction of loneliness as its narrative allows the player to directly experience the subject at hand with their own senses and later may raise awareness of the mental illness. The analysis of ‘Finding Paradise’ narrative with reader response approach to literature will enrich and stimulate language learning activities in ESL/EFL classes.

## **The Effectiveness of Hypermedia Articulate Storyline in Science Learning on Critical Thinking Skills**

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**Abstract.** In today's era of globalization, the challenge of improving quality in various aspects of life is unavoidable. So that education must be directed at increasing the competitiveness of the nation to be able to compete in global competition. This can be achieved if education in schools is directed not only at mastering and understanding scientific concepts, but also at increasing students' thinking abilities and skills. Critical thinking is an important skill in 21st century education. In the digital era, teachers are required to plan and create learning designs that suit the needs of students as a native generation. The development of hypermedia articulate storyline is one form of the learning process using multimedia which can be seen as a construction of student knowledge. The purpose of this study was to determine the effectiveness of hypermedia articulate storyline in science learning on students' critical thinking skills in elementary schools. The design of this study used a quasi-experimental with pretest-posttest control-group design with a sample of 86 fourth grade students in West Jakarta City. The effectiveness test was conducted based on the pretest and posttest scores, then analyzed using the average normality test (N-Gain) to see the increase in critical thinking skills. The results of this research analysis show that, (1) There is a difference in the average results of students' critical thinking skills who use hypermedia articulate storyline in science learning compared to students who learn to use image media, (2) The experimental class gets an n-gain score of 0.712 with high criteria, and the control class gets a score of 0.712 n-gain 0.483 with moderate criteria. The hypermedia articulate storyline that was developed has several advantages is having experimental or simulation activities, HOTS questions, contextual material, relevant material and can build critical thinking skills.

## **A Study of Student's Independence in Online Learning with Flipped Classroom in the Covid-19 Era**

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**Abstract.** Learning patterns during the Covid-19 pandemic have changed and affected all levels of education. This study aims to determine the effect of online learning through WhatsApp application media with Flipped Classroom on the learning independence of 5th-grade elementary school students. This study uses a quantitative method with a sample of 54 students in the 5th-grade elementary school in West Jakarta. The technique of collecting data using questionnaires and interviews sheet. The data obtained were analyzed quantitatively with correlation and regression tests to show the effect of online learning with flipped classrooms on students' independence. The results of the analysis of this study showed: (1) that the value of Pearson correlations of  $-0.62 < 0.1638$ , so there is no relationship between the variables (x) and (y), (2) no effect of variable (x) and (y) on 5th-grade elementary school students in the era of the covid-19 pandemic in West Jakarta, with a simple regression value of  $Y = 44,580 + (-0.99) X$  as evidenced by the result of (t-count < t-table)  $-0.99 < 1.98373$ . Based on the results obtained interviews also concluded that distance learning in a pandemic situation Covid-19 students in learning activities still helped by parents at home so that students who are not learning independence. Researchers suggested that schools can improve the learning interesting and fun in a pandemic situation COVID-19.

## **Identifying Research Competencies Among Pre-Service Teachers**

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**Abstract.** The development of science and technology requires critical, creative, and problem-solving thinking skills. Problems can be solved one of them by research. New theories derived from the results of the research are urgently needed in the development of science. It becomes a challenge for teachers to develop researching skills. The purpose of this research was to find out the level of research capabilities of prospective teachers. The research method used was quantitative. Two hundred fifty-nine students in the Building Engineering Education, Physical Health and Creative Education and Language and Literature Education Study Program as a research sample. The data was obtained by a questionnaire. The data were analyzed with descriptive statistics and inference statistics (i.e., Mann Whitney tests and Wallis Kruskal tests). The results suggest that the research capabilities of prospective teachers are at a medium level. The research ability of prospective female teachers is the same as male teachers. The research capabilities of prospective teachers of the new generation are different from the old generation. The research capabilities of prospective teachers based on the fields of education are the same. Therefore, teachers should develop research skills to improve the quality of learning. These steps, which should require generation of the final output from the styled paper, are mentioned here in this paragraph. First, users have to run “Reference Numbering” from the “Reference Elements” menu; this is the first step to start the bibliography marking (it should be clicked while keeping the cursor at the beginning of the reference list). After the marking is complete, the reference element runs all the options under the “Cross Linking” menu.

## **Self-Efficacy of Biology Students In An RQANI Classroom During The Covid-19 Pandemic**

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**Abstract.** The Covid-19 pandemic has altered learning processes and other facets of classroom instruction. The development of students' self-efficacy during the learning process is critical to describe in order to attain future learning goals and achievement. Self-efficacy measures the extent to which pupils can execute and complete specific tasks. This study was conducted on students from *Tadris* Biology Department at IAIN Ternate in North Maluku, Indonesia. The research sample consisted of 40 students, 25 of whom were female and 15 of whom were male. Prior to their usage, the instrument employed in the investigation had been declared valid and reliable by experts and practitioners. A self-efficacy questionnaire was used to collect data. The results indicated that on average, Biology students in the RQANI classroom had a self-efficacy score of 81.00 (quite confident). Female students scored higher on various facets of self-efficacy, including tenacity, the ability to adapt to difficult tasks, the ability to avoid situations and behaviors that are beyond their skills, as well as cognitive and affective abilities. Several components of self-efficacy, however, must be cultivated in students. The findings of this study are expected to provide insights to secondary and tertiary level teachers on the importance of improving students' competence, abilities, and confidence, particularly amid this COVID-19 pandemic.

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# **ABSTRACT ROOM 5**

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## **Early geoscience literacy skills assessment based on TIMSS's view**

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**Abstract.** The importance of geoscience literacy, encourages young generation to have good geoscience literacy skill. The purpose of this research was to describe the early geoscience literacy skills of junior high school students. This type of research is descriptive quantitative research. The subjects of this research were 360 junior high school students in the Kediri Residency who were randomly selected, with reference to having studied the material of the earth's layer structure and its dynamics. The initial ability of geoscience literacy is measured through test instruments and questionnaires. The test instrument consists of 10 multiple choice questions which are adapted from TIMSS questions in the Earth Science sub-discussion. The results showed that the geoscience literacy skills of junior high school students in Kediri Residency with an average score of 47.44% or classified as very low. Viewed from the content domain, the skills of geoscience literacy is very low, especially in indicators describe the process of the hydrological cycle and recognize the sun as a source of energy for the hydrological cycle. Judging from the cognitive domain, students have very low scores and the lowest skills is the reasoning domain.



## **Detection of Food-Borne Pathogens Bacteria *Staphylococcus aureus* in Contaminated Meat and Milk Product by Real Time PCR**

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**Abstract.** The development of rapid, sensitive, and specific detection methods has increasingly become the attention in handling food poisoning cases. In this study, the method of Real Time PCR (RT-PCR) with *nuc* gene target was developed for the detection of *Staphylococcus aureus* in food samples of meat and milk. The results showed that the primer *nuc* gene with Gradient PCR could detect *Staphylococcus aureus* bacteria from pure culture at 57-61 °C by producing amplicons measuring 135 base pairs. Amplification by RT-PCR in the same sample at annealing temperature of 58°C and a concentration of 50 ng gave a Ct value of 18.88-19.56. The primer specificity test of that gene shows that the primer can recognize the target bacteria with a strong fluorescent signal at the Melting Curve of 79.02 °C, whereas non-target bacteria give low signals and different T<sub>m</sub> values. The primer sensitivity of the *nuc* gene has a detection limit (LOD) of 98.4 pg/μL or 8.8 x 10<sup>2</sup> CFU/mL. Based on these results, the RT PCR method with the *nuc* gene has the potential to be a method of detecting specific, sensitive, and rapid for *Staphylococcus aureus* bacteria in a food sample.

## **The Development of *Articulate Storyline*-based Learning Media to Optimize the 4C Aspects of Heat Material**

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**Abstract.** In this industrial revolution 4.0 towards 5.0, young people who think critically and creatively are needed. One of the efforts that is emphasized in the science learning is through the 4C aspect (Critical Thinking, Creative Thinking, Communication, Collaboration). This study aims to: 1) Knowing the analysis of the needs of students and teachers of SMPN 23 Malang especially in science learning; 2) to develop the learning media needed based on the analysis. Retrieval of needs analysis data using descriptive method with a sample of 30 students. Data collection techniques using a questionnaire, and interviews which analyzed qualitatively and described in descriptive form and Ms. Excel. The results of data analysis show that: 1) students tend to have difficulty when learning IPA related to the count (Physics); 2) students are more interested in relaxing learning such as playing games; 3) Students tend to find it difficult on heat physics IPA material. Based on these results, the researcher developed an articulate storyline-based learning media to optimize the 4C aspects of the heat material. With this media, it is hoped that it will facilitate students in learning heat material science and can train students' high thinking skills by inserting 4C aspects in it.

## **Acceptance Analysis of The Progress of Geothermal Energy in Dieng Indonesia**

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**Abstract.** Public knowledge and perception are the main factors in geothermal development in Indonesia, many people think that geothermal development has a high risk. Knowledge becomes the basis because it includes psychological factors that have an impact on public acceptance. Knowledge enhancement can be done by investigating peoples' perceptions of acceptance and involvement in geothermal management. The method used to find out is the questionnaire and interview method by processing quantitative descriptive qualitative standards. Measurements on this instrument use a Likert scale as a reference in determining the value of the instrument's answers. Each instrument item contains 5 (five) grading answers. The results showed the level of peoples' knowledge about the use of geothermal at 83% agreed or high level, where many peoples agreed that geothermal could be used for electricity production. In the aspect of trust, 32% of peoples stated that the use of geothermal energy could prevent increased global warming. In the next question, it was found 53% of peoples agreed that geothermal energy was used in the future.

## **Bioenergy Generating from Wastewater Treatment by Photosynthetic Microbial Fuel Cell (PMFC) System with *Chlorella vulgaris* as Bio-Cathodic**

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**Abstract.** Photosynthetic microbial fuel cell (PMFC) are novel bio-electrochemical transducers that use microalgae to generate oxygen, organic metabolites and electrons. The performance of PMFC depends on the organic matter contained in the substrate used. This study reports the effect of using tofu, fisheries, and domestic wastewater as a substrate for the microorganism *Lactobacillus plantarum* in the anode compartment of the PMFC system with *Chlorella vulgaris* as Bio-Cathodic. Results show that PMFC with fishery wastewater as a substrate had the best performance with open circuit voltage (OCV) of 997 mV and a power density of 6813 W/cm<sup>2</sup>. Meanwhile, in the utilization of tofu liquid waste and domestic waste, the OCV is 744 and 674 mV, with a power density of 3581.56 and 1758 W/cm<sup>2</sup>.

## **The relationship between the patient's body weight and the value of the Specific Absorption Rate (SAR) on Thoracal-Lumbar MRI examination**

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**Abstract.** Magnetic Resonance Imaging(MRI) is one of Imaging Techniques which is used to visualize human body have three kind of electromagnetic waves that work sinergically producing images. Each electromagnetic wave used has a side effect. One of the three electromagnetic waves that work in producing images on MRI is an electromagnetic wave that has a frequency of 10-400 MHz which serves to stimulate the excitation process in protons. This wave wellknown as Radiofrequency. Radiofrequency's side effects are known as the Specific Absorption Rate (SAR). International Committee on Non Ionizing Radiation Protection (ICNIRP) state that the accepted SAR dose don't exceeded limit of the threshold set by ICNIRP it can cause a heat effect that can be harmful to humans. The SAR value is influenced by conductivity, root mean square and mass density. This study has a purpose to find out the relationship between the patient's weight as a variable that represents the mass densityand the resulting SAR value. The root mean square is set at 230 mm<sup>2</sup> and 320 mm<sup>2</sup> (Thoracal-Lumbar MRI examination field) and Conductivity is locked with the metal-free screening for patient to avoid affect of heat increasing due to the conductivity of metal. The research method used is descriptive quantitative on 43 samples with statistical analysis of Shapiro Wilk's normality and homogeneity test. Meanwhile, to see the relationship between the patient's weight and the SAR value use independent t test and how the relationship between the patient's weight and the SAR value is using the Pearson's Product Moment test. The results of independent t-test obtained sig. (2 tailed)  $0.000 < 0.05$  indicates that there is a difference in the SAR value between the group of patients weighing  $< 60$  kgs and the group of patients weighing  $> 60$  kgs. Meanwhile, in the Pearson Product Moment correlation test, the sig value is obtained. of  $0.000 < 0.05$ , it states that there is a relationship between the patient's weight and the SAR value with the Pearson correlation value of 0.608 which indicates a strong relationship between the patient's weight and the resulting SAR value.

## **Optimization of Exposure Factors on radiographic Examination Chest AP Supine with 15% kV Rule Method**

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**Abstract.** The supine AP chest radiograph is an examination that is often performed in diagnosing and as an indicator of treatment, so this examination has become more frequent compared to other radiographic examinations during the COVID-19 pandemic. The purpose of this study is to find out how to optimize the use of exposure factors radiography examination of the chest supine AP using the 15% kV rule method. Descriptive quantitative research method carried out in the laboratory of the Department of diagnostic imaging and radiotherapy, Health Polytechnic of the Ministry of Health, Jakarta 2 using computer radiography, X-rays, piranha radiation detectors, and anthropomorphic phantoms. Statistical analysis of the one-way ANOVA test to determine the effect of the 15% rule method on image quality Contrasts to noise ratio (CNR), and determine the appropriate optimization procedure using the figure of merit (FOM). The results of the one-way ANOVA test have a p-value of 0.995, so there is no significant difference in the CNR value to changes in the exposure factor using the 15% kV rule method. Then the FOM results show that the correct optimization procedure using an exposure factor of 85kV 2.5mAs can provide a dose of 0.22 mGy while maintaining optimal CNR image quality.

## **Kinetic Studies on Conversion of *Mischantus Giganteus* to Levulinic Acid**

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**Abstract.** Levulinic acid (LA) derived from biomass is a building block chemical for synthesizing various chemical derivatives, which can be used to manufacture different compounds to replace fossil-based fuels. The kinetics study was carried out to redetermine the optimum reactions conditions such as temperature and catalyst concentration also to predict the performance of the reaction if a continuous reactor (CSTR and PFR) is used. The number of experiments conducted by Dussan (2013) was 8 experiments results in 186 data. Kinetic parameter studies were carried out using PYTHON 3.8 with the Curve\_Fit function method. The results of this study show that the kinetic model still prevails with different simulation methods. The reaction at 150 °C and 0.526 M H<sub>2</sub>SO<sub>4</sub> gives the highest LA yield of 72 mol% and hence is concluded to be the optimum condition. In a given residence time, higher LA yields obtain in PFR continuous reactor than the CSTR continuous reactor.

## **Kinetic Studies of Levulinic Acid Production from Acid-Catalyzed Hydrolysis of Sugar Cane Bagasse**

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**Abstract.** As a platform chemical that derivate biofuel, production of Levulinic Acid from biomass can be a great of impact on the sustainable development. This study aims to validate the kinetic model for the acid-catalyzed hydrolysis of sugar cane bagasse to Levulinic Acid, to redetermine the optimum reaction conditions for the reaction, and to predict the course of the reaction if a continuous reactor (CSTR and PFR) is used. The number of data used in this study were 384 data collected from 8 experiments by Girisuta (2013). The method of this study is data simulation using the Curve\_Fit function method in PYTHON 3.8. The results of this study indicate that the kinetic model remains valid with different simulation methods, the reaction at 150°C and 0.55M H<sub>2</sub>SO<sub>4</sub> gives the highest LA yield of 63mol% and thus concluded to be the optimum condition, and in a given residence time, the PFR continuous reactor configuration gives higher LA yields than the CSTR continuous reactor configuration.



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# **ABSTRACT**

# **ROOM 6**

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## **The effectiveness of making a portable laboratory integrated with local wisdom using a project-based learning approach to improve student learning outcomes**

**Rudi Susanto<sup>1,2</sup>, Mohd Nizam Husen<sup>1</sup>, Adidah Lajis<sup>1</sup>, Wiji Lestari<sup>2</sup>, Herliyani Hasanah<sup>2</sup>**

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**Abstract.** This study aims to determine the effectiveness of making a portable laboratory integrated with local wisdom using a project-based learning approach to improve student learning outcomes. This research was conducted at the Department of Informatics and Computer Engineering, Duta Bangsa University Surakarta, Indonesia in the 2020/2021 academic year. The total number of participating students was 239 with 84.10% male students and 15.90% female students. To evaluate the effectiveness, the applied instruments are in the form of Likert scale questionnaire, open ended questions to get the participants explaining their abilities after the making of the portable laboratory, together with pre-test and post-test questions. The analysis was carried out on the results of the questionnaire based on clustering with the K-means algorithm, then it is compared with the answers to the open-ended questions, pre-test, and post-test results, and finally with the portable laboratory products produced by the students. The results indicate that making a portable laboratory integrated with local wisdom using a project-based learning approach is effective in improving students' learning outcomes such as character, knowledge, skills, attitudes, and 21st-century skills. The effectiveness of increasing learning outcomes judging from gender and educational background shows relatively the same results and there is no significant difference.

## **E-module Development for Vector Calculus Courses Based on Problem Based Learning**

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**Abstract.** This study aims to develop an e-module based on problem based learning. This development is based on the fact that students are required to study independently during this pandemic where lectures are held online. Meanwhile, the available textbooks are designed for face-to-face lectures. The developed e-module is used for Vector Calculus courses in the 2020/2021 even semester. This development research uses the Plomp development model which consists of 3 stages, namely: (1) preliminary research, (2) prototyping stage, (3) assessment phase. There are 4 modules produced on the topics of Green's Theorem, Surface Integral, Stokes' Theorem, and Gauss' Theorem. Each module is validated by a college lecturer. Aspects that are validated are module components, mathematical material, and language. The validation results are good and get some input from the validator. The even semester 2020/2021 Vector Calculus courses was attended by 9 students. The result of mid-semester test are still not satisfactory because only 3 students got scores above C. This may be due to the fact that students are not familiar with group study. Usually the material is explained by the lecturer. Now using the module they have to learn the material on their own through group discussions. The result of final test are much better, namely 6 students who get grades above C. At the end of the lecture, students give positive opinions such as e-modules are easy to learn and they can understand the material easily

## **The Need Analysis of Learning Media With Film Based as Multimedia for College Students**

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**Abstract.** Learning media with film based is essential to do in entrepreneurship course as one of compulsory subjects which is taught to higher education level to provide the entrepreneur experiences. The film creates learning environments by extending the possibility of one-way communication area as both interactive learning with visualization and content production. The research aim is to determine the need analysis of entrepreneurship course by using media film based of entrepreneurship film. The open-ended questionnaire is the instrument used that shows the findings, namely the media based of entrepreneurship film is preferred more by both teachers and students in stimulating the knowledge of entrepreneur as well as learning business practice in procedure of production and high involvement of business entrepreneurs.

# **The Effect of The Google Classroom-Based Flipped Model on The Learning Outcomes of Machinery Theory in The Covid-19 Pandemic**

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**ABSTRACT.** This study examines the application of the Google Classroom-based flipped classroom model used in learning machining theory during the COVID-19 pandemic in the Department of Mechanical Engineering Education, Faculty of Engineering, State University of Medan, which is an obstacle to learning activities. From these problems, an alternative and appropriate solution is needed in accordance with the current situation and conditions of the covid-19 pandemic, namely, by applying the flipped classroom model based on the google classroom to improve student learning outcomes in the machining theory course. The flipped classroom model can facilitate students to learn in a way that is considered easy to achieve learning objectives. Through the Flipped classroom, lecturers can take advantage of online learning to make it easier for students to access and study learning materials at the Department of Mechanical Engineering Education, Faculty of Engineering, State University of Medan. For this reason, it is very important to conduct research on this issue. There are three objectives in this research, namely: (1) to examine the learning outcomes of students who apply the flipped classroom learning model assisted by Google Classroom in the treatment class, (2) to examine the learning outcomes of students who apply the conventional learning model to the comparison class; (3) to determine the effect of using the flipped classroom model assisted by Google Classroom whether it has an effect on learning outcomes of machining theory compared to the use of conventional learning models on students of the Department of Mechanical Engineering Education, Faculty of Engineering, State University of Medan. The type of research used is quasi-experimental research. The population in this study were students of the Mechanical Engineering Education Study Program, Faculty of Engineering, Medan State University class A and B in the even semesters of 2020/2021. Researchers used a cluster sampling technique (cluster random sampling) for sampling, namely selecting two classes from the population and determining the treatment class and comparison class. The data were obtained from the results of observations and learning outcomes tests. Data analysis in this study used descriptive and inferential statistical analysis. The results of the descriptive statistical analysis show that the average student learning outcomes with online learning methods are higher at 80.05 than conventional learning methods at 64.45. Based on the results of inferential statistical analysis, it can be concluded that the learning outcomes of machining theory achieved by students who apply the flipped classroom learning model assisted by Google Classroom are better or have a positive effect than the learning outcomes of students achieved by applying conventional learning models.

## **The Development of Hydrocarbon's Electronic Module for Science Student 11<sup>th</sup> Grade with PQ4R (*Preview, Question, Read, Reflect, Recite, Review*) Strategy**

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**Abstract.** The Covid-19 pandemic occurred many impacts in education, there is an adaption of changes from conventional to distance learning processes. Module is one of the learning media, which is now also being developed in a digital form. The use of digital media is a very helpful in the distance learning process. This study aims to develop electronic modules (e-Module) on hydrocarbon for science students of 11<sup>th</sup> grade with PQ4R (Preview, Question, Read, Reflect, Recite, Review) strategy. This module used six learning stages of PQ4R strategy as a stimulus for the student's learning process. This study used descriptive quantitative method with the type of research and development according to Borg and Gall. The instrument used in this study is a questionnaire. The e-Module was validated by three experts in content and language, and four experts in media and graphic. The e-Module was also tested by eight chemistry teachers and 60 science students of 11<sup>th</sup> grade. The result of the assessment given by experts, teachers, and students from validation and trial stage can categorize as good up to be very good for a percentage range of 84-95%. It can be concluded that the e-Module is feasible to be used as a learning media for high-school students.

## **Students' Perspectives in Facing Difficulties Towards Online Learning In Higher Education**

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**Abstract.** Online learning in higher education requires a modern learning environment with the use of information technology. Students as learning subjects are required to better master information technology during online learning. In practice, there are many difficulties faced by students, but in fact students have their own solutions in dealing with these difficulties. This study aims to describe students' ways of dealing with online learning difficulties so that this type of research is a qualitative descriptive study. The subjects of this study were students in 6 Study Programs at the University of Muhammadiyah Palangka Raya totaling 403 people. The results showed that students did not face difficulties in learning online because they had their own way of dealing with these difficulties, including (1) students had good cooperation in group study, (2) students could manage assignments well (3) students were more actively ask if there is something that is not understood either to the lecturer or colleagues.

## **Characterizing Biology Teachers' Practices in Developing Secondary School Students' Scientific Explanation**

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**Abstract.** The development of scientific explanation (hereafter SE) plays an important role in the contemporary education as it help learners acquire 21th century skills (e.g., problem-solving and decision-making). While studies focusing on SE has been globally gathered much of interest, we still know little about such a study taking place in the Indonesian context. In order to fill the literature gap, the present study attempts to depict the characteristics of secondary biology teachers' practices for developing students' SE. By employing an online qualitative survey, we investigated seven biology secondary school teachers. The characteristics of SE learning were elicited through open-ended questions on plant tissue materials. The data were analysed through two cycles of manual coding. The results of the analysis shows two major characteristics of teachers' practices in developing students' SE: (1) the explicit explanation of SE framework and; (2) the demonstration of SE through modelling. Based on the results, we call for the inclusions of pedagogical activities accommodating SE learning in the biology lesson.



## **Computational Thinking Skills Identification among Students of Physics Education Department using Rasch Model Analysis**

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**Abstract.** This research aims to determine the ability of Computational Thinking owned by students of the physics education department in Indonesia. This research was carried out because of increasing attention to Computational Thinking, especially in education. This type of research is quantitative using Rasch models to analyze data that has been obtained. The subjects of this study were 63 students of the Physics Education Department spread across four universities in 3 provinces in Indonesia. The instrument used in the study is CTS (*Computational Thinking Scales*), developed by Korkmaz et al. in 2017. Based on the analysis results, it is known that the average MNSQ grade obtained by students is 1.01, while the ZSTD obtained by students is at a value of -0.1. MNSQ and ZSTD values are in the ideal range of  $0.5 < \text{MNSQ} < 1.5$  and  $-2.0 < \text{ZSTD} < 2$ . This shows that the data obtained is fit and following Rasch's analysis model. Through the analysis, 11.46% of students have high CT ability, 34.92% have intermediate CT ability, and 47.61% have low CT ability.

## **Strengthening Civic Literacy in Civic Education Learning Using The Flipped Classroom Model**

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**Abstract.** Strengthening civic literacy aims to increase national insight and make citizens live in the nation and state in accordance with the values of Pancasila. This study presents an effort to strengthen students' civic literacy through the flipped classroom model. This study aims to find out how teachers implement flipped classrooms in strengthening civic literacy and revealing students' perceptions of the learning model. The research method used in this study is a qualitative descriptive method, with interview data collection techniques; observation; and documentation studies. Teachers and students in grade V elementary school were the subjects of this study. The results showed that the teacher implemented four main stages in civic education learning with the flipped classroom model. As for student perceptions, students perceive all stages and activities in the flipped classroom model positively. Students expressed the flipped classroom as a fun learning model, which helps them become more active and independent learners, increases motivation to learn, and increases students' interest in reading so that students have broader insights about Pancasila and citizenship.

## **Vocational High School Students' Readiness and Response Analysis in HOTS-Based Learning: A Case Study in Central Java Province, Indonesia**

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**Abstract.** Globally, HOTS-based learning stimulates the students' creativity in solving problems, which is still low in Indonesia. Students developed a habit of not asking questions when experiencing difficulties in understanding learning materials, preventing most graduates from competing in the workforce. The Ministry of Education was heavily criticized and advised to investigate learners' readiness and response. The purpose of this study was to investigate readiness and response in HOTS-based learning that includes critical thinking and problem-solving, creativity, collaboration, and communication (4C) skills. A descriptive survey design was used to sample high school students in Central Java Province. Furthermore, purposive sampling technique was used to select a total of 507 students while the data were collected through questionnaires and interviews. The results showed that Vocational High School learners were ready and responsive only in certain aspects. Moreover, the readiness and response questionnaires mean were 2.9 and 2.95, respectively which indicates the students reach 72.5% and 73.75%. From the interview, they did not prepare for HOTS-based learning because the class was teacher-centered and conventional and did not provide a challenging learning experience. Therefore, Indonesian students were less critical and creative, necessitating for effective strategies. This is because classroom learning cannot stimulate students to think critically and creatively.





DRAFT

# Self-Efficacy of Biology Students in an RQANI Classroom During The Covid-19 Pandemic

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**Abstract.** The Covid-19 pandemic has altered learning processes and other facets of classroom instruction. The development of students' self-efficacy during the learning process is critical to describe in order to attain future learning goals and achievement. Self-efficacy measures the extent to which pupils can execute and complete specific tasks. This study was conducted on students from *Tadris* Biology Department at IAIN Ternate in North Maluku, Indonesia. The research sample consisted of 40 students, 25 of whom were female and 15 of whom were male. Prior to their usage, the instrument employed in the investigation had been declared valid and reliable by experts and practitioners. A self-efficacy questionnaire was used to collect data. The results indicated that on average, Biology students in the RQANI classroom had a self-efficacy score of 81.00 (quite confident). Female students scored higher on various facets of self-efficacy, including tenacity, the ability to adapt to difficult tasks, the ability to avoid situations and behaviors that are beyond their skills, as well as cognitive and affective abilities. Several components of self-efficacy, however, must be cultivated in students. The findings of this study are expected to provide insights to secondary and tertiary level teachers on the importance of improving students' competence, abilities, and confidence, particularly amid this COVID-19 pandemic.

## INTRODUCTION

During the COVID-19 epidemic, online teaching and learning processes have become a requirement for education worldwide [1], [2]. Changes that have been brought to the classroom have altered learning patterns and facets of classroom instruction. These significant changes require students to adjust quickly. Therefore, students need to instill self-confidence and self-efficacy to accomplish this.

It is important to describe how students increase their self-efficacy during the learning process because it helps students attain success in the future [3], [4]. Students with a high level of self-efficacy appear to be more confident and enthusiastic about learning [5]. Self-efficacy has a significant role in explaining the degree to which students are challenged during the learning process in terms of problem-solving, task completion, and essential learning behaviors [6], [7]. When students with high self-efficacy are confronted with a tough task, they will attempt to tackle the problem in a variety of ways [8], [9]. According to Pajares, self-efficacy influences a variety of stressors and individual experiences, as well as anxiety, such as when individuals are engaged in an activity ([10]).

Students who have a high sense of self-confidence view challenging activities as obstacles they can conquer. They will choose difficult projects, swiftly regain their self-efficacy, and persevere in the face of several challenges [11]. Self-efficacy also adds to students' increased independence and achievement in the classroom [12]. Self-efficacy is regarded as critical for successful classroom learning [13]. Self-efficacy evolves into a tool for assessing an individual's capacity to perform a task, accomplish a goal, and produce something [14].

Self-efficacy is important for individuals to be able to make their own judgments about the amount of effort required to accomplish goals [15]. Self-efficacy has three dimensions: level, strength, and generality. *Level* denotes the degree of self-efficacy that varies according to the complexity of the assignment. *Strength* relates to individual

beliefs or expectations of their abilities. The term "*generality*" refers to a broad range of activities that indicate individuals' confidence in their ability [16]. The level of self-efficacy indicates the degree to which pupils can execute and finish specific activities. It can be associated with the critical role of student achievement in fostering academic success [17]. Students with a high level of self-efficacy demonstrate a high level of academic performance [18]. According to Myres, those who trust in their own competence and efficacy and who maintain a healthy internal control center will be able to manage and achieve higher academic achievement than those who do not [19]. Individual success in resolving a life issue might foster positive feelings [20]. Self-efficacy is a strong predictor of increased motivation and academic accomplishment, according to research [21].

Students develop self-efficacy from four primary sources of information: self-mastery experiences, observations of others, social persuasion received from others, and emotional and psychological states [22]. Active learning perception is the appraisal, comprehension, and emotion of students toward the notion of learning, as evidenced by the condition of students who consistently have a meaningful learning experience [23], [24].

One of the factors contributing to student low self-efficacy is a lack of variation in the types of learning models used to foster students' self-confidence in the classroom [5]. An authentic learning environment enables students to take greater ownership of their learning, hence enhancing their self-efficacy [25], [26]. To improve self-efficacy, learners should be supplied with an appropriate learning environment [27]. Students' involvement is not only physical, but also intellectual and emotional, during learning activities, and students experience changes consciously or unconsciously as a result of the learning process [28].

RQANI is a new educational approach that was developed in response to students' requirements for merging science principles and Islamic values. The RQANI learning model is thought to have the ability to boost students' self-efficacy. The phases of RQANI learning contribute to increased self-efficacy by emphasizing critical reading and practicing asking and answering questions correctly. The empowerment component of this model entails student participation to build confidence in their ability to participate in classroom learning activities. Students can have a more nuanced understanding of the subjects studied since RQANI pushes students to combine the concepts learned with Islamic values found in the Qur'an and Hadith. This study aimed to ascertain biology students' self-efficacy during the COVID-19 pandemic.

## RESEARCH METHODS

This study was designed with a pre-experimental design. A one-shot case study was undertaken in this situation. The experimental class was taught using the RQANI learning model. The participants consisted of 40 students from Biology Department at IAIN Ternate, North Maluku, Indonesia. The class contained 25 women and 15 men. Data collection was done through the distribution of self-efficacy questionnaire.

There were three measurement dimensions in the self-efficacy questionnaire, which were (1) magnitude or level, which is related to the level of student confidence in determining the level of difficulty faced; 2) strength, which is related to the level of student confidence in their ability to solve problems; and (3) generality, which is related to the level of student confidence in generalizing tasks and previous experiences. This self-efficacy questionnaire consists of 30 statement items with alternative answers scoring from 0-49 (not confident), 50-89 (quite confident), and 90-100 (very confident). Before it was put into use, the questionnaire went through a process of expert validation followed by an empirical validation. Tadris Biology students were asked to participate in an empirical validation study, which was conducted on 30 students. The reliability of the questionnaire was determined using data analysis using Cronbach's Alpha. The validity and reliability of the self-efficacy questionnaire have been established, allowing it to be utilized in the collection of research data. Analyses of the data were carried out utilizing quantitative descriptive techniques.

## RESULTS AND DISCUSSION

Table 1 contains data on the distribution of self-efficacy scores among biology students, classified by gender, in an RQANI classroom.

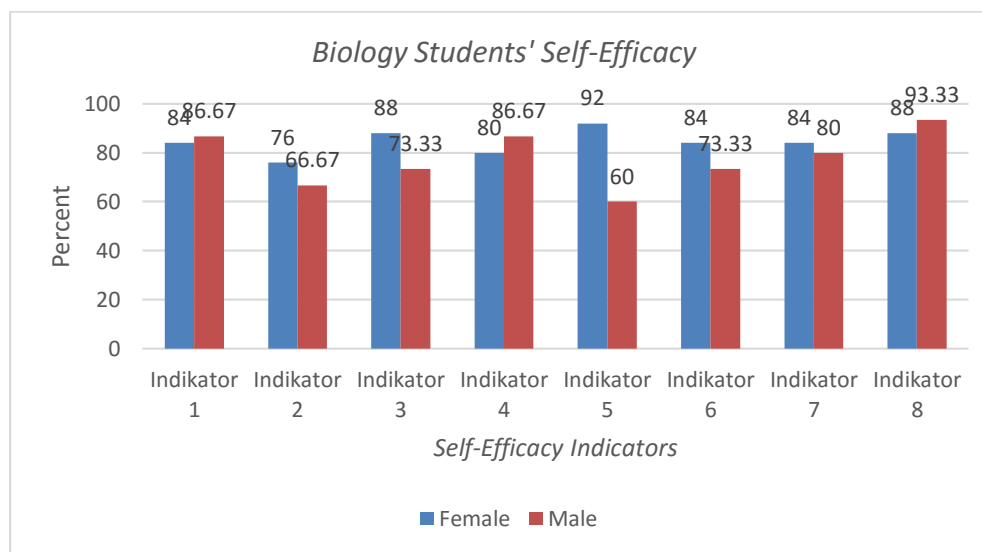


**TABLE 1.** Analysis of Biology Students' Self-Efficacy in an RQANI Classroom

No	Dimension	Indicator/Aspect	Female	Male	Total Mean Score
1	<i>Magnitudo/Level</i> (task difficulty)	1. Students' confidence in their ability to succeed	84.00	86.67	85.33
		2. Students' capacity for adapting to challenging tasks	76.00	66.67	71.33
		3. Students' capacity to avoid situations and activities that surpass their capabilities	88.00	73.33	80.67
2	<i>Strength</i> (confidence and expectation)	4. Ability to defend self	80.00	86.67	83.33
		5. Tenacity	92.00	60.00	76.00
3	<i>Generality</i> (diversity and breadth of behavioral fields)	6. Cognitive ability	84.00	73.33	78.67
		7. Affective ability	84.00	80.00	82.00
		8. Psychomotor abilities	88.00	93.33	90.67
Total Mean Score			84.50	77.50	81.00
Category			Quite confident	Quite confident	Quite confident

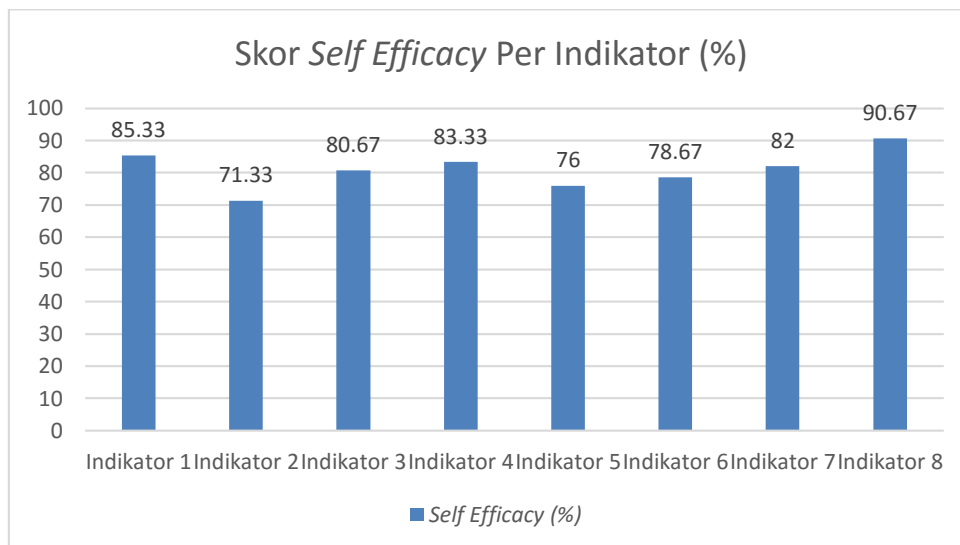
According to the statistics in Table 1, biology students who learned using RQANI achieved an average self-efficacy score of 81.00 (quite confident). Male students, on the other hand, exhibited a higher level of optimism about achievement than female students, based on the statistics presented. Male pupils also demonstrated a greater capacity for self-defense and psychomotor abilities than female students. This is consistent with research undertaken by [29] which found that male students show a greater confidence in finishing tasks than female students. Increased self-confidence is regarded to be capable of bolstering optimism for academic performance. Male pupils can work more diligently than female students [30].

Additionally, previous research indicates that female students achieve high mean scores in various facets of self-efficacy, including the ability to adapt to challenging tasks, avoid situations and behaviors that surpass their capacities, tenacity, and cognitive and affective abilities. Figure 1 depicts the distribution of self-efficacy scores obtained by biology students on each self-efficacy indicator.



**FIGURE 1.** Biology Students' Self-Efficacy in an RQANI Classroom Based on Gender

Pedagogical techniques, gender division, gender composition, and group division in the classroom all have a role in establishing positive or negative attitudes, interests, self-confidence, and enthusiasm toward biology education [31]. The study's findings indicated that female students outperformed male students in terms of self-efficacy and academic achievement [32]. This is consistent with the findings Jamil & Sawari, which revealed that female students exhibited stronger self-efficacy than male students [33], [34].



**FIGURE 2.** Biology Students' Score for Each Self-Efficacy Indicator in an RQANI Classroom

As illustrated in Figure 2, indicator 2 (students' ability to adapt to challenging tasks), indicator 5 (tenacity), and indicator 6 (cognitive ability) of biology students all require improvement. Low self-efficacy is not limited to students who lack ability and desire for studying; it may equally affect exceptional students who lack confidence in their abilities to complete tasks [35].

On each indicator, the study's participants demonstrated sufficient self-efficacy. This indicates that biology students who have been exposed to RQANI have a high level of confidence in their abilities to carry out their academic responsibilities as students, such as studying, completing assignments, and utilizing the learning environment. Self-efficacy is critical since it serves as a powerful paradigm for regulating one's drive to learn [36]. Self-efficacy reflects pupils' perceptions of their talents. If a person has a healthy self-esteem, he or she is more likely to be self-sufficient during the learning process. Students with a positive self-concept will be more motivated to pursue autonomous learning. This is because they have recognized and comprehended themselves to act appropriately in a variety of settings. A positive self-concept is frequently associated with self-acceptance. Students that have a positive self-concept can comprehend and accept a variety of self-related aspects.

RQANI learning was able to boost students' self-efficacy in biology since students were given the opportunity to study material linked to lectures during the learning process. The opportunity is intended to familiarize students with critical-reading patterns that can help them enhance their literacy and readiness to learn. Students in the RQANI class appeared more confident and engaged in discussion activities, expressing their opinions/arguments more actively. This conviction is formed because of students' solid conceptual foundations for knowledge construction and argumentation during class discussions. Additionally, students are given the ability to ask and answer questions throughout RQANI learning. The habit of asking and responding to these questions builds students' confidence in admitting when they do not comprehend a concept. Besides, RQANI involves students in discussion activities. The integration of Islamic values and science in an RQANI classroom enables students to connect the content being studied to everyday occurrences. The incorporation of Islamic values into learning enriches the learning process, which in turn increases students' self-efficacy.

Self-efficacy is associated with feelings and attitudes, including self-confidence and complete trust in someone's ability to do something correctly to succeed. It is also determined by the environment's physical, social, and carrying capacities [37]. Students that have a high sense of self-efficacy will typically find it easier to complete the given assignments. Students who lack self-efficacy shun tough assignments and have reservations about their abilities to

solve complex challenges. Self-efficacy can also be influenced by an individual's psychological circumstances and emotional state. Positive emotional states have been shown to promote self-efficacy, and negative emotions have been shown to diminish self-efficacy.

Self-efficacy is not an inherent or permanent characteristic of an individual, but rather the consequence of a cognitive process [38]. Self-efficacy is a motivational construct that is founded on an individual's self-perception of competence and ability [39]. Self-efficacy is critical when acting or making a decision to accomplish a goal [30]. Self-efficacy influences an individual's behavior, effort, tenacity, adaptability to change, and achievement of goals [40]. Self-efficacy enables pupils to cognitively create knowledge in the form of basic thought structures in problem-solving.

Teacher self-efficacy has a beneficial effect on the attainment of active learning goals and the learning environment of students [41], [42]. When teacher self-efficacy diminishes, students are more likely to encounter scenarios such as (1) being less engaging and productive in the classroom; (2) encountering issues with unpredictable teacher behavior; and (3) being unable to accomplish learning activities efficiently [43], [44]. Self-efficacy has been shown to improve motivation [45] and ability to succeed [46]. Teacher self-efficacy and perceptions are almost certainly critical components of daily science teaching practice [47]. When students are confronted with real-world challenges, they believe that scientific classes become more interesting and enjoyable [26].

## CONCLUSION

The findings of this study reveal that the self-efficacy of biology students enrolled in an RQANI class is classified into the "quite confident" category with an average score of 81.00. Female students scored higher on various measures of self-efficacy, including the ability to adapt to challenging tasks, the ability to avoid situations and behaviors that are beyond their skills, tenacity, cognitive and affective abilities. Male students, on the other hand, exhibited a higher level of optimism for success than female students. Similarly, male students scored higher than female pupils in terms of self-defense ability and psychomotor ability.

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