



UNIVERSITAS PENDIDIKAN INDONESIA (UPI)

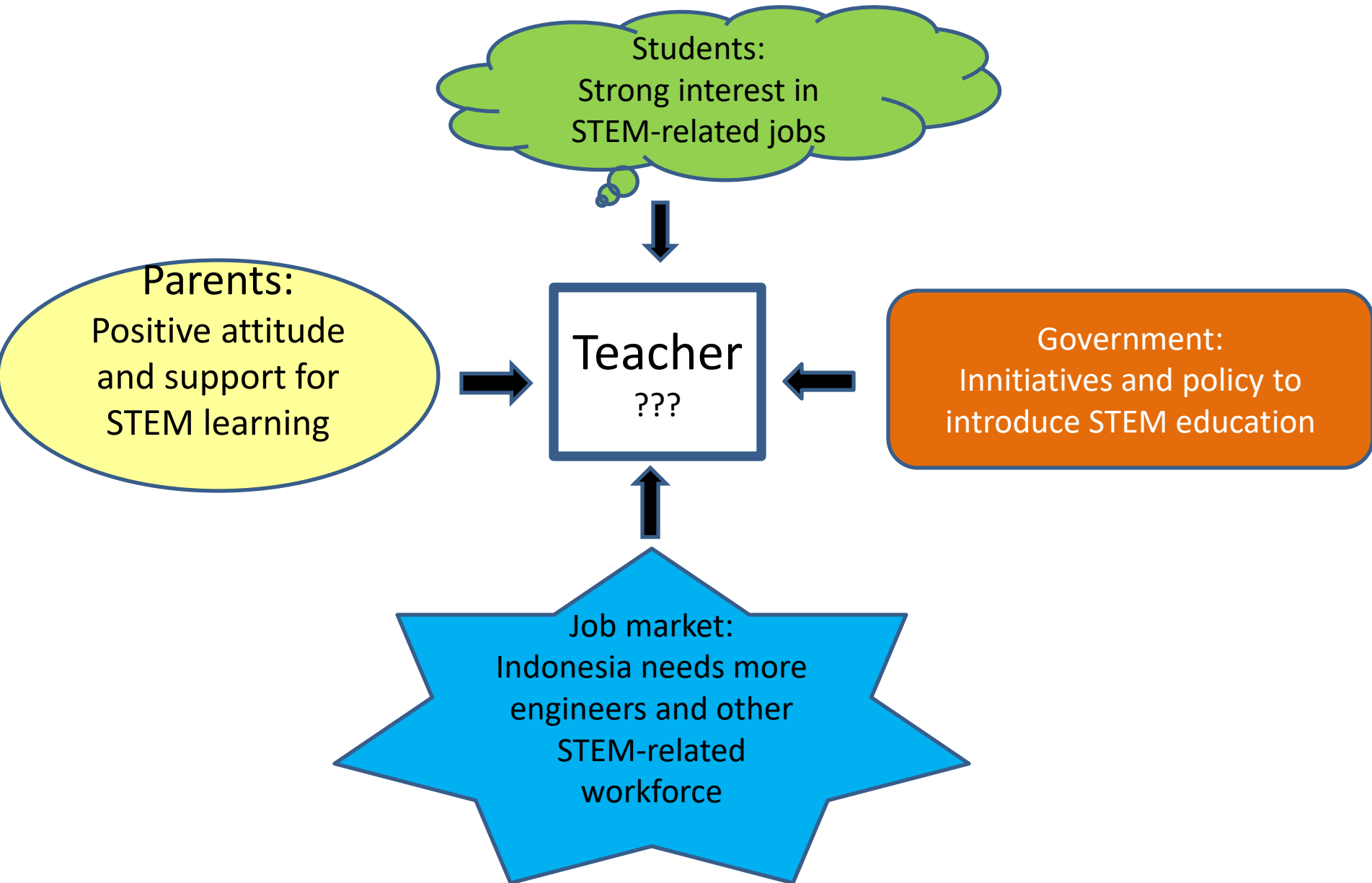
PREPARING TEACHERS TO TEACH STEM

Ari Widodo

Universitas Pendidikan Indonesia

widodo@upi.edu

Stakeholders' expectations



Drawbacks



School subjects are compartmentalized



STEM is not listed in school curriculum, no teacher is responsible to teach STEM



School system does not support for STEM learning



Teachers are not prepared to teach STEM

Attempts to bring STEM into classrooms



Trainings for teachers



Research and Development



Pilot projects at schools



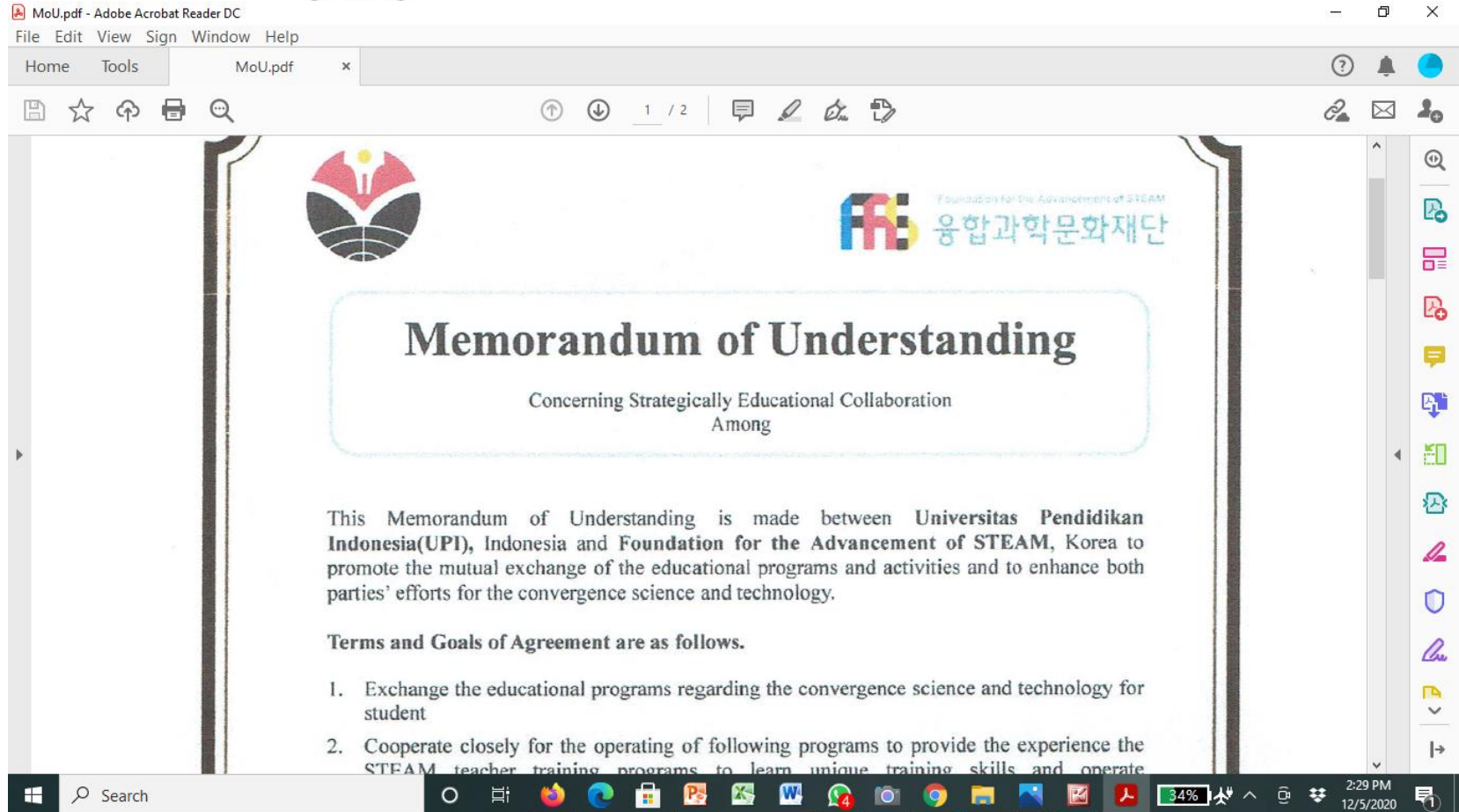
Special training events for children

Attempts are not well designed, managed, and coordinated

Universitas Pendidikan Indonesia's contributions in promoting of STEM



Establishment of UPI STEM CENTER



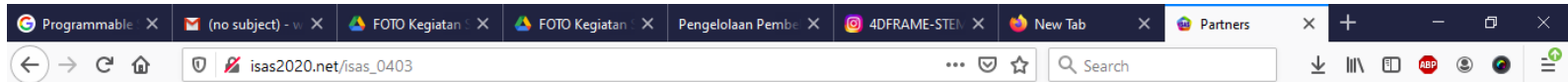
Mou Between UPI and Foundation for the Advancement
of STEAM Korea



STEM

EDUCATION CENTER UPI

PROMOTING FUTURE LEARNING AND RESOURCES



International Society for the Advancement of STEAM

Partners

Notice

Schedule

Partners

Partners

파트너

CERI
융합교육연구소
Convergence Education Research Institute

**QUE
BON**



**4D
FRAME**
www.4dframe.com

GeoGebra
한국지오지보라연구소

Bilingual
Montessori
School
of Lund





STEM
EDUCATION CENTER UPI
PROMOTING FUTURE LEARNING AND RESOURCES

Activities

Training for students

Training for teachers

Competitions
students

Gallery display for
visitors

STEM CAMP 41 w

WE ARE INVITING
INTERNATIONAL PRE-SERVICE
TEACHER STUDENT

**INTERNATIONAL
STUDENT
STEM
Camp**

**22-27
JUNE
2020**

APPLICATION

1. Fill out the registration form on:
bit.ly/regSTEMCAMPUPI
2. Confirm your registration to:
085722985471
IRMA RAHMA S., Ph.D
085315026485
ANTI

OUR ACTIVITY

SCIENCE AND ENGINEERING
LAB VISIT

SCHOOL VISIT

ENGINEERING PRACTICES
USING 4DFRAME

**BANDUNG CITY TOUR
USING "BANDROS" BUS
AND MORE ACTIVITY...
SO COME AND JOIN WITH US !**

IMPORTANT DATE

1. Application due date April 30, 2020.
2. Announcement for acceptance May 21st 2020.
3. Invitation letter for VISA* June 1st 2020.

stemcenterupi@gmail.com [STEM Center UPI](#) [@stemcenterupi](#)

**Calling all the International
Pre-Service Teachers to
attend our Camp.
It's Free!!**

Send message

ISTEMCC 40 w

**WAKTU LOMBA
SABTU
27 JUNI 2020**

**TEMPAT
MUSEUM
PENDIDIKAN
NASIONAL
UPI**

**1st INDONESIA
STEM CREATIVITY
COMPETITION**

KATEGORI LOMBA

4DFRAME - CREATIVITY COMPETITION
KELAS 4 s/d KELAS 9
BIAYA PENDAFTARAN
Rp. 250.000 / TIM (2 ORANG)

4DFRAME - MECHANTRONICS COMPETITION
KELAS 7 s/d KELAS 12
BIAYA PENDAFTARAN
Rp. 500.000 / TIM (2 ORANG)

**RAIH DIALA
MEMENONGRUB**

**SNACK
LUNCH
SERTIFIKAT
GOODIE BAG**

**WAKTU PENDAFTARAN
1 APRIL - 20 MEI 2020**
LINK PENDAFTARAN:
bit.ly/daftarISTEMCC

Contact Person: 085722985471 (IRMA RAHMA S., Ph.D) 085315026485 (ANTI) STEM Center UPI @stemcenterupi

[@stemcenterupi](#)

**RAIH KESEMPATAN UNTUK
PERGI KE KOREA SELATAN
GRATIS UNTUK JUARA!!!**

Send message

Inclusion of STEM into teacher education curriculum



Faculty of Mathematics and Science Education takes the responsibility to prepare STEM teachers

The Curriculum Design

MANDATORY

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Compulsory course for all students in Faculty of Mathematics and Science Education



Three credit units for two semesters
(6 credit units in total)



Interdisciplinary



Project-based problem solving

Content of the Courses



Scientific Processes



Engineering Processes

The courses are “subject free” as the content are scientific process skills and engineering process skills

Goals of the Courses



Creativity



Problem solving



Collaboration



Technology Literacy



Sustainable Lifestyle

Trainings for teachers



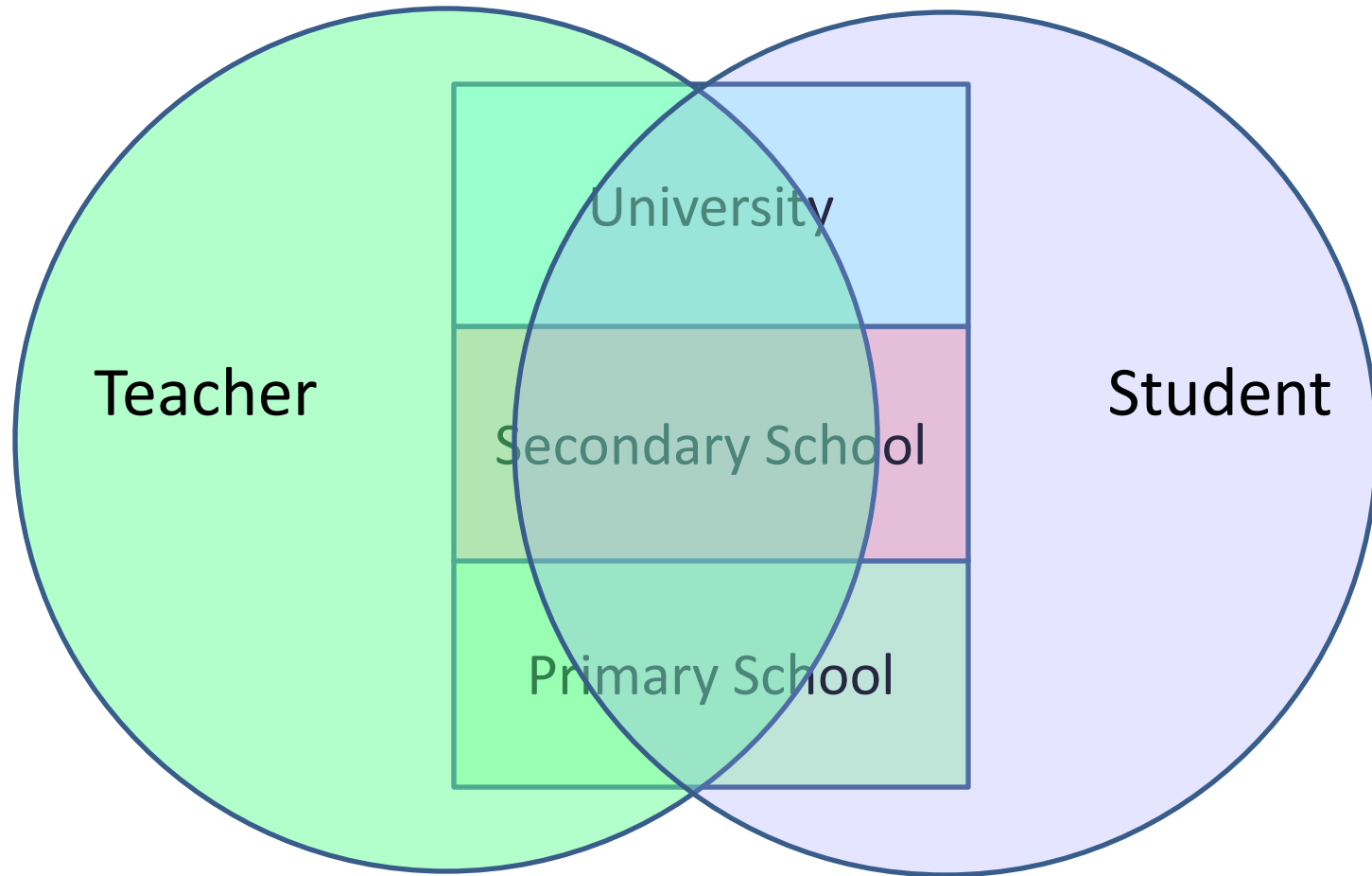
Training contents

How to integrate STEM into the existing curriculum

How to design STEM-based lessons

How to manage a STEM class

Mapping Areas for Research



Participants:
Teacher and students

Education Level:
Primary school to university

Research on STEM

The screenshot shows a web browser window displaying the ICMScE website. The browser's address bar shows the URL: science.conference.upi.edu/proceeding/index.php/ICMScE/article/view/18. The website header features the ICMScE logo and the text "International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia". The navigation menu includes "HOME", "ARCHIVES", "ANNOUNCEMENTS", "ABOUT", and "WEBSITE". The article title "Fifth-grade elementary school perception of STEM" is prominently displayed. Below the title, the authors are listed: T Trivena, A Widodo, and W Sopandi, along with their affiliations. A thumbnail image of the conference proceedings cover is shown. On the right side, there is a "DIRECTORY WEB" section listing previous years (2020 to 2016) and a "MOST READ LAST WEEK" section.

Programmable S (no subject) - wi FOTO Kegiatan S FOTO Kegiatan S Pengelolaan Pembelajaran 4DFRAME-STEM New Tab Fifth-grade e X problem solving

science.conference.upi.edu/proceeding/index.php/ICMScE/article/view/18

ICMScE International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia *Proceeding Series* Login

HOME ARCHIVES ANNOUNCEMENTS ABOUT WEBSITE SEARCH

HOME / ARCHIVES / VOL 3 (2018): PROMOTING 21ST CENTURY SKILLS THROUGH MATHEMATICS AND SCIENCE EDUCATION / Articles

Fifth-grade elementary school perception of STEM

T Trivena
Program Studi Pendidikan Dasar, Sekolah Pascasarjana, Universitas Pendidikan Indonesia

A Widodo
Departemen Pendidikan Biologi, Program Studi Pendidikan Biologi dan Program Studi Pendidikan Dasar, Sekolah Pascasarjana, Universitas Pendidikan Indonesia

W Sopandi
Departemen Pendidikan Kimia, Program Studi Pendidikan Kimia dan Program Studi Pendidikan Dasar, Sekolah Pascasarjana, Universitas Pendidikan Indonesia

ICMScE International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia
"Promoting 21st Century Skills Through Mathematics and Science Education" Volume 3, 2018

DIRECTORY WEB

- ICMScE 2020
- ICMScE 2019
- ICMScE 2018
- ICMScE 2017
- ICMScE 2016

MOST READ LAST WEEK

4:34 PM 12/5/2020

The study explored primary school students' perceptions and readiness to learn STEM

Research on STEM

The screenshot shows a web browser window with multiple tabs. The active tab is 'ERIC - EJ1264959'. The address bar shows the URL 'https://eric.ed.gov/?id=EJ1264959'. The ERIC logo is visible, along with a search bar and navigation links like 'Collection', 'Thesaurus', 'Notes', 'FAQ', and 'Contact Us'. The main content area displays the title of the research article, the authors 'Kartini, Dwi; Widodo, Ari', and the publication details 'Elementary School Forum (Mimbar Sekolah Dasar), v7 n1 p58-69 Apr 2020'. A detailed abstract follows, discussing the need for STEAM education and the study's findings. To the right, a sidebar provides additional information: 'Peer reviewed', 'Download full text', 'ERIC Number: EJ1264959', 'Record Type: Journal', 'Publication Date: 2020-Apr', 'Pages: 12', 'Abstractor: As Provided', 'ISBN: N/A', and 'ISSN: ISSN-2355-5343'. At the bottom, there are links for 'Descriptors' and 'Publication Type', and a Windows taskbar is visible at the very bottom.

Exploring Elementary Teachers', Students' Beliefs and Readiness toward STEAM Education

Kartini, Dwi; Widodo, Ari
Elementary School Forum (Mimbar Sekolah Dasar), v7 n1 p58-69 Apr 2020

21st century demands education to promote students with STEAM competencies. Most researches on STEAM are mainly focused on students' learning outcomes on STEAM, but only few address non-cognitive aspects. It is necessary to examine elementary teachers and students' beliefs and readiness towards STEAM learning. The purpose of this research is to explore teachers' and students' beliefs and readiness towards STEAM learning. The survey-designed method was used in this research. A total of 34 elementary school teachers and 36 elementary school students in the city of Bandung participated in this research. The samples were selected using a random sampling technique. Questionnaires were used to collect research data. The results obtained from this research show that students and teachers have positive perceptions in career and benefit of STEAM learning. Students are actually interested in STEAM learning, but the competencies and factors that support and stimulate STEAM learning in schools are still low. The teacher has low competencies to implement STEAM learning. This is due to the lack of knowledge and understanding of teachers about STEAM. This research is expected to contribute to the novelty of teachers' readiness and beliefs in STEAM education in the city of Bandung.

Descriptors: [Elementary School Teachers](#), [Teacher Attitudes](#), [Elementary School Students](#), [Student Attitudes](#), [Beliefs](#), [Readiness](#), [STEM Education](#), [Foreign Countries](#), [Positive Attitudes](#), [Student Interests](#), [Art Education](#), [Competence](#), [Program Implementation](#)

Indonesia University of Education. Jl. Mayor Abdurachman No. 211, Sumedang, Jawa Barat, 45322, Indonesia. Web site: <https://ejournal.upi.edu/index.php/mimbar/index>

Publication Type: Journal Articles; Reports - Research
Education Level: Elementary Education
Audience: N/A

ERIC Number: EJ1264959
Record Type: Journal
Publication Date: 2020-Apr
Pages: 12
Abstractor: As Provided
ISBN: N/A
ISSN: ISSN-2355-5343

The study explored primary school teachers' perceptions and readiness to teach STEM

Research on STEM

The screenshot shows a web browser window with multiple tabs. The active tab is titled "Development X" and displays a research article page. The browser's address bar shows the URL <https://aip.scitation.org/doi/abs/10.1063/1.4983969>. The page content includes a breadcrumb trail: "Home > AIP Conference Proceedings > Volume 1848, Issue 1 > 10.1063/1.4983969". Below this, it states "Free . Published Online: 30 May 2017". The main title of the article is "Development and validation of science, technology, engineering and mathematics (STEM) based instructional material". The authors listed are "Ineu Gustiani^{1,a)}, Ari Widodo²⁾, and Irma Rahma Suwarma³⁾". There are buttons for "View Affiliations", "PDF", "ABSTRACT", "CITED BY", "TOOLS", "SHARE", and "METRICS". A sidebar on the left titled "TOPICS" lists "Simple machine", "Teaching", and "Educational assessment". The abstract text reads: "This study is intended to examine the development and validation of simple machines instructional material that developed based on Science, Technology, Engineering and Mathematics (STEM) framework that provides guidance to help students learn and practice for real life and enable individuals to use knowledge and skills they need to be an informed". At the bottom of the browser window, there is a Windows taskbar with various application icons and a system tray showing the time as 4:32 PM on 12/5/2020.

Home > AIP Conference Proceedings > Volume 1848, Issue 1 > 10.1063/1.4983969

Free . Published Online: 30 May 2017

Development and validation of science, technology, engineering and mathematics (STEM) based instructional material

AIP Conference Proceedings **1848**, 060001 (2017); <https://doi.org/10.1063/1.4983969>

Ineu Gustiani^{1,a)}, Ari Widodo²⁾, and Irma Rahma Suwarma³⁾

View Affiliations

PDF

ABSTRACT CITED BY TOOLS SHARE METRICS

TOPICS

- Simple machine
- Teaching
- Educational assessment

ABSTRACT

This study is intended to examine the development and validation of simple machines instructional material that developed based on Science, Technology, Engineering and Mathematics (STEM) framework that provides guidance to help students learn and practice for real life and enable individuals to use knowledge and skills they need to be an informed

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Got it!

The study identified instructional materials needed to conduct STEM-based lessons

Research on STEM



The study explored university students' perceptions and readiness to learn STEM

Reflection



Blue light – Ijen, Indonesia

Implementing STEM in school requires a comprehensive solution and collaboration amongst stakeholders

Thank you for watching