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Proceeding

The 2nd International Conference of
the Indonesian Chemical Society 2013

ICCS 2013

Research in Chemistry for Better Quality of Environmental

Universitas Islam Indonesia, Yogyakarta, Indonesia
October, 22 - 23th 2013

Abdul Kahar Muzakkir, Conference Hall
Universitas Islam Indonesia (UII), Yogyakarta.
Kampus Terpadu, Jl. Kaliurang KM 14,5 Sleman, Yogyakarta.

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The 2nd International Conference of the Indonesian Chemical Society 2013
October, 22–23rd 2013

Preface

The international conference is an annual conference of the Indonesian Chemical Society (Himpunan Kimia Indonesia, HKI). In the year 2013, the mandate of the organizing committee was given to the HKI Yogyakarta branch and also supported by Department of Chemistry of Universitas Negeri Yogyakarta (UNY), Department of Chemistry of Universitas Gadjah Mada (UGM), Department of Chemistry of Universitas Islam Negeri Sunan Kalijaga (UIN Suka), National Nuclear Energy Agency (BATAN Yogyakarta), and Volcano Investigation and Technological Development Center (BPPTK Yogyakarta). For the year 2013, ICICS 2013 is hosted by Department of Chemistry, Faculty of Mathematics and Natural Sciences, Islamic University of Indonesia, Yogyakarta from October 22 – 23, 2013. This conference was also prepared to celebrate 70th anniversary of Universitas Islam Indonesia.

The Scientific Programme of ICICS2013 comprises the following:

1. Invited Speaker 11 papers
2. A total 256 paper for parallels sessions
 - a. Organic Chemistry 32 papers
 - b. Inorganic Chemistry 43 papers
 - c. Physical Chemistry 37 papers
 - d. Analytical Chemistry 68 papers
 - e. Education Chemistry 23 papers
 - f. Biochemistry 43 papers

The breakdown of the presentation is as follows:

Session	Oral	Poster	Total
Invited Speaker	11	0	11
Organic Chemistry	25	7	32
Inorganic Chemistry	38	5	43
Physical Chemistry	31	6	37
Analytical Chemistry	61	7	68
Education Chemistry	22	1	23
Biochemistry	34	8	43
Total	222	34	256

Yogyakarta, 25th November 2013

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Editors

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Welcoming Address by The Organizing Committee



Assalamu'alaikum Wr. Wb.

Honorable Rector of Universitas Islam Indonesia
The distinguished invited speakers, and
All participants of the ICICS 2013

Welcome you at the 2nd International Conference of the Indonesia Chemical Society 2013 (ICICS 2013) this morning here at the Auditorium Kahar Muzakkir Universitas Islam Indonesia, Yogyakarta. The international conference is an annual conference of the Indonesian Chemical Society (Himpunan Kimia Indonesia, HKI). In the year 2013, the mandate of the organizing committee was given to the HKI Yogyakarta branch and also supported by Department of Chemistry of Universitas Negeri Yogyakarta (UNY), Department of Chemistry of Universitas Gadjah Mada (UGM), Department of Chemistry of Universitas Islam Negeri Sunan Kalijaga (UIN Suka), National Nuclear Energy Agency (BATAN Yogyakarta), and Balai Penyelidikan dan Pengembangan Kegunungapian (BPPTK Yogyakarta). For the year 2013, the honor of hosting ICICS 2013 has been given to the Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Islam Indonesia, Yogyakarta. This conference was also prepared to celebrate 70th anniversary of Universitas Islam Indonesia.

The conference comprises both oral and poster presentation in English and Indonesian with optional post conference publication of full papers in English in the *Procedia Chemistry* (Elsevier, ISSN: 1876-6196) and *Proceeding Conference for Indonesian language*. There are 211 papers presented orally and 34 papers presented by poster covering wide-variety subjects of chemistry. We invited 6 Indonesian invited speakers, 2 Japan invited speakers, 1 Australian invited speakers, 1 Saudi Arabia invited speakers, and 1 Malaysian Invited speakers.

We hope you will enjoy a pleasant and valuable seminar at Universitas Islam Indonesia

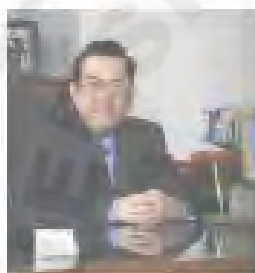
Wassalamu'alaikum Wr. Wb.



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Opening Speech from the Rector of Universitas Islam Indonesia



Assalamu'alaikum Wr. Wb
The distinguished invited speakers, and
All participants of the ICICS 2013

Firstly, I would like to express my great appreciation to the Department of Chemistry UII as one of the organizers of the program The 2nd International Conference of the Indonesian Chemical Society 2013 (ICICS 2013) with the theme "Research in Chemistry for Better Quality of Environmental". I am proud that this interesting event is being organized and held in Yogyakarta.

As the biggest and the oldest private university in Yogyakarta, University Islam Indonesia is committed to the excellence in research and teaching. Recently, we are preparing UII as one of the world class universities.

Knowing that committee has selected outstanding speakers from various prestigious institutions, I believe that all of the participants will enjoy the discussion of issue covered by the topic of this seminar. Scientist have shown that the environment's condition is increasingly critical, and human industrial activities are largely to blame. In fact that environmental damage is a crisis we caused together, therefore, a responsibility we all share together. We are deeply concerned with the issues and opportunities in the internationalization of sciences for better life, sciences have to make better quality of environmental.

Finally, I would once again like to thank the organizer for organizing this event, and to thank all the participants attending this ICICS 2013 event as well as delivering their scientific presentations. I do really hope that you can enjoy this seminar and have excellent stay in Yogyakarta.

Wassalamu'alaikum Wr. Wb

Prof. Dr. Edy Suandi Hamid, M.Ec.
Rector of Universitas Islam Indonesia

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Remarks by the Chairman of the Indonesian Chemical Society (Himpunan Kimia Indonesia, HKI)



Indonesian Chemical Society (Himpunan Kimia Indonesia, HKI) is an independent, nonprofit organization founded in February 1962 to facilitate communication among Indonesian chemists and other professionals from chemistry related fields, and to promote the advancement of science, education, and application of chemistry to support the better life of mankind. HKI organize activities to enhance communication and collaboration among chemists in various institutions in Indonesia, to disseminate new knowledge and research results in chemistry and related fields, to improve the knowledge and

skills of chemists working in schools, universities, industries, research institutes, and other sectors, to nurture a scientific temper on school children to ensure strong capabilities of future chemists that are needed for humankind, and other activities that support its missions. HKI holds various academic conferences, publishes several journals, supports the development of scientific information systems in Indonesian; organize training for chemists in various sectors, etc.

The 2013 International Conference of the Indonesian Chemical Society will be the 2nd event in the ICICS conference series, started in 2012, that brings together individuals involved in chemistry-related fields (chemistry, pharmacy, environmental science, chemical engineering, molecular biology, material science, education chemistry, etc.) or institution in chemistry-related sectors. The First International Conference of the Indonesian Chemical Society 2012 is organized by East Java Branch of HKI in collaboration with chemistry departments at several universities in East Java: ITS, UB, UIN Maliki, UM, UMC, Unair, Unej, and Unesa.

ICICS 2013 will be organized by the Indonesian Chemical Society Yogyakarta branch. The international conference was supported by the Indonesian Chemical Society (Himpunan Kimia Indonesia, HKI), Department of Chemistry of Universitas Negeri Yogyakarta (UNY), Department of Chemistry of Universitas Gadjah Mada (UGM) and Department of Chemistry of Universitas Islam Negeri Sunan Kalijaga (UIN Sunan Kalijaga). For the year 2013, the honor of hosting ICICS-2013 has been given to the Department of Chemistry, Faculty of Mathematics and Natural Sciences, Universitas Islam Indonesia (UII), Yogyakarta, Indonesia.

Congratulations to the ICICS 2013 committee for this conference.

Dr. Muhamad Abdulkadir Martoprawiro
Chairman of the Indonesian Chemical Society

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3. Rector of Islamic University of Indonesia
4. Rector of Gadjah Mada University
5. Rector of Yogyakarta State University
6. Rector of State Islamic University of Sunan Kalijaga
7. Head of Geological Agency of Indonesia
8. Head of National Nuclear Energy Agency of Indonesia

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Studi Perbandingan Penggunaan Multimedia dan Media Sederhana pada Hasil Belajar Kimia Siswa SMA

Azhari Umar Siragar

Jurusan Kimia FMIPA Universitas Negeri Medan, Jl. Willem Iskandar Psr. V Medan, Sumatera Utara,
Indonesia

Abstract

This research aims to find out the difference between learning outcome from multimedia class and simple media class of students in teaching atomic structure. Background of this study is because of the characteristic very abstract; we need more effort for construct the atomic concept in student's idea specially in using media. As a basic concept, if we wrong to comprehend the atomic idea, there will be very difficult to study about chemistry. So, the concept was very important. This is a quasi-experimental study with a pretest – posttest control and one-school study case. There are three class with 38 students of SMLAN 1 Padangsidimpuan Timur at 2008-2009 academic year in each class as the population of this study. There only two class with random sampling used as sample of this study: Class A/X₁ (using multimedia in teaching atomic structure) and B/X₂ (using simple media in teaching atomic structure). The instrument of this study is the test that already valid and reliable. The data were analyzed by t test. The result showed that multimedia is more effective than simple media ($t_{count} (4,15) > t_{table} (1,99)$).

Kata kunci : Multimedia, media sederhana, pembelajaran kimia, hasil belajar, struktur atom

Pendahuluan

Dalam pelajaran kimia terdapat berbagai konsep, dari konsep yang sederhana sampai konsep yang lebih kompleks dan abstrak. Konsep-konsep ini saling berhubungan satu sama lain dan akan terus berkembang sesuai dengan naiknya tingkatan/kelas daripada siswa. Banyaknya konsep kimia yang bersifat abstrak yang harus diserap siswa dalam waktu relatif terbatas menjadikan ilmu kimia merupakan salah satu mata pelajaran tersulit bagi siswa saat ini. Struktur atom merupakan salah satu konsep dasar kimia yang bersifat abstrak. Anderson (P. Suparno, 2005) menemukan di tengah siswa berumur 12-16 tahun di Swedia, berpikir bahwa atom itu mempunyai bermacam-macam bentuk seperti persegi, bulat, lonjong dan lain-lain. Padahal sebenarnya teori atom modern menyatakan bahwa struktur dari atom seperti bola tiga dimensi yang mana letak elektron merupakan kebolehhajian. Media sebagai salah satu bentuk dan saluran yang digunakan untuk menyampaikan pesan dan informasi. Seorang guru bisa menggunakan media apa saja dan kapan saja tidak hanya untuk konsep yang abstrak seperti struktur atom untuk meningkatkan pemahaman maupun motivasi siswa serta mencegah terjadinya kesalahpahaman (W. Sanjaya, 2008). Ada banyak jenis media yang telah kita kenal, Bretz, Duncan (A. Simanjuntak, 2006) membagi media berdasarkan pemanfaatannya untuk dunia pendidikan ditinjau dari segi biaya, kelangkaan dan keluasan lingkungan

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sasarannya, kemudahan pengadaan serta penggunaan dan tingkat kerumitan perangkat media yang dipergunakan atas media sederhana dan media rumit (multi). Tetapi perlu diingat setiap media pasti memiliki kelebihan dan kekurangan.

Materi Struktur Atom dirasakan sulit oleh siswa kemungkinan besar karena mereka baru saja mempelajari ilmu kimia. Masih awal mempelajari ilmu kimia siswa sudah langsung terbebani dengan materi yang konsepnya sangat abstrak dimana teori tentang atom hanya bisa ditelusuri dari hasil-hasil penelitian ahli-ahli jaman dahulu.

Metode Penelitian

Penelitian ini menggunakan metode eksperimen semu (*quasi eksperimental design*) (Sugiyono, 2010) dengan populasi seluruh siswa SMA Negeri 1 Padangsidempuan Timur dan dilaksanakan pada awal semester Tahun Ajaran 2008/2009, tepatnya pada bulan Juli 2008. Populasi dalam penelitian ini adalah siswa kelas X. Sampel dalam penelitian ini diambil sebanyak 2 kelas ditentukan secara acak, yaitu satu kelas dengan penggunaan multimedia/VCD (A) dan satu kelas dengan menggunakan media sederhana/chart (B). Instrumen yang digunakan dalam pengumpulan data penelitian adalah tes dalam bentuk pilihan berganda sebanyak 30 soal. Penyusunan tes berpedoman pada Kurikulum Tingkat Satuan Pendidikan (KTSP) Materi Pokok Struktur Atom. Sebelum dijadikan alat pengumpul data, instrumen terlebih dahulu diujicobakan validitas dan reliabilitas tes tersebut kepada siswa di luar sampel.

Untuk mendeskripsikan data setiap variabel penelitian digunakan statistik deskriptif, yaitu mendefinisikan, mencatat dan menganalisis data. Setelah data terkumpul dilakukan pengujian antara lain:

- 1) Menghitung rata-rata atau menentukan rata-rata hirung untuk masing-masing variabel,
- 2) Menentukan simpangan baku masing-masing variabel,
- 3) Uji Homogenitas,
- 4) Pengujian hipotesis menggunakan uji t.

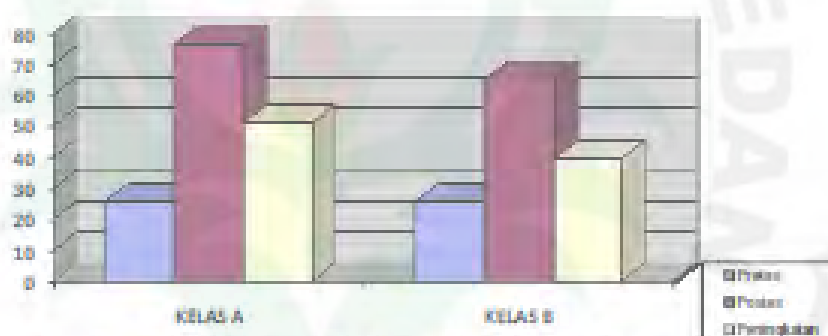
Selanjutnya, untuk mengetahui besarnya persentase peningkatan hasil belajar siswa dengan pengajaran menggunakan multimedia dan menggunakan media sederhana dapat dihitung dari selisih antara pretest dan posttest kedua kelompok siswa. Persen Peningkatan Hasil Belajar dapat dihitung dengan rumus *g factor* (faktor ternormalisasi) (Simson Tarigan, 2010).

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Hasil dan Pembahasan

Hasil pengujian instrumen penelitian dari 30 butir soal yang diujikan terdapat 20 soal yang dinyatakan valid dan 10 soal yang dinyatakan tidak valid, hasil pengujian reliabilitas tes diperoleh harga $r_{11} = 0,71$ yang berarti soal yang diujicobakan adalah reliabel atau dapat dipercaya. Dengan demikian dari 30 soal yang disusun hanya 20 soal yang valid dan dapat dipercaya untuk dijadikan alat pengumpul data hasil belajar siswa. Secara ringkas dari hasil penelitian diperoleh data rata-rata pretes dan postes siswa kelas A maupun kelas B seperti pada grafik berikut.



Gambar Grafik Rata-rata Ringkasan Hasil Belajar Siswa

Pengujian normalitas data dilakukan dengan menggunakan uji Lilliefors. Berdasarkan hasil perhitungan diperoleh hasil sebagai berikut :

Tabel Hasil Uji Normalitas Data Pretest

Kelas	L_{hitung}	$L_{tabel} (\alpha = 0,05 \text{ dan } N = 38)$	Keterangan
A	0,10	0,14	Normal
B	0,11	0,14	Normal

Tabel di atas menunjukkan bahwa sebaran data pretest siswa kelas A dan siswa kelas B adalah berdistribusi normal, dengan harga $L_{hitung} < L_{tabel}$ pada $\alpha = 0,05$ dan $N = 38$. Hasil pengujian homogenitas data diperoleh harga $F_{hitung} = 1,58$ dan $F_{tabel} = 1,71$ dan disimpulkan bahwa sampel yang digunakan baik kelas A maupun kelas B berasal dari populasi yang homogen atau dapat mewakili populasi lainnya.

Setelah melalui beberapa tahap pengolahan data, untuk menguji hipotesis dilakukan uji beda yang diperoleh dari rata-rata selisih postes – pretes (peningkatan) kedua kelas yang diberikan perlakuan. Berdasarkan hasil pengujian, diperoleh $t_{hitung} > t_{(1-\alpha/2)}$ atau $4,15 > 1,99$ sehingga terima H_0 , atau tolak H_0 , pada taraf $\alpha = 0,05$ dan $dk = 74$, yang sekaligus berarti ada

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perbedaan pengaruh penggunaan multimedia dan media sederhana pada peningkatan hasil belajar kimia siswa pada materi pokok struktur atom dengan $\mu_1 \neq \mu_2$.

Berdasarkan hasil perhitungan diperoleh rata-rata faktor ternormalisasi (*g factor*) untuk kelas A sebesar 51%, dan pada kelas B hanya 40%. Artinya peningkatan hasil belajar kimia siswa dengan pengajaran multimedia lebih besar dari media sederhana sejalan dengan hasil penelitian Ertinawati tahun 2007 dengan judul "Perbandingan Penggunaan Multimedia dan Media Sederhana Terhadap Hasil Belajar Kimia Siswa Pada Materi Pokok Teori Domain Elektron dan Gaya Antarmolekul" menyatakan peningkatan hasil belajar siswa yang diajar dengan menggunakan multimedia lebih besar dari pada yang diajar menggunakan media sederhana. Dengan demikian dari hasil penelitian ini dan yang sebelumnya terbukti bahwa penggunaan multimedia lebih baik digunakan dalam upaya meningkatkan hasil belajar siswa dibandingkan menggunakan media sederhana.

Simpulan dan Saran

Berdasarkan hasil penelitian dan pembahasan, maka diperoleh kesimpulan yaitu terdapat perbedaan antara hasil belajar kimia siswa yang diajarkan dengan menggunakan multimedia dan hasil belajar kimia siswa yang diajarkan dengan menggunakan media sederhana pada materi pokok Struktur Atom di Kelas X SMA Negeri 1 Padangsidimuan Timur T.A. 2008/2009. Rata-rata persentase peningkatan hasil belajar siswa yang dinyatakan dengan Gain ternormalisasi dari hasil belajar siswa untuk pengajaran menggunakan multimedia berbeda secara signifikan dibanding pengajaran menggunakan media sederhana.

Berdasarkan pembahasan dan kesimpulan yang telah dikemukakan, maka penulis mengajukan saran agar guru maupun mahasiswa calon guru diharapkan mampu untuk menggunakan multimedia dalam setiap pembelajaran sehingga proses penerimaan siswa terhadap pelajaran menjadi lebih berkesan secara mendalam, serta memperkecil kemungkinan kesalahan pemahaman.

Ucapan Terima Kasih

Ucapan terima kasih disampaikan kepada Ibu Noni Roito guru kimia di SMA Negeri 1 Padangsidimuan Timur TA. 2008/2009 yang paling membantu dalam pelaksanaan penelitian ini dan Dosen Pendidikan Kimia UNIMED yang banyak memberikan solusi dalam setiap masalah yang dihadapi pada saat penelitian.

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