



GEDUNG  
Prof. Dr. Syawal Gulfom, M.Pd.  
"Membangun Negeri dari Sekolah"

**SEMINAR NASIONAL KIMIA  
DAN PENDIDIKAN KIMIA  
JURUSAN KIMIA  
FMIPA  
UNIVERSITAS NEGERI MEDAN  
2020**

Sabtu 12 Desember 2020 Pukul 08.00 WIB s.d. selesai

Tema: Optimalisasi Sains, Teknologi  
dan Pembelajaran Kimia Menuju  
Manusia Indonesia Seutuhnya

Organized by:  
Jurusan Kimia FMIPA Unimed dan IA-Kimia Unimed

## DAFTAR ISI

<b>DAFTAR ISI</b>	ii
<b>KATA PENGANTAR</b>	viii
<b>SAMBUTAN DEKAN</b>	ix
<b>SUSUNAN DEWAN REDAKSI</b>	xi
<b>NASKAH PROSIDING</b>	
<i>Pengembangan Bahan Ajar Berbasis Proyek Pada Materi Asam Dan Basa Di Sekolah Menengah Atas</i>	1
Novelyani Siregar <sup>1*</sup> , Jamalum Purba <sup>2</sup>	1
<i>Upaya Peningkatan Motivasi dan Hasil Belajar Kimia Siswa Melalui Penerapan Model PBL Berbantuan Media Adobe Flash pada Materi Laju Reaksi</i>	6
Indah Ramadhan <sup>1</sup> , Bajoka Nainggolan <sup>2</sup>	6
<i>Perbedaan Aktivitas dan Hasil Belajar Siswa yang dibelajarkan Menggunakan Problem Based Learning dan Discovery learning Berbantuan Adobe Flash pada materi laju reaksi</i>	12
Nia Adelia <sup>1</sup> , Dewi Syafriani <sup>2</sup>	12
<i>Analisis Bahan Ajar Kimia Kelas Xi Sma/Ma Pada Materi Hidrokarbon</i>	18
Fadhilah Latief <sup>1*</sup> , Albinus Silalahi <sup>2</sup> , Nurfajriani <sup>2</sup>	18
<i>Penjernihan Minyak Jelantah Dengan Menggunakan Adsorben Sekam Padi Dan Serabut Kelapa</i>	24
Febi Ridhanisa	24
<i>Penggunaan RBDCNO untuk Menghasilkan Produk Oleokimia Terhidrogenasi pada Oleochemical Plant Berbasis Bahan Baku CPKO</i>	29
Pravil M. Tambunan <sup>1,*</sup> , Anna Juniar <sup>2</sup>	29
<i>Pengaruh Model Project Based Learning Berbasis Lesson Study Terhadap Kemampuan Berpikir Kritis Materi Laju Reaksi</i>	34
Veren Raenovta <sup>1,*</sup> dan Retno Dwi Suyanti <sup>2</sup>	34
<i>Pengaruh Strategi Pembelajaran Inquiry Dengan Media WEB Pada Materi Termokimia Terhadap Hasil dan Motivasi Belajar Siswa</i>	42
Bambang Enra Priando Purba <sup>1,*</sup> , Ida Duma Riris <sup>2</sup> dan Zainuddin Muchtar <sup>3</sup>	42
<i>Produksi Gas Hidrogen Dengan Metode Logam Direaksikan Dengan Asam Arrhenius</i>	48
Elsima Nainggolan <sup>1</sup> , Aura Fitriani Harahap <sup>2</sup> , Anna Chairunissa Siregar <sup>3</sup> , Aria Nanda <sup>4</sup>	48
<i>Optimalisasi Kemampuan Berpikir Kritis dan Penguasaan Konsep Mahasiswa melalui Penerapan Model Penemuan Konsep</i>	52
Elvinawati <sup>1</sup>	52

Pengembangan E-book Inovatif Pada Materi Laju Reaksi Untuk Meningkatkan Motivasi dan Hasil Belajar Siswa	58
<i>Fatimah Asri Jambak<sup>1,*</sup>, Iis Siti Jahro<sup>2</sup></i>	58
Pengembangan Bahan Ajar Berbasis Project Based Learning (Pjbl) Pada Materi Laju Reaksi Untuk Kelas Xi Sma	63
<i>Efrahim Melinda Br Purba<sup>1,*</sup> dan Marudut Sinaga<sup>2</sup></i>	63
Pengaruh Model Pembelajaran Inkuiri Terbimbing Berbasis Praktikum Terhadap Hasil Belajar Siswa Pada Materi Laju Reaksi	69
<i>Lili Nur Indah Sari Tarigan<sup>1,*</sup>, Hafni Indriati Nasution<sup>2</sup></i>	69
Pengembangan Bahan Ajar Kimia Berbasis Kontekstual pada Materi Kesetimbangan Kimia Di Kelas XI SMA	76
<i>Sahfitri Wirdani Nasution<sup>1,*</sup>, Saronom Silaban<sup>2</sup></i>	76
The Development of an Interactive Learning Material Based on Website on The Electrolyte and Non Electrolyte Solution Topic	83
<i>Fanny Fahiri<sup>1,*</sup>, Nora Susanti<sup>2</sup></i>	83
Pengembangan Media Interaktif Ispring Presenter Pada Materi Kesetimbangan Kimia	89
<i>Mutia Ardila<sup>1,*</sup>, Ajat Sudrajat<sup>2</sup></i>	89
Mini Review Pengembangan media e-learning pada Situasi Pandemi COVID -19	95
<i>Wan Azura<sup>1,*</sup>, Albinus Silalahi<sup>2</sup></i>	95
<i>Identifikasi Zat Pewarna Sintesis Dalam Minuman Sachet Dengan Kromatografi Kertas</i>	101
<i>Sri Adelila Sari<sup>1</sup>, dan Ade Novita Sari Lubis<sup>2</sup></i>	101
<i>Penjernihan Minyak Goreng Bekas (Jelantah) Dengan Menggunakan Daun Nanas (Ananas comosus) Sebagai Adsorben Teraktivasi dan Tidak Teraktivasi</i>	105
<i>Laras Arma Dita</i>	105
<i>Pengembangan Media Pembelajaran Berbasis Visualisasi 3D dan Animasi Molekul pada Sub Pokok Bahasa Bentuk Molekul di SMA</i>	111
<i>Putri Sintiani<sup>1,*</sup>, Novira Dewita<sup>2</sup> dan Asep Wahyu Nugraha<sup>3</sup></i>	111
<i>Pengembangan Media Pembelajaran Berbasis Ispring Presenter Untuk Meningkatkan Hasil Belajar Kimia Pada Materi Ikatan Kimia</i>	118
<i>Mahmud<sup>1,*</sup>, dan Shabra Arifa<sup>2</sup></i>	118
<i>The Implementation Of Problem Based Learning (PBL) With Audiovisual Media In Class X SMA</i>	122
<i>Tio Lyn Sihombing<sup>1</sup>, Marham Sitorus<sup>2</sup></i>	122
<i>Efektivitas Pembelajaran Daring Di Tengah Pandemi Covid-19 Terhadap Hasil Belajar Siswa Pada Materi Laju Reaksi</i>	125
<i>Yuni Ariyani Banjarnahor<sup>1</sup> dan Wesly Hutabarat<sup>2</sup></i>	125



<i>Penerapan Model Pembelajaran Problem Based Learning Berbantuan Flashcard Berbasis Online Pada Materi Ikatan Kimia</i>	133
Regina Pasaribu <sup>1*</sup> dan Agus Kembaren <sup>1</sup>	133
<i>Minyak Atsiri Dari Daun (Jeruk Purut Dan Serai) Dan Biji (Andaliman Dan Ketumbar) Menggunakan Metode Destilasi Uap</i>	139
Sri Adelila Sari <sup>1</sup> , dan Desi Heriyanti Nasution <sup>2</sup>	139
<i>Penerapan Lembar Kerja Mahasiswa Berbasis Masalah Terintegrasi Karakter Dalam Meningkatkan Hasil Belajar Asam Basa Di Perguruan Tinggi</i>	146
Nisyaa Syarifatul Husna <sup>1,*</sup> , Zainuddin Muchtar <sup>2</sup> , dan Eddiyanto <sup>2</sup>	146
<i>Pembuatan Pestisida Nabati Menggunakan Limbah Tanaman Dengan Campuran Puntung Rokok</i>	153
Gilbert Alberto Simon Gulo	153
<i>Merancang Alat Produksi Gas Hidrogen dengan Metode Sederhana</i>	158
Cessya Noviandra Br Tarigan <sup>1</sup> , Anastasia Gayatri M <sup>2</sup> , Cindy Fitria <sup>3</sup>	158
<i>Produksi Gas Hidrogen Menggunakan Alumunium Foil Dengan Bantuan Katalis Asam (Hcl) Dan Basa(Naoh)</i>	162
Desy Istanti Simbolon <sup>1*</sup> , Aisyah fitria Sari <sup>2</sup> , Ayu Inggrias Tuty <sup>3</sup>	162
<i>Pemanfaatan Bahan Alam dan Yoghurt untuk Pembuatan Masker Wajah</i>	166
Yossi Lestari Situmorang dan Sri Adelila Sari	166
<i>Perbedaan Hasil Belajar Dan Keterampilan Proses Sains Siswa Yang Dibelajarkan Menggunakan Inkuiri Terbimbing Dan Discovery Learning</i>	171
Selvi Hotnita Manik <sup>1,*</sup> , Anna Juniar <sup>2</sup>	171
<i>Penggunaan Model Pembelajaran Inkuiri untuk Meningkatkan Kemampuan Menulis Teks Berita</i>	178
Sanggup Barus <sup>1</sup> , Sahat Siagian <sup>2</sup> , Abdul Hasan Saragih <sup>3</sup>	178
<i>Pengaruh Model Inkuiri Terbimbing Terhadap Keterampilan Proses Sains Dan Hasil Belajar Siswa Pada Materi Titrasi Asam Basa</i>	185
Shela Jannata <sup>1,*</sup> , Anna Juniar <sup>2</sup>	185
<i>Pengaruh Multimedia ISpring Presenter Berbasis Problem Based Learning Terhadap Berpikir Kreatif Siswa Pada Laju Reaksi</i>	194
Nurfajriani <sup>1*</sup> , Nur Halimah <sup>2</sup> , Siti Hajar <sup>3</sup>	194
<i>Pengembangan Media Pembelajaran Kimia Menggunakan Media Prezi Pada Materi Larutan Elektrolit Dan Non Elektrolit</i>	201
Mhd.Rizki.Harahap <sup>1,*</sup> , Dahniar Siregar <sup>2</sup>	201
<i>Pengaruh Model Pembelajaran PBL dengan Media Bingo Pada Materi Laju Reaksi Terhadap Hasil Belajar dan Aktivitas Siswa</i>	207
Sofia Andini <sup>1,*</sup> , Ratu Evina Dibyantini <sup>2</sup>	207

<i>Kajian Enumerator Pengaruh Pandemi Covid 19 Terhadap Minat Pembelajaran Kimia Secara Daring Di Kecamatan Sumur Bandung, Bandung 2020</i>	215
Tiurma PT Simanjuntak STP Msi	215
<i>Implementasi Bahan Ajar Terintegrasi Nilai Spiritual Untuk Meningkatkan Hasil Belajar Siswa Ditinjau Dari Motivasi Belajar Siswa</i>	230
Nada Maghfira Meutia <sup>1*</sup> dan Ayi Darmana <sup>2</sup>	230
<i>Pengembangan Bahan Ajar Inovatif Topik Ikatan Kimia valiberdasarkan Problem Based Learning</i>	235
Izzatul khairi Sajida s <sup>1*</sup> , marini damanik <sup>2</sup>	235
<i>Implementasi Bahan Ajar Kimia Terintegrasi Nilai Spiritual Untuk Meningkatkan Minat dan Hasil Belajar Siswa</i>	241
Tia Utami <sup>1*</sup> dan Ayi Darmana <sup>2</sup>	241
<i>Pengaruh Media Pembelajaran Berbasis Visualisasi 3D dan Animasi Molekul Terhadap Hasil Belajar Bahasan Bentuk Molekul</i>	244
Novira Dewita <sup>1*</sup> , Putri Sintiani <sup>2</sup> dan Asep Wahyu Nugraha <sup>3</sup>	244
<i>Inovasi Bahan Ajar Berbasis Pendekatan SETS (Science, Environment, Technology And Society) Terintegrasi Nilai Islam Terhadap Peningkatan Hasil Belajar Siswa Pada Materi Laju Reaksi</i>	251
Rafika Utami <sup>1*</sup> Ayi Darmana <sup>2</sup>	251
<i>Penerapan Model Pembelajaran STAD dan Discovery Learning Berbantuan Macromedia Flash Untuk Meningkatkan Hasil Belajar Siswa</i>	256
Siti Aminah Br Bancin <sup>1*</sup> , Dewi Syafriani <sup>2</sup>	256
<i>Pengaruh Multimedia Articulate Storyline Berbasis Discovery Learning Terhadap Kemampuan Berpikir Kreatif Pada Materi Laju Reaksi</i>	261
Siti Hajar <sup>1*</sup> , Nurfajriani <sup>2</sup> dan Nur Halimah <sup>3</sup>	261
<i>Validasi Bahan Ajar Kimia Dasar Terintegrasi Nilai – Nilai Islam Berbasis Kontekstual</i>	268
Rizki Fitriani Nasution <sup>*1</sup> , Ayi Darmana <sup>2</sup> , Ajat Sudrajat <sup>3</sup>	268
<i>Desain dan Uji Coba Game Edukasi Berbasis Role Playing Game (RPG) pada Materi Sistem Periodik Unsur</i>	275
<i>Designing and Testing Role Playing Game (RPG) Based Education Game on Periodic System of the Elements Lesson</i>	275
Dina Liana <sup>1*</sup> , Yuni Fatisa <sup>2</sup>	275
<i>Pengembangan Media Pembelajaran Berbasis Animasi Menggunakan Adobe Flash Pada Materi Ikatan Kimia</i>	283
Luxy Grebers Swend Sinaga <sup>1*</sup> , Ayi Darmana <sup>2*</sup>	283
<i>Melatkan Keterampilan Proses Sains Mahasiswa Melalui Implementasi Model Pembelajaran Inkuiri Terbimbing Pada Materi Analisis Anion</i>	288
Anna Junior <sup>1*</sup> dan Privil Mistryanto Tambunan <sup>2</sup>	288

<i>Pengaruh Pemakaian Media Power Point (PPT) dan Media Alat Peraga dengan Berbasis Problem Based Learning Terhadap Hasil Belajar Siswa SMA pada Pokok Bahasan Ikatan Kimia</i>	293
Nisa Qurrata Aini <sup>1*</sup> , Jasmidi <sup>1</sup> , Putri Sintiani <sup>1</sup> , dan Novira Dewita <sup>1</sup>	293
<i>Pengembangan Media Pembelajaran Berbasis Android Pada Materi Laju Reaksi</i>	298
Siti Zubaidah <sup>1*</sup> , Zainuddin Muchtar <sup>2</sup>	298
<i>Implementasi Bahan Ajar Kimia Terintegrasi Nilai-Nilai Spiritual untuk Meningkatkan Hasil Belajar Ditinjau dari Minat Belajar Siswa</i>	305
Annisa Sylvia Nurfikalana Simbolon <sup>1</sup> , Ayi Darmana <sup>2</sup>	305
<i>Pengembangan Media Pembelajaran Mobile Learning Pada Materi Termokimia</i>	313
Kelvin Martinus Bago , Zainuddin Muchtar	313
<i>Penerapan Media Monopoli Berbasis Teams Games Tournament (TGT) Hasil Pengembangan Dalam Pembelajaran Ikatan Kimia</i>	320
Bajoka Nainggolan <sup>1*</sup> , Nurul Chairina Batubara <sup>2</sup>	320

## **KATA PENGANTAR**

Puji Syukur atas Kehadirat Allah SWT atas Rahmat yang diberikan-NYA sehingga Prosiding Seminar Nasional Kimia dan Pendidikan Kimia serta pelantikan Ikatan Alumni Periode 2020-2024 Jurusan Kimia Unimed selesai tersusun dan dapat kami hadirkan ke hadapan pembaca. Prosiding ini adalah kumpulan dari artikel pada bidang Kimia dan Pendidikan Kimia.

Penyebarluasan hasil penelitian ini diharapkan dapat mendukung pertumbuhan dan penguatan kerjasama mitra dengan Unimed. Hal ini berarti pengupayaan untuk menempatkan hasil penelitian sebagai bagian dari kegiatan penumbuhan budaya IPTEK Inovatif. Melalui langkah-langkah yang konkrit dan terpadu dalam mengelola hasil-hasil penelitian di Jurusan Kimia. Jurusan Kimia FMIPA UNIMED terus berupaya untuk meningkatkan kualitas dalam tridarma Perguruan Tinggi khususnya dalam bidang penelitian mahasiswa dan dosen untuk menjadi lebih baik. Penerbitan Prosiding ini diharapkan dapat memberikan kemudahan bagi masyarakat dan stakeholder lainnya dalam mengakses hasil penelitian yang telah dilaksanakan.

Jurusan kimia FMIPA Unimed mengucapkan terima kasih dan penghargaan yang setinggi-tingginya kepada semua pihak yang telah membantu terselenggaranya penulisan prosiding ini.

Medan, Desember 2020  
Ketua Jurusan Kimia

Dr. Ayi Darmana, M.Si



## **KATA SAMBUTAN DEKAN FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM UNIVERSITAS NEGERI MEDAN**

Assalamu'alaikum warahmatullahi wabarakatuh

Selamat pagi dan salam sejahtera untuk kita semuanya

Puji dan syukur marilah senantiasa kita panjatkan kehadiran Allah swt, karena berkat rahmat dan hidayah-Nya kita dapat hadir di tempat ini untuk mengikuti kegiatan Seminar Nasional Kimia dan Pendidikan Kimia serta Pelantikan Ikatan Alumni periode 2020 – 2024 Jurusan Kimia Unimed tahun 2020 yang diselenggarakan oleh Jurusan Kimia bekerjasama dengan Ikatan Alumni Jurusan Kimia FMIPA Unimed. Kami ucapkan **Selamat datang** kepada seluruh peserta kegiatan Seminar Nasional Kimia dan Pendidikan Kimia serta Pelantikan Ikatan Alumni periode 2020 – 2024 Jurusan Kimia Unimed.

Pelaksanaan kegiatan Seminar pada kondisi pandemik saat ini memiliki tantangan tersendiri karena semua aktivitas yang kita lakukan harus mengikuti protokol kesehatan, sehingga pelaksanaan kegiatan ini dilakukan secara virtual. Ke depan pelaksanaan Seminar Nasional secara virtual ini dapat dijadikan peluang karena pelaksanaannya bisa lebih murah dan efisien, sehingga bentuk pertukaran informasi dan kolaborasi dapat dilakukan dengan cara-cara yang lebih efisien.

Sebagai salah satu lembaga Pendidikan Tinggi, Fakultas Matematika dan Ilmu Pengetahuan Alam Universitas Negeri Medan berpartisipasi aktif dalam menyelenggarakan program/kegiatan yang dapat meningkatkan kualitas sumber daya manusia dan pengembangan sains dan teknologi di masa yang akan datang. Pada kegiatan Seminar Nasional Kimia dan Pendidikan Kimia serta Pelantikan Ikatan Alumni periode 2020 – 2024 Jurusan Kimia Unimed tahun 2020 mengambil tema: Optimalisasi Sains, Teknologi, dan Pembelajaran Kimia Menuju Manusia Indonesia Seutuhnya dengan keynote speaker Prof. Dr. H. R Asep Kadarohman, M.Si, Muhammad Haris Effendi Hasibuan S.Pd, M.Si, Ph.D, Dr. Ayi Darmana, M.Si, dan Dr. Murniaty Simorangkir, MS dengan invited speaker Imam Kusnodin, M.Pd dan Ahmad Nawawi S.Pd, M.Pd. Dalam kegiatan ini juga akan dilakukan pelantikan pengurus Ikatan Alumni Jurusan Kimia FMIPA Unimed. Selain kedua aktivitas tersebut pada kegiatan ini juga akan dilakukan Seminar parallel dalam bidang pendidikan kimia dan ilmu kimia, melalui aktivitas tersebut diharapkan terjadi tukar menukar informasi sehingga dapat diwujudkan kolaborasi dalam kegiatan penelitian, publikasi ilmiah, dan kegiatan pengabdian kepada masyarakat.

Dekan Fakultas Matematika dan Ilmu Pengetahuan Alam sebagai kepanjangan tangan dari pimpinan Universitas Negeri Medan mendukung sepenuhnya pelaksanaan kegiatan Seminar Nasional Kimia dan Pendidikan Kimia serta Pelantikan Ikatan Alumni periode 2020 – 2024 Jurusan Kimia Unimed ini serta mengucapkan terimakasih kepada seluruh personil kepanitiaan yang telah bekerja keras, sehingga kegiatan ini dapat diselenggarakan dengan baik. Saya berharap semoga kegiatan ini dapat memberikan manfaat positif terhadap pengembangan



kualitas sumberdaya manusia dan pengembangan sains dan teknologi di masa yang akan datang.

Akhir kata, jika masih terdapat kekurangan dalam penyelenggaraan kegiatan ini, atas nama civitas akademika Fakultas Matematika dan Ilmu Pengetahuan Alam Universitas Negeri Medan, kami mohon maaf yang sebesar-besarnya. Saya mengucapkan **Selamat** mengikuti kegiatan kegiatan Seminar Nasional Kimia dan Pendidikan Kimia serta Pelantikan Ikatan Alumni periode 2020 – 2024 Jurusan Kimia Unimed, dengan memohon kepada Allah swt, semoga apa yang kita harapkan pada kegiatan ini dapat terwujud.

Wassalamu'alaikum warahmatullahi wabarakatuh

Medan, Desember 2020  
Dekan FMIPA UNIMED

Prof. Dr. Fauziyah Harahap, M.Si



THE  
*Character Building*  
UNIVERSITY

**PROSIDING  
SEMINAR NASIONAL KIMIA DAN PENDIDIKAN KIMIA  
JURUSAN KIMIA FMIPA UNIMED**

**Gedung Prof. Dr. Syawal Gultom, MPd  
FMIPA Universitas Negeri Medan, Medan 12 Desember 2020**

**PENANGGUNG JAWAB:**

Prof. Dr. Fauziah Harahap, M.Si  
Dr. Ayi Darmana, M.Si

**DEWAN REDAKSI**

Dr. Asep Wahyu Nugraha, M.Si  
Dr. Zainuddin Muchtar, M.Si  
Dr. Sri Adelila Sari, SPd, M.Si  
Dr. Lisnawaty Simatupang, S.Si, M.Si  
Dra. Hafni Indriati Nasution, M.Si.  
Nora Susanti, S.Si., M.Sc., Apt.  
Drs. Jasmidi, M.Si  
Dra. Anna Juniar, M.Si

**REVIEWER:**

Prof. Dr. Albinus Silalahi, MS  
Prof. Dr. Retno Dwi Suyanti, M.Si  
Dr. Ani Sutiani, M.Si  
Dr. Destria Roza, M.Si  
Dr. Sri Adelila Sari, SPd, M.Si  
Dr. Junifa Layla Sihombing, S.Si., M.Sc.  
Dr. Murniaty Simorangkir, M.Si  
Dr. Ahmad Nasir Pulungan, M.Sc

**EDITOR:**

Haqqi Annazili Nasution, S.Pd., M.Pd.  
Ricky Andi Syahputra, S.Pd, M.Sc  
Siti Rahmah, S.Pd., M.Sc  
Susilawati Amdayani, S.Si., M.Pd.  
M. Isa, S.Si., M.Pd

# Prosiding Semnaskim

Jurusan Kimia FMIPA  
Universitas Negeri Medan  
ISBN 978-602-9115-73-4

## The Development of an Interactive Learning Material Based on Website on The Electrolyte and Non Electrolyte Solution Topic

Fanny Fahiri <sup>1,\*</sup>, Nora Susanti <sup>2</sup>

<sup>1</sup>*Kimia, Universitas Negeri Medan, Medan*

<sup>2</sup>*Kimia, Universitas Negeri Medan, Medan*

*\*fannyfashiri21@gmail.com*

---

### Abstract:

This study aims to know the feasibility of an interactive learning material based on a website that innovated based on BSNP. The research method used Research and Development (R&D) with the ADDIE models which consist of five stages are analysis, design, development, implementation, and evaluation. Data collected technique used for feasibility was a questionnaire of BSNP was given to experts lecture. The analysis results of this research are the interactive learning material based on the website was feasible that used questionnaire of BSNP showed a score of the truth, breadth, and depth of concept aspects was 4.66, material and question device aspects was 4.56, language structure aspects was 5.0, display of media aspects was 4.83, software engineering aspects was 4.33, usefulness aspects was 4.66. The average score overall validation of interactive learning material based on the website on the electrolyte and nonelectrolyte solution topic was 4.67. The average score overall validation of interactive learning material based on the website on the electrolyte and nonelectrolyte solution topic shows that this media is very eligible and can be used in the learning process.

### Keywords:

*Interactive Learning Material, Website, Electrolyte and Non Electrolyte Solution*

---

### PRELIMINARY

The development of science and technology today has grown so rapidly in all aspects of life, especially in the field of education and learning. This has an impact on various aspects of human life, including in education (Linda et al. 2018). Education in Indonesia has now entered the era of industrial revolution 4.0. This era was marked by advances in information technology as the main media in helping human life. The development of the digital era technology provides various positive impacts in supporting the success of the science learning process. Information technology can be used as an alternative to facilitate the needs of interactive learning media in schools. Education is a human effort to develop its potential through the learning process to achieve the goals of national education. One way to achieve the

goal of national education is to improve the quality of education in every level of education that exists through the development of the curriculum (Kurniawan et al. 2018).

Using media in the chemistry learning process will affect students in understanding the subject matter delivered by the teacher more interesting because it can describe the material is becoming more real for giving positive influence of student learning outcomes (Listantia & Sumarti, 2015). The attractive learning media can invite students to interact directly with learning material. Learning the material in student memory that is transcribed with the right media can last a long time because of the nature of the media that has a strong stimulus (Rahmawan & Sukarmin, 2013).

Chemistry in science learning, in particular, recognized the electrolyte and non-electrolyte solution. At the macroscopic

level of material electrolyte and non-electrolyte solution, students learn through real observations of a phenomenon that is seen in daily experience, for example, the symptoms of electric conductivity through a solution. At the microscopic level, students learn the structure and processes at the particle level (molecules or ions) of the observed macroscopic phenomena, for example, the characteristics of electric conductivity and the ability of a solution to conduct electric current. Learning that can facilitate independent learning makes students interested in learning the electrolyte and non-electrolyte solution material using learning media (Dewi, 2014).

The impact of the use development of an interactive learning media can improve the quality of the learning process and in turn can enhance learning outcomes, among others, be more interesting learning that can motivate students to learn, the learning material will be clearer meaning that students easily achieve learning goals, to combine multiple methods of learning, and students more actively in learning activities (Tambunan, 2013).

Web-based learning applications are expected to be a medium/facility with displays text, images, animation, and display multimedia such as videos and animations used to help provide more time and space and be an interesting learning media innovation. The development of the web is expected to be beneficial because it has the potential to be used as a medium for the delivery of teaching materials (Supriyono et al. 2015).

Research that is relevant to website development is done by (Kurniyahayati & syamsurizal, 2012) to develop e-learning using the website in helping in chemistry learning especially stoichiometry. The results showed that online Web-based chemistry learning media can improve student interest to learn chemistry and effective to enhance student's comprehension of stoichiometry.

In this research, a website-based interactive learning media will be developed as a product to improve the quality of

education in the chemistry learning process. The use of educational media can help students learning processes in teaching and learning which in turn can enhance learning outcomes that are not limited by distance and time (Pratomo & Irawan, 2015). The benefits of this interactive module learning media are expected to motivate students to learn independently, creatively, effectively, and efficiently. In addition to this interactive module learning media, it is expected to reduce student boredom because all this time the learning process carried out is only centered on the teacher which causes students to become bored and bored, causing student motivation to decrease.

## METHOD

This research was conducted at the Department of Chemistry, Faculty of Mathematics and Natural Science (FMIPA), Universitas Negeri Medan. The time of this research was carried out from February till May 2020.

This research is an ADDIE model of research and development (Haryati, 2012). Product development that is oriented to the learning software in the form of web-media used to overcome learning problems in the classroom. The interactive learning material based on website that can be accessed and used by lectures. The steps of this model include analysis, design, development, implementation, and evaluation.

The population in this research was all chemistry lecturers at Universitas Negeri Medan. Samples for this research were two chemistry lectures that was designated by purposive sampling.

## Interactive Learning Material

The interactive learning material based on website used in the research was developed and implemented. It can be used after the learning material was valid. The initial step after made learning material was validation it to the expert validator as much as two validators or expert lecturer. There were four aspects that could be observed on the learning material, (1) feasibility aspects of



truth, breadth, and depth of concept, (2) feasibility aspects of the material and questions, (3) the feasibility aspect of the language structure, (4) feasibility aspects of the media display, (5) feasibility aspects of software engineering, and (6) feasibility aspects of usefulness.

Validation has been done by the lecture experts to know the feasibility of the product development. Validation is done using a poll that contains questions about different aspects of product eligibility. The poll contains criteria of questions using the 1-5 scale. The validity category can be seen in Table 1.1 and the media expert validation data can be seen in Table 1.1.

**Tabel 1.1.** Validation Category

Range of Average Score	Score Classification	Feasibility Assessment
$X > 4.2$	Very Good	Very Eligible
$3.4 < X \leq 4.2$	Good	Eligible
$2.6 < X \leq 3.4$	Fair	Fair
$1.8 < X \leq 2.6$	Poor	Poor
$X \leq 1.8$	Very Poor	Very Poor

Assessment of the lecture experts is used to analyze the validity of learning media developed. The average score from each aspect of validity is calculated by the formula:

$$\bar{x} = \frac{\sum x}{n}$$

where:

$\bar{x}$  = average score

$\sum x$  = Sum of score

$n$  = Sum of reviewers

## RESULT AND DISCUSSION

The results of validation indicate that the integrated website-based chemistry learning evaluation is valid and feasible to be used as one of the learning resources used in school. The results of the validation of lecture experts are presented below. This can be seen in Table 1.2 below.

**Tabel 1.2.** Validation Result of Validator 1

Indicator	Validator		Average
	I	II	
Truth, Breadth, and Depth of Concept	4.33	5.00	4.66
Material and Question Device	4.28	4.85	4.56
Language Structure	5.00	5.00	5.00
Display of Media	5.00	4.67	4.83
Software Engineering	4.67	4.00	4.33
Usefulness	4.50	4.83	4.66
Total	4.63	4.72	4.67

Based on table 1.2, regarding the formula for converting the actual score into a five scale value. Data results from the first validator can be seen briefly, it is known that the average score ( $x$ ) for the six aspects of 4.63 which is located in the range of  $x \geq 4.2$  which means included in the criteria is very good and very eligible. Data results from the second validator can be seen briefly in table 1.3, regarding the formula for converting the actual score into a five scale value, it is known that the average score ( $x$ ) for the six aspects of 4.72 which is located in the range of  $x \geq 4.2$  which states that the product developed is included in the category of very good and very eligible.

The validation assessment results from both experts get an average in the range of  $x \geq 4.2$  which means it included in the criteria is very valid. This means that the media of website that is developed deserve to be used as interactive learning material. The result of interactive learning material based on website development is valid because it has fulfilled the criteria of standardized eligibility.

Based on the table, the results of this are the interactive learning material based on the website was feasible that used questionnaire of BSNP showed a score of each aspect, this

means that the validator gives a positive opinion on the website created so that the website-based interactive learning material is declared valid. Recapitulation of Validation result by experts can be seen briefly in Figure 1.1

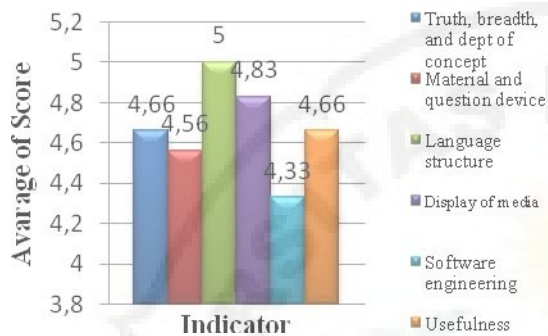


Figure 1.1 Graph of average validation results

The assessment was given by two lectures done by giving a poll that contains a variety of questions about the feasibility aspect in the development of interactive learning material based on the website. The validation assessment results from both experts get a total of average is 4.67 which means included in the criteria is valid. This means that the interactive learning material based on the website on the electrolyte and nonelectrolyte solution topic development deserves to be used as learning.

Based on figure 1.1 could be shown that used questionnaire of BSNP showed a score of the truth, breadth, and depth of concept aspects was 4.66, material and question device aspects was 4.56, language structure aspects was 5.0, display of media aspects was 4.83, software engineering aspects was 4.33, and usefulness aspects was 4.66. The average score overall validation of interactive learning material based on the website on the electrolyte and nonelectrolyte solution topic was 4.67. This showed that the validator gives a positive response to the interactive learning material based on the website, so it was very valid for implementation of learning and did not need to be revised.

## CONCLUSION

Based on the result of research, can be concluded that innovative learning material has been developed and the feasibility assessment of interactive learning material based on the website, showed a score of the truth, breadth, and depth of concept aspects was 4.66, material and question device aspects was 4.56, language structure aspects was 5.0, display of media aspects was 4.83, software engineering aspects was 4.33, usefulness aspects was 4.66.

The average score overall validation of interactive learning material based on the website on the electrolyte and nonelectrolyte solution topic was 4.67. The average score overall validation of interactive learning material based on the website on the electrolyte and nonelectrolyte solution topic show that the average score is shown that the interactive learning material was very feasible and can be used in the chemistry learning.

## Give Thanks

Thank you to God who has provided smoothness in the completion of this article. On this occasion, the author also thanks Nora Susanti, S.Si., M.Sc., Apt, as a supervisor who has provided much guidance and suggestions to the author so the author can complete this article quite well.

Thanks to all parties involved who helped provide smoothness in the process of making this article. The author has tried as much as possible in the completion of this article, but the authors realize there are still many weaknesses both in terms of content and grammar, for that the authors expect suggestions and constructive criticism from readers for the perfection of this article. This article may be useful in enriching the treasury of education.

## REFERENCES

Dewi, A.C., (2014). Pengembangan Modul Kimia Berbasis Problem Based Research (PBR) pada Materi Larutan Elektrolit

# Prosiding Semnaskim

Jurusan Kimia FMIPA  
Universitas Negeri Medan  
ISBN 978-602-9115-73-4

- dan Nonelektrolit. *Jurnal Prisma Sains*, 3(2): 369-372.
- Haryati, S., (2012). Research and Development (R&D) Sebagai Salah Satu Model Penelitian Dalam Bidang Pendidikan. *Jurnal UTM*, 37:11-26.
- Kurniawan, R., Nasruddin, H., & Mitarlis. (2018). Practicing The Student's Communication Skills Through The Application of Guided Inquiry on The Reaction Rate Material at XI Grade SMAN 1 Cerme-Gresik. *UNESA Journal Chemical Education*, 7(1): 1-7.
- Kurniyahayati, D., & Syamsurizal. (2012). Development of Web Centric Course Based Learning on Stoichiometry to Increase Student Learning Motivation in SMA Titian Teras Jambi. *Edu-Sains*, 1(1): 38-44.
- Linda, R. Abdullah., & Shafiani, N. (2018). Development of Interactive Multimedia Based on Lectora Inspire in Chemistry Subject in Junior High School or Madrasah Tsanawiyah. *Journal of Educational Sciences*, 2(1): 46-55.
- Listantia, L., & Sumarti, S. (2015). Pengembangan Media Pembelajaran Flash Berbasis Guided Discovery Untuk Hasil Belajar Siswa. *Journal Chemistry in Education*, 4 (2), 22-28.
- Pratomo, A., & Irawan, A. (2015). Pengembangan Media Pembelajaran Interaktif Berbasis Web Menggunakan Metode Hannafin dan Peck. *Jurnal POSITIF*, No.1 : 14-28.
- Rahmawan. A., & Sukarmin. (2013). Pengaruh Penerapan Media Animasi Terhadap Pergeseran Konsep Siswa Pada Ketiga Level Representatif Kimia (Makroskopis, Submikroskopis, Dan Simbolik) Pada Materi Pokok Larutan Penyangga Untuk Siswa Kelas XI SMAN 1 Kertosono Nganjuk. *Unesa Journal Of Chemical Education*, II (2), 95-100.
- Supriyono, H. Sujalwo. Sapetra, A., & Rahayu, T. E. (2015). Pelatihan Pengembangan Media Pembelajaran Berbasis Web, *Warta*, 18 (2): 98-109.
- Tambunan, H., (2013). Interactive Learning media based Visual Basic and Smoothboard. *Research Journal of Science & IT Management*, 2(6): 18-23.