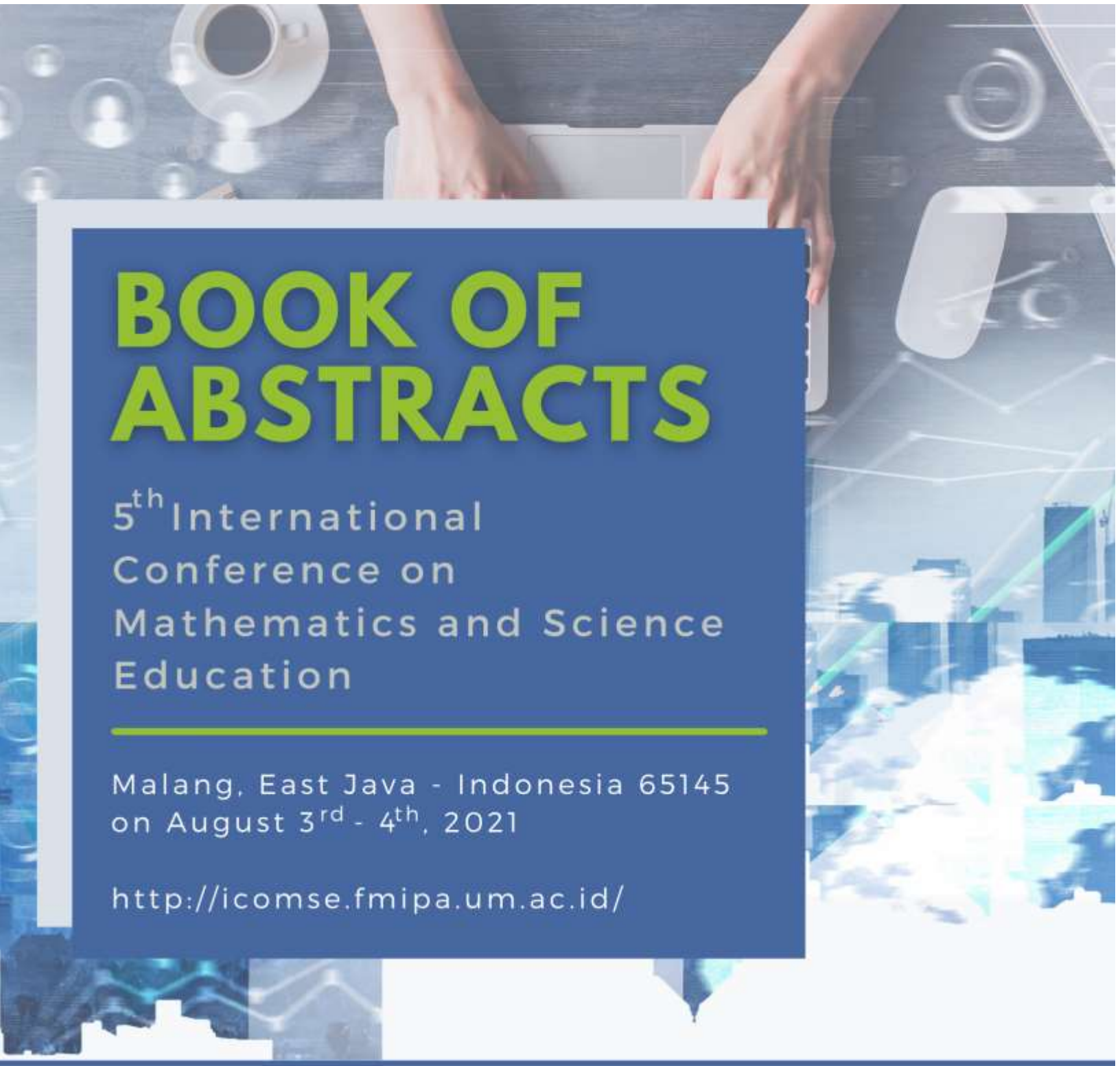

BOOK OF ABSTRACTS

5th International Conference on Mathematics and Science Education

Malang, East Java - Indonesia 65145
on August 3rd - 4th, 2021

http://icomse.fmipa.um.ac.id/

ICOMSE 2021

PREFACE

Foreword by The Dean of Faculty of Mathematics and Natural Science, Universitas Negeri Malang (UM)



Assalamualaikum warahmatullahi wabarakaatuh

Firstly, I would like to praise Allah 'Azza wa Jalla for granting us another opportunity to hold the Fifth International Conference on Mathematics and Science Education (ICoMSE) 2021 in collaboration with Faculty of Social Science and Humanity, Universiti Teknologi Malaysia. I would also like to take this opportunity to give my sincere appreciation and gratitude to the excellent keynote speakers, including Prof. Vicente A Talanquer, Ph.D. from University of Arizona, USA; Prof. Dr. Mustafa Sozbilir from Atatürk University, Turkey; Prof. Dr. Zaidatun binti Tasir from Universiti Teknologi Malaysia; Dr. Marianne Achiam, M.Sc. from University of Copenhagen, Denmark; Dr. Igusti Darmawan. M.Sc. from Adelaide University, Australia; and Dr. Sentot Kusairi, S.Pd, M.Si from Universitas Negeri Malang, Indonesia.

Distinguished guests, ladies, and gentlemen, a successful conference is the sum of many essential parties who have worked hard in planning and organizing ICoMSE 2021 in this challenging time. Would you please let me extend my deepest gratitude and highest appreciation to all committee members? I would like to take the opportunity to thanks all the participants for attending our conference and bringing your expertise to our gathering. Enjoy the ICoMSE 2021 hope you find it intellectually stimulating and academically empowering.

Malang, August 2021
Prof. Dr. Hadi Suwono, M.Si

Dean of FMIPA UM

Greetings from The Committee



On behalf of the committee, it is my pleasure to welcome all the participants to The 5th International Conference on Mathematics and Science Education (ICoMSE) 2021 organized by The Faculty of Mathematics and Natural Sciences, Universitas Negeri Malang (UM), in collaboration with the Faculty of Social science and Humanities, Universiti Teknologi Malaysia.

My high appreciation for the fabulous keynote speakers, including Prof. Prof. Vicente A Talanquer, Ph.D. from University of Arizona, USA; Prof. Dr. Mustafa Sozbilir from Atatürk Univesity, Turkey; Prof. Dr. Zaidatun binti Tasir from Universiti Teknologi Malaysia; Dr. Marianne Achiam, M.Sc. from University of Copenhagen, Denmark; Dr. Igusti Darmawan. M.Sc. from Adelaide University, Australia; and Dr. Sentot Kusairi, S.Pd, M.Si from Universitas Negeri Malang, Indonesia. My gratitude also goes to the invited speakers, including Dr. Noor Azean binti Atan from Universiti Teknologi Malaysia; Yuli Rahmawati, M.Sc., Ph.D. from Universitas Negeri Jakarta; Dr. Ferli Septi Irwansyah from UIN Sunan Gunung Djati Bandung, Indonesia; Dr. Muntholib, M.Si. from Universitas Negeri Malang, Indonesia; Prima Luna, S.T.P., M.Si., Ph.D. from Balai Besar Pasca Panen Balitbangtan, Ministry of Agriculture, Indonesia; Prof. Dr. Abdur Rahman As'ari, M.Pd., M.A. from Universitas Negeri Malang, Indonesia; Dr. Antuni Wiyarsi, M.Si from universitas Negeri Yogyakarta; and Dr. Oktavia Sulistina, S.Pd., M.Pd. from Universitas Negeri Malang, Indonesia.

Over 250 abstracts have been submitted, and hundreds of participants will share their experiences in their presentations, offer their insights, and point the challenges up in

this conference. The papers will be published in the Scopus indexed proceeding, American Institute of Physics (AIP) Publishing.

The ICoMSE 2021 can be carried out due to the support of the various parties. I would like to take the opportunity to express my appreciation to the Rector of Universitas Negeri Malang, Prof. Dr. AH. Rofi'uddin, M.Pd; Dean of the Faculty of Mathematics and Natural Science, Universitas Negeri Malang, Prof. Dr. Hadi Suwono, M.Si; The Dean of Faculty of Social Science and Humanities, Universiti Teknologi Malaysia, the head of the chemistry department, Dr. Sumari, M.Si; and the head of IPA education, Dr. Munzil, M.Si for all of their support. I want to also thank the committee members for their hard work, commitment, and dedication in organizing this conference. We hope that all participants in the ICoMSE 2021 will gain insights and knowledge and enjoy the conference.

Malang, August 2021

Habiddin, S.Pd., M.Pd., PhD

Chairman

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CONFERENCE SCHEDULES

Link Zoom : https://bit.um.ac.id/ICoMSE2021

Meeting ID : 916 2262 4223

Passcode : 698268

PLENARY SESSION

Tuesday, August 3rd 2021

Time	Programs	PIC
07.00 – 07.45	Registration	Agung Mulyo Setiawan, S.Pd., M.Si., Hanumi Oktiyani Rusdi, S.Pd., M.Si. Meyga Evi Ferama Sari, S.Si., M.Si.
07.45 – 08.00	Opening Ceremony by MC	Nova Ariani, S.Pd., M.Ed. Endang Ciptawati, S.Si., M.Si. Meyga Evi Ferama Sari, S.Si., M.Si.
08.00 – 08.10	Opening Prayer	Dr. Ridwan Joharmawan, M.Si.
08.10 – 08.20	Indonesian National Anthem	Erti Hamimi, S.Pd., M.Sc.
08.20 – 08.30	**Welcoming Speech** by Chairman of ICoMSE 2021	Habiddin, S.Pd., M.Pd., Ph.D.

08.30 – 08.40	**Welcoming Speech** by Dean of the Faculty of Mathematics and Sciences	Prof. Dr. Hadi Suwono, M.Si.
08.40 – 09.40	**Keynote Speaker I:** Prof. Vicente A Talanquer, Ph.D. (University of Arizona, USA)	**Moderator:** Dr. Suharti, S.Si., M.Si.
09.40 – 10.40	**Keynote Speaker II:** Dr. Igusti Darmawan, M.Sc. (Adelaide University, Australia)	**Moderator**: Khusaini, S.Pd., M.Ed.
10.40 – 11.40	**Keynote Speaker III:** Dr. Marianne Achiam, M.Sc. (University of Copenhagen, Denmark)	**Moderator**: Dr. Eli Hendrik Sanjaya, S.Si., M.Si.
11.40 – 13.00	Break	MC
13.00 – 16.00	Parallel Sessions (Room 1- 9)	Operators & Parallel Moderators

Wednesday, August 4th 2021

Time	Programs	PIC
07.45-08.00	Registration	Agung Mulyo Setiawan, S.Pd., M.Si., Hanumi Oktiyani Rusdi, S.Pd., M.Si. Meyga Evi Ferama Sari, S.Si., M.Si.
08.00 – 09.00	**Keynote Speaker IV:** Dr. Sentot Kusairi, S.Pd., M.Si. (Universitas Negeri Malang, Indonesia)	**Moderator**: Dr. Sumari, M.Si.

09.30 – 10.30	**Keynote Speaker V:** Prof. Zaidatun binti Tasir (Universiti Teknologi Malaysia, Malaysia)	**Moderator:** Dr. rer.nat. Safwatun Nida, S.Si., M.Pd.
10.30 – 11.30	**Keynote Speaker VI:** Prof. Dr. Mustafa Sözbilir (Atatürk University, Turkey)	**Moderator**: Prof. Dra. Sri Rahayu, M.Ed., Ph.D.
11.30 – 12.00	**Closing Speech** by Dean Faculty of Mathematics and Sciences	Prof. Dr. Hadi Suwono, M.Si.
12.00 – 13.00	Break	MC
13.00 – 16.00	Parallel Sessions (Room 10 - 18)	Operators & Parallel Moderators

An Individualized Chemistry Teaching Trial via Video Lessons Supplemented with 3D Hands on Materials during Covid-19 Pandemic

Mustafa Sözbilir,[1, a)] and Dilek Teke[1, b)]

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Abstract. Covid-19 Pandemic had a dramatic effect on practicing everyday routines including education. Due to the fatality the virus, schools are forced to close and in many cases remote teaching has become a necessity. Although, online teaching provides some solutions to the educational problems in difficult times such as pandemic, natural disasters or people who lives in remote areas, it does not develop still for the full capacity to meet the all challenges of distance education. Therefore, there still a way to go for effective online education. One of the most important challenges of online education is the aces to the hands on activities which we have in face to face education. In order to overcome this problem, we aimed in this study to investigate the possibility of using developing hands on supplementary materials and implement in during individualized education settings during Covid-19 pandemic to teach symbolic language of the chemistry in high school. It is hard to keep students' motivation and interest high towards chemistry in distance education. We thought providing supplementary hands on materials to students may enhance their motivation and interest towards chemistry and this may result more effective learning in individualized learning environment for the high school students. Within this framework, this study particularly aimed at examining the effect of video lessons supplemented with 3D hands on materials on strong intramolecular interactions to ninth grade students in an individualized instruction trial during Covid-19 lockdowns.

The design-based research approach has been implemented in development of the 3D instructional supplementary materials while the effectiveness study was designed as an intervention mixed design. Design-based research combines teaching methods and techniques with designed teaching materials and activities and produces products that have meet the teaching needs. In addition, it is a method that enables the emergence of effective teaching materials by making necessary evaluations in the application and analysis of the designs that are related to learning theories and will be developed in the research. This method is used in the design phase and will help to create practical designs that can be used to describe the symbolic language of chemistry by eliminating the deficiencies of the materials to be designed. In the implementation phase, mixed research design with intervention was used. This design is a research that provides a solution to the identified problem by adding qualitative data to the research process by implementing an intervention (experiment/treatment) program. During investigating the effectiveness of the teaching qualitative data were also used to better understand the effectiveness of the materials and their effect on success, as well as quantitative data.

The study group of the research consists of five students and four parents. After the materials designed and developed, produced with 3D printers, and educational videos supporting them are prepared, a pre-test is given to five students in the treatment group. The application has started with the delivery of materials and videos to the students. The students have tried to learn the subject on their own, that is, individually, by watching three videos and using 18 supplementary 3D Materials. The process is completed with the application of the post-test at the end of the application and the interviews with the students and their parents took place. Pre and posttest data were subjected to the gain score analysis and the interview data were content analyzed. The results showed that video lessons supplemented with 3D materials are enhanced students' understanding and long-term retention of the subject learned as well as improved visual and spatial abilities. 3D supplementary materials embody abstract concepts in chemistry. The results will be further discussed in the presentation.