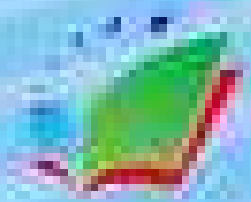
European Journal of
Education Studies

ISSN 2501 - 1111
Volume 6, Issue 4, 2019



Open Access Publishing Group

Editorial Team

Editor in Chief

International Advisory Board - Europe

International Advisory Board - Asia

ISSN 2501 - 1111
ISSN-L 2501 - 1111

Education Journals

European Journal Of Physical Education and Sport Science

European Journal of Foreign Language Teaching

European Journal of English Language Teaching

European Journal of Special Education Research

European Journal of Alternative Education Studies

European Journal of Open Education and E-learning Studies

Public Health Journals

European Journal of Public Health Studies

European Journal of Fitness, Nutrition and Sport Medicine Studies

European Journal of Physiotherapy and Rehabilitation Studies

Social Sciences Journals

European Journal of Social Sciences Studies

European Journal of Economic and Financial Research

European Journal of Management and Marketing Studies

European Journal of Human Resource Management Studies

European Journal of Political Science Studies

Literature, Language and Linguistics Journals

European Journal of Literature, Language and Linguistics Studies

European Journal of Literary Studies

European Journal of Applied Linguistics Studies

Article template

Manuscript submission

FONT

Indexing and Abstracting

1. International Academic Databases and Academic Social Networks

Google Scholar is a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of publishing formats and disciplines. Google Scholar index includes most peer-reviewed online journals of Europe and America's largest scholarly publishers, plus scholarly books and other non-peer reviewed journals. It contains roughly 160 million documents as of May 2014 and approximately 80-90% coverage of all articles published in English. Usually, a period of time, approximately 3-5 weeks, is required between the publication of the research and its indexation. Our indexed articles could be accessed **here**.

Microsoft Academic is a free public web search engine for academic publications and literature, developed by Microsoft Research. Re-launched in 2016, the tool features an entirely new data structure and search engine using semantic search technologies. It currently indexes over 375 million entities, 170 million of which are academic papers.The Academic Knowledge API offers information retrieval from the underlying database using REST endpoints for advanced research purposes. The service replaces the earlier Microsoft research project, Microsoft Academic Search, which ended development in 2012. Preliminary reviews by bibliometricians suggest the new Microsoft Academic Search is a competitor to Google Scholar, Web of Science, and Scopus for academic research purposes as well as citation analysis. Our indexed articles could be accessed **here**, **here**.

In June 2014, Baidu launched **Baidu Scholar** with the aim of becoming the biggest research platform in China, and, through the acquisition of English language resources and publications, to become the best English language search platform in China. By the end of 2014, Baidu Scholar included hundreds of thousands of academic websites and had indexed over 100 million literature resources in total, providing free access to a huge amount of Chinese and foreign literature.Researchers are able to carry out an advanced search (by keyword, author, title and field), plus an advanced filter and ranking (by professional field, time, document type) to find the document that they want. Additionally, for each article, the author information and publication source are easy to view, making Baidu Scholar a very real rival to Google Scholar. Our indexed articles could be accessed **here.**

Academia.edu is a social networking website for academics. The platform can be used to share papers, monitor their impact, and follow the research in a particular field. It was launched in September 2008, with 31 million registered users as of January 2016 and over 8 million uploaded texts. Academia.edu allows following the evolution of a shared research, offering statistics about referring sources, views of the abstract and downloads of the indexed article. Our profile could be accessed **here**.

ERIC (Education Resource Information Center) is an online library of education research and information, sponsored by the Institute of Education Sciences (IES) of the U.S. Department of Education. The Education Resource Information Center (ERIC) provides access to educational literature and resources. This database provides access to information from journals included in the Current Index of Journals in Education and Resources in Education Index. The submission/accessing procedure are not conditioned by the existence of an account. THE INDEXING IS A COMPLEX PROCEDURE, THE ARTICLES ARE REVIEWED BY ERIC, INDEXED AND CLASSIFIED BASED ON THIR EDUCATIONAL CONTENT, UNDER THEIR OWN KEYWORDS, ETC.. USUALLY THE INDEXING TAKES BETWEEN 4 AND 6 WEEKS. ERIC INDEXED ARTICLES or ERIC.ED.GOV

The FP7 project **OpenAIRE** aimed to support the implementation of Open Access in Europe. It provides the means to promote and realize the widespread adoption of the Open Access Policy, as set out by the ERC Scientific Council Guidelines for Open Access and the Open Access pilot launched by the European Commission. Its successors OpenAIREplus was aimed at linking the aggregated research publications to the accompanying research and project information, datasets and author information. The goal is to make through the portal www.openaire.eu, as much European funded research output as possible available to all. This research output, whether it is publications, datasets or project information is not only accessible through the OpenAIRE portal, extra functionalities are also offered, such as statistics, reporting tools and widgets – making OpenAIRE a useful support service for researchers, coordinators and project managers. OpenAIRE relies heavily on a decentralized structure where there is a representation in all member states (the so-called NOADs or National Open Access Desks) who can give specialized advice. Our indexed articles could be accessed **here.**

ROAD is a Directory of Open Access scholarly Resources. ROAD has been developed with the support of the

ISSN 2501 - 1111
ISSN-L 2501 - 1111

Education Journals

European Journal Of Physical Education and Sport Science

European Journal of Foreign Language Teaching

European Journal of English Language Teaching

European Journal of Special Education Research

European Journal of Alternative Education Studies

European Journal of Open Education and E-learning Studies

Public Health Journals

European Journal of Public Health Studies

European Journal of Fitness, Nutrition and Sport Medicine Studies

European Journal of Physiotherapy and Rehabilitation Studies

Social Sciences Journals

European Journal of Social Sciences Studies

European Journal of Economic and Financial Research

European Journal of Management and Marketing Studies

European Journal of Human Resource Management Studies

European Journal of Political Science Studies

Literature, Language and Linguistics Journals

European Journal of Literature, Language and Linguistics Studies

European Journal of Literary Studies

European Journal of Applied Linguistics Studies

Article template

Manuscript submission

FONT

indicators. They are downloadable as a MARC XML dump and will be available as RDF triples in 2014.

ICDS = 2.5 (2016) / 2.8 (2017)

Updated annually, **MIAR** (a database of scientific resources developed by **Universitat of Barcelona, Spain, Generalitat di Catalunya and Agencia di Gestio, d'Ajuts Universitaris e di Recerca, Spain**) gathers key data for identification and analysis of journals. These are grouped into major scientific areas -subdivided turn in more specialist academic fields. The system creates a matrix of correspondence between journals, identified by ISSN, and databases, directories and library catalogs that indexed or included. In addition, the link to the websites of the publishers and makers of repertoires and sources indicated institutions is available whenever it. MIAR is a support tool for those who have to perform assessment work : now have data on the identity and dissemination of the journals in which the works are published under evaluation MIAR includes more than 28,000 publications , for each of which its presence and multidisciplinary repertoires BDD is analyzed and as a result their ICDS is obtained.

Mendeley is an academic platform aimed to allow sharing research papers, discovering research data and collaborating online. If offers the possibility of search by abstract, keyword and author, and allows to organize and share data in public and closed groups. Mendeley permits to follow the evolution in terms of the number of readers that accessed/saved the metadata of the shared research articles. Our profile could be accessed **here**.

Zotero is free and open-source reference management software to manage bibliographic data and related research materials. Notable features include web browser integration, online syncing, generation of in-text citations, footnotes, and bibliographies, as well as integration with the word processors Microsoft Word, LibreOffice, OpenOffice.org Writer and NeoOffice. It is produced by the Center for History and New Media of George Mason University, United States of America. Our profile could be accessed **here**.

Zenodo is an online digital repository where researchers can preserve and share their research outputs, including figures, datasets, images, and videos. It is free to upload content and free to access, in adherence to the principle of open data. It was created by OpenAIRE and CERN to provide a place for researchers to deposit datasets.

Calaméo is a free document publishing platform that creates interactive web publications in real time. It allows following the evolution of the shared document by counting the readers. Our profile could be accessed **here**.

The goal of **Vixra** is to enable anyone to distribute their works of science and mathematics irrespective of their status or affiliations. Vixra is recording and time-stamping submissions and replacements so that the authors can use the information to establish the priority of their discoveries. The URL link to the abstract page can be used as a fixed reference and will remain open access to anyone with an internet connection. By providing this simple service viXra is supporting a growing community of scientists and mathematicians who are excluded from other repositories. Their output through viXra is about 4% of the quantity of submissions of arXiv (the biggest official academic repository.)

CiteUlike is a web service which allows users to save and share citations to academic papers. Based on the principle of social bookmarking, the site works to promote and to develop the sharing of scientific references amongst researchers. When browsing issues of research journals, small scripts stored in bookmarks (bookmarklets) allow one to import articles from repositories like PubMed, and CiteULike supports many more. Then the system attempts to determine the article metadata (title, authors, journal name, etc.) automatically. Users can organize their libraries with freely chosen tags and this produces a folksonomy of academic interests. Our profile could be accessed **here**.

ERIH (European Reference Index for the Humanities) is an index containing bibliographic information on academic journals in the humanities and social sciences. It has been called "**the most important and prestigious reference index in the European Union when it comes to international quality and impact accreditation for scientific journals in the areas of Humanities and Social Sciences**". The index includes all journals that meet the following requirements: "explicit procedures for external peer review; an academic editorial board, with members affiliated with universities or other independent research organizations; a valid ISSN code, confirmed by the international ISSN register; abstracts in English and/or another international language relevant for the field for all published articles; information on author affiliations and addresses; a maximum two thirds of the authors published in the journal from the same institution". ERIH was originally established by the European Science Foundation and was transferred to the Norwegian Social Science Data Services in 2014, mainly because it already operates the Norwegian Scientific Index. At the same time it was extended to also include social science disciplines and renamed ERIH PLUS. The list with the approved publications could be accesed **here**.

BibSonomy is a social bookmarking and publication-sharing system. It aims to integrate the features of bookmarking systems as well as team-oriented publication management. BibSonomy offers users the ability to store and organize their bookmarks and publication entries and supports the integration of different communities and people by offering a social platform for literature exchange. Both bookmarks and publication entries can be tagged to help structure and re-find information. As the descriptive terms can be freely chosen, the assignment of tags from different users creates a spontaneous, uncontrolled vocabulary: a folksonomy. It is developed and operated by the KDE group of the University of Kassel, the DMIR group of the University of Wurzburg, Germany. Some samples of our submitted research could be found here:**1**,**2**,**3**,**4**,**5**,**6**,**7**,**8**,**9**,**10**.

of OAI has expanded to promote broad access to digital resources for eScholarship, eLearning, and eScience. The Open Archive Initiative project is developed by Cornell University, USA. The profiles of our journals could be accessed here: **EJES, EJPESS, EJFLT, EJELT, EJSER, EJAE, EJOEES.**

Journal Index (ScopeMed JournalIndex.net) is a directory database service offered by ScopeMed that stores journals data and allows searching by various criteria: name, research area, country, language. It contains more than 9900 journals (March 31, 2016). The profiles of our journals could be accessed here: EJES, EJPESS, EJFLT, EJELT, EJSER, EJAE, EJOEES.

AcademicKeys is the premier source for academic employment. Our 18 discipline-focused sites offer comprehensive information about faculty, educational resources, research interests, and professional activities pertinent to institutions of higher education. More than 89% of the top 120 universities (as ranked by US News and World Report) are posting their available higher ed jobs with AcademicKeys.com. Our profiles could be accessed on the social sciences section (searching by publisher, ISSN or name of the journal) **here**.

The **Electronic Journals Library** (EZB) is a service to facilitate the use of scholarly journals on the internet. It offers a fast, structured and unified interface to access full-text articles online. It comprises 85027 titles from all areas of research, 16697 of which are available online only. In addition, 88009 journals, which are provided by aggregators, are listed. The EZB contains 52639 journals which are accessible free of charge to anyone. Furthermore, the participating libraries provide their users access to the journals they subscribe to. The journals are presented in lists sorted by research area. An updated list is generated by the database according to the member library's specifications each time it is accessed. The availability of full-text access is indicated by traffic-light symbols according to the license situation of each member library. The Electronic Journals Library project is developed by Regensburg University, Germany. The profiles of our journals could be accessed here: **EJES, EJPESS, EJFLT, EJELT, EJSER, EJAE, EJOEES**.

BASE (Bielefeld Academic Search Engine) is one of the world's most voluminous search engines, especially for academic open access web resources. BASE is operated by Bielefeld University Library, Germany. It facilitates effective and targeted searches and retrieves high quality, academically relevant results. The articles metadata is harvested periodically, a period of around 2-4 weeks could occur between the publication and indexing. Samples of our submitted research could be find here: **1,2,3,4,5,6,7,8,9,10.** or with a **verbatim search.**

DataCite is an international not-for-profit organization which aims to improve data citation in order to establish easier access to research data on the Internet, increase acceptance of research data as legitimate, citable contributions to the scholarly record and support data archiving that will permit results to be verified and re-purposed for future study. DataCite was subsequently founded in London on 1 December 2009 by organisations from 6 countries: the British Library; the Technical Information Center of Denmark (DTIC); the TU Delft Library from the Netherlands; the National Research Council's Canada Institute for Scientific and Technical Information (NRC-CISTI); the California Digital Library (University of California Curation Center); Purdue University (USA) and the German National Library of Science and Technology (TIB). Samples of our submitted research could be found here: **1,2,3,4,5,6,7,8,9,10.**

Genamics JournalSeek is an online database covering academic journals. The JournalSeek database contains 104166 journals from 6434 different publishers (February 2016). The database includes journal descriptions and links to the journals' homepages. Journal information includes the description (aims and scope), journal abbreviation, journal homepage link, subject category, and ISSN. Searching this information allows the rapid identification of potential journals to publish your research in, as well as allow you to find new journals of interest to your field.Our profiles could be accessed here: **EJES, EJPE, EJSER,**

2. Impact Factor

CiteFactor is a service that provides access to quality controlled Open Access Journals. The Directory indexing of journal aims to be comprehensive and cover all open access scientific and scholarly journals that use an appropriate quality control system, and it will not be limited to particular languages or subject areas. The aim of the Directory is to increase the visibility and ease of use of open access scientific and scholarly journals thereby promoting their increased usage and impact. **(Impact Factor under evaluation)**

Impact factor = 3.719 (2016)

ResearchBib (Research Bible) is open access with high standard indexing database for researchers and publishers. The Journal Database contains 420,000+ journals from different publishers, which includes the title, abbreviation, journal host url, index, publisher, description (aims and scope), online issn and print ISSN etc.Research Bible may freely index journals, research papers, call for papers, research position. Journal Database try to cover all open access scientific and scholarly journals that use an appropriate quality control system, and it will not be limited to particular languages or subject areas. An Impact Factor based on citations, article reviews, accessings and number of published articles is calculated every year for every journal submitted. The profiles of our journals can be accessed here: **EJES** A ResearchBib free account is required in order to access the profiles.

Impact factor = 0.101 (2017)

OAJI (Open Academic Journals Index) is a full-text database of open-access scientific journals founded by International Network Center for Fundamental and Applied Research, Russian Federation. It s19tores more than 78.000 articles from 2100 journals from 90 countries. A Journal Impact Factor is calculated yearly based on previous activity: accessing, citation, indexing in databases, author provenience, website design, etc.. **(Impact Factor under**

JournalTOCs is a Current Awareness Service (CAS) where you can discover the newest papers coming directly from the publishers as soon as they have been published online. It is one of the biggest searchable collections of scholarly journal Tables of Contents (TOCs). It contains articles' metadata of TOCs for over 27,299 journals directly collected from over 2824 publishers (February 2016). It is a project of School of Mathematical and Computer Sciences, Heriot-Watt University, Edinburgh, United Kingdom.

SHERPA/RoMEO is a database service run by SHERPA (Joint Information Systems Committee, United Kingdom, University of Nottingham, United Kingdom and University of Lund, Sweden) aimed to show the copyright and open access self-archiving policies of academic journals. The database uses a color-coding scheme to classify publishers according to their self-archiving policy. This shows authors whether the journal allows pre-print or post-print archiving in their copyright transfer agreements. It currently holds records for over 22,000 journals (February 2016).

Further Indexation and Abstracting are in process.

This journal is a serial publication uniquely identified by an International Standard Serial Number (ISSN) serial number certificate issued by Romanian National Library (Biblioteca Nationala a Romaniei). All the research works are uniquely identified by a CrossRef DOI digital object identifier supplied by indexing and repository platforms. All authors who send their manuscripts to this journal and whose articles are published on this journal retain full copyright of their articles. All the research works published on this journal are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a Creative Commons Attribution 4.0 International License (CC BY 4.0).

Journal Contact

Mailing Address

Open Access Publishing Group
Moinest Street, Nr. 40
061231, Bucharest, Romania

Nita Constantin Trifon Emil I.I.
RO29354723
Str. Rosiori de Vede, Nr. 1, Ap 58,
Bucharest, 061203
Romania

Phone: 0040724511635
Email: contact@oapub.org

Principal Contact

Constantin Emil
Executive managing editor
Phone: +040724511635
Email: editor@oapub.org

Support Contact

Constantin Emil
Email: editor@oapub.org

ISSN 2501 - 1111
ISSN-L 2501 - 1111

Education Journals

European Journal Of Physical Education and Sport Science

European Journal of Foreign Language Teaching

European Journal of English Language Teaching

European Journal of Special Education Research

European Journal of Alternative Education Studies

European Journal of Open Education and E-learning Studies

Public Health Journals

European Journal of Public Health Studies

European Journal of Fitness, Nutrition and Sport Medicine Studies

European Journal of Physiotherapy and Rehabilitation Studies

Social Sciences Journals

European Journal of Social Sciences Studies

European Journal of Economic and Financial Research

European Journal of Management and Marketing Studies

European Journal of Human Resource Management Studies

European Journal of Political Science Studies

Literature, Language and Linguistics Journals

European Journal of Literature, Language and Linguistics Studies

European Journal of Literary Studies

European Journal of Applied Linguistics Studies

Article template

Manuscript submission

FONT

EUROPEAN JOURNAL EDUCATION STUDIE

Volume 6, Issue 4, 2019

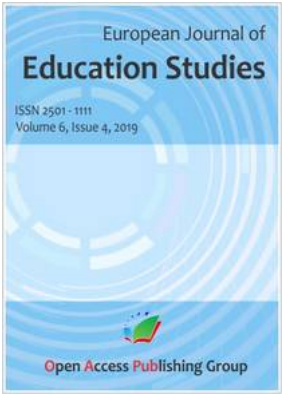


Table of Contents

Articles

ISSN 2501 - 1111
ISSN-L 2501 - 1111

THE DEVELOPMENT OF INQUIRY BY LEARNING CYCLE (RYLEAC) MODEL ON ELECTRICITY AND MAGNETIC CONCEPT TO INCREASE SCIENCE PROCESS SKILL AND THE ACADEMIC ACHIEVEMENT OF STUDENTS

Tirtawaty Abdjul, M. Mursalin, Elya Nusantari, W. Dj. Sarson Pomalato

Abstract

This study aims at developing an inquiry by learning cycle (RYLEAC) model in electricity and magnetic concept to increase science process skill and the learning achievement of students at physics department of Universitas Negeri Gorontalo and to describe factors supporting and inhibiting the RYLEAC learning model in basic physics subject, especially in electricity and magnetic concept. This study was a development study with 4D model. This study revealed: (1) the 4D development of RYLEAC learning model with the following steps of 4D: (a) define, (b) design, (c) develop, and (d) disseminate; (2) factors supporting the implementation of RYLEAC model implementation were (a) sufficient laboratory condition and facilities; (b) interaction among students, between students and lecturer, environment, and learning resources, lecturer allocated time to interact students and provide them with opportunities to ask questions. Meanwhile, the inhibiting factors were: (a) tools and media to carry out experiments were insufficient; (b) lack of reading the relevant books, making notes on what was gained from reading, discussion with friends, and lack of concentration during teaching and learning process.

Keywords

electricity, magnetic concept, RYLEAC learning model, science process skill

Full Text:

PDF

References

Anderson, L. W., Krathwohl, D.R. (2001). A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives. New York: Addison Wesley Longman, Inc.

Andrini, V. S. (2016). The Effectiveness of Inquiry Learning Method to Enhance Students' Learning Outcome: A Theoretical and Empirical Review. Journal of Education and Practice www.iiste.org ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol.7, No.3, 2016

Aksela, M. (2005). Dissertation: Supporting Meaningful Chemistry Learning and Higher-order Thinking through Computer-Assisted Inquiry: A Design Research Approach. Helsinky : Faculty of Science University of Helsinki.

Ali, M. (1993). Guru dalam Proses Belajar Mengajar [Teacher in Teaching and Learning. Bandung]: Sinar Baru Algesindo.

Ali, L. U., Suastra I. W, Sudiatmika A. A. I. A. R. (2013). Pengelolaan Pembelajaran IPA Ditinjau Dari Hakikat Sains Pada SMP DI Kabupaten Lombok Timur. E-journal Program Pascasarjana Universitas Pendidikan Ganesha Program Studi IPA, Volume 3, Tahun 2013.

Arends, R. (2012). Belajar Untuk Mengajar. Yogyakarta: Pustaka Pelajar. Arista S. A., Irawati S. Primayriani A. (2017). Penerapan Model Pembelajaran Inquiry Untuk Menig katkan Keterampilan Proses Sains Mahasiswa Kelas VIII.1. Jurnal Pendidikandan Pembelajaran Biologi 1 (1): 103-108 (2017). ISSN 2598-9669.

Arikunto & Suharsimi (2010). Prosedur Penelitiansuatupendekatanpraktik. Jakarta: PT. Rineka Cipta.

Avianti, R. & Yonata, B. (2015). Keterampilan Proses Sains Mahasiswa Melalui Penerapan Pembelajaran Model Kooperatif Konsep Asam Basa Kelas XI SMAN 8 Surabaya. Journal of Chemical Education. Vol.4 (2): 224-231.

Astuti, T. (2015). Kekurangandan Kelebihan model Inquiry. Bandung.

Bruce, J. & Weil, M. (2000). Model of Teaching Boston London, Toronto, Tokyo, Singapore Hall Inc.

Budiasih, E. & Widarti H. R. (2004). Penerapan Pendekatan Daur Belajar (Learning cycle) hearts Pembelajaran Mata Kuliah Praktikum Kimia Analisis Instrumen. Jurnal Pendidikandan Pembelajaran. 10 (1), 70-78.

Chiappetta, E. & Koballa T. R. (2010). Science Instruction in the Middle and Secondary Schools. United State: Pearson Education Inc.

Dahar, R. W. (1996). Teori-TeoriBelajar. Jakarta: Erlangga

Dimyati & Mudjiono (2006). Belajardan Pembelajaran. Jakarta: Rineka Cipta.

----------. (2009). Belajardan Pembelajaran. Jakarta: Rineka Cipta.

Eronika, S., Santoso, A., & Maryami, T. (2013). Pengaruh Penerapa Model Pembelajara Learning cycle 5 Fase Terhadap Prestasi Belajar Mahasiswa Kelas X SMA Negeri 1 Batu T.A 2012/2013 Pada Konsep Stoikiometri.

Hake, R. R. (1999). Analyzing Change/ Gain Score. Retrieved online November 15, 2018.

Ismiati, C. (2017). Penyusunan Perangkat Pembelajaran. UNY

ABOUT THE AUTHORS

Tirtawaty Abdjul
Department of Mathematics and Natural Sciences, Universitas Negeri Gorontalo, Indonesia

M. Mursalin
Department of Mathematics and Natural Sciences, Universitas Negeri Gorontalo, Indonesia

Elya Nusantari
Department of Mathematics and Natural Sciences, Universitas Negeri Gorontalo, Indonesia

W. Dj. Sarson Pomalato
Department of Mathematics and Natural Sciences, Universitas Negeri Gorontalo, Indonesia

ISSN 2501 - 1111
ISSN-L 2501 - 1111

Karyatin (2013). Penerapan Pembelajaran Inquiry Terbimbing Berbasis Laboratoriumuntuk Meningkatkan Keterampilan Proses dan Hasil Belajar IPA Mahasiswa Kelas VIII-4 di SMPN 1 Probolinggo. Tesis: Universitas Negeri Malang. (Jurnal Pendidikan Sains, Volume 1, Nomor 2, Juni 2013)

King, F. J., Goodson, L., & Rohani, F. (2011). Higher Order Thinking Skills. A publication of the Educational Services Program, now known as the Center for Advancement of Learning and Assessment, (Online), (www.cala.fsu.edu), diakses 5 Juni 2018.

Kreano, J. (2012). Desain model pengembanganperangkatpembelajaran matematik 3. E. Jounal Universitas Negeri Semarang. ISSN: 2086 – 2334. Vol. 3, No. 1.

Lete, M., Sutopo, & Yuliati, L. (2016). Peningkatan Keterampilan Proses Sains Mahasiswa Melalui Pembelajaran Discovery Topik Tekanan Hidrostati. Jurnal: Pros Semnas Pend. IPA Pascasarjana UM. Vol. 1, 2016. ISBN: 978-602-9286-21-2.

Maftuhah & Rahman, T. (2015). Penerapan Learning cycle Untuk Mening katkan Penguasaan Konsep Sistim Koordiasi Pada Mahasiswa SMA. Prosiding Simposium Nasional Inovasidan Pembelajaran Sains.

Mauritha, S., Nur, S., & Adlim. (2017). Pengaruh Penggunaan Model Pembelajaran Inkuiri Terbimbing Terhadap

Neka, I. K., Marhaeni, A. A. I. N., & Suastra, I. W. (2015). Pengaruh Model Pembelajaran Inquiry Terbimbing Berbasis Lingkunganterhadap Keterampilan Berpikir Kreatifdan Penguasaan Konsep IPA Kelas V SD Gugus VIII Kecamatan Abang, eJournal Program Pascasarjana Universitas Pendidikan Ganesha Program Study Pendidikan Dasar, (Online). (http://www.pasca.undiksha.ac.id), diakses 29 September 2018.

Ngalimun. (2014). Strategidan Model Pembelajaran. Yogyakarta. Aswaja Perissindo.

Nismalasari, Santiani, & Rohmadi, M. (2016). Penerapan Model Pembelajaran Learning cycle Terhadap Keterampilan Proses Sains Dan Hasil Belajar Mahasiswa Pada Pokok Bahasan Getaran Harmonis. Jurnal Pendidikan Sains dan Matematika Volume 4 Nomor 2; 2016 ISSN 2338-4387

Nieveen, N. (1999). Prototype to reach product quality. Dlm. van den Akker, J., Branch, R. M., Gustafson, K., Nieveen, N., & Plomp, T. (pnyt.). Design approaches and tools in educational and training. Dordrecht: Kluwer Academic Publisher.

Polyiem, T. Nuangchalern, P., & Wongchantra, P. (2011). Learning

Achievement, Science Process Skills, And Moral reasoning Of Ninth Grade

Student Learned By 7E Learning Cycle And Socioscientific Issue-Based

Learning. Australian Journal of Basic and Applied Sciences. Hal 257-296.

Purwanto, N. 2012. Prinsip-Prinsipdan Teknik evaluasi Hasil Pengajaran. Bandung: PT Remaja Rosdakarya

Rafiuddin. (2016). Application of Hypothesis Deductive Cycle Learning Model In The Matter Of Chemical Equilibrium To Improve Critical Thinking Skills Student High School. International Journal of Education and Research Volume 4 No.06 Juni 2016

Rahmadi, F. (2015). Pengembangan Perangkat Pembelajaran Berbasis Pemecahan Masalah Berorientasipada Kemampuan Penalarandan Komunikasi Matematika. Jurnal Pendidikan Matematika Vol. 10 – No. 2, ISSN: 1978-4538

Rahmawati K. S., Dasna W. (2016). Kajian Pengaruh Learning cycle 5E Terhadap Keterampilan Proses Sains Mahasiswa SMP. Pros. Semnas Pend. IPA Pascasarjana UM. Vol. 1 2016. ISBN: 978-602-9286-21-2.

Rajabi M, Ekohariadi LGP, Buditjahjanto A 92015). Pengembangan Perangkat Pembelajaran Instalasi System Operasi Dengan Model Pembelajaran Berbasis Praktek,. Vol.3 No. ISSN: 2302-285x

Ratumanan GT, Laurens (2006). Evaluasi Hasil Belajar Pada Tingkat Satuan Pendidikan. Surabaya: Unesa Unversity Press

Revita R. (2017). Validitas Perangkat Pembelajaran Matematika Berbasis

Penemuan Terbimbing. Suska Journal of Mathematics Education

(p-ISSN: 2477-4758) e-ISSN: 2540-9670. Vol. 3, No. 1, 2017, Hal. 15 – 26

Rizal M. (2014). Pengaruh Inquiry Terbimbing Dengan Multi Representasi Terhadap Keterampilan Proses Sainsdan Penguasaan Terhadap Konsep IPA Mahasiswa SMP. Jurnal Pendidikan Sains Vol. 2 No. 3.

Rustaman N. Y., et al. (2003). Strategi Belajar Mengajar Biologi. Bandung: Jurusan Pendidikan.

Rustikayanti, R. N., Kartika I., Herawati Y. (2016). Adaptation of psychological changes in the third semester of pregnant women. The Southeast Asian Journal of Midwifery, 2(1): 45-49. 2017.

Sanjaya W. (2008). Strategi Pembelajaran Berorientasi Standar Proses Pendidikan. Rawamangun-Jakarta: Kencana Perdana Media Group.

----------.. (2012). Strategi Pembelajaran Berorientasi Standar Proses Pendidikan.Rawamangun-jakarta: Kencana Perdana Media Group

Santoso S. (2005). DinamikaKelompok. Jakarta: BumiAksara.

Setiasih S. P. (2016). Penggunaan Model Pembelajaran Inquiry Untuk Mening katkan Hasil Belajar Mahasiswa Pada Konsep Sifat-sifat Magnet Di Kelas V SD Sukajaya Kecamatan Jatinunggal Kabupaten Sumedang. Pena Ilmiah 1 (1).

Setyowati A., Subali B., Mosik (2014). Implementasi Pendekatan Konflik Kognitif Dalam Pembelajaran Fisika Untuk Menumbuhkan Kemampuan Berpikir Kritis Mahasiswa Smp Kelas VIII. Jurnal pendidikan fisika Indonesia 7 (2011): 89-96. Issn: 1693-1246. http://journal.unnes.ac.id.

Sudijono A. (2013). Pengantar Evaluasi pendidikan [Introduction to Educational Evaluation]. PT. Raja Grafindo Persada. Jakarta.

Sudjana N. (2014). Penilaian Hasil Proses Belajar Mengajar. Bandung: Remaja Rosdakarya.

Sujana A. (2012). Pendidikan IPA teoridanpraktik. Sumedang: Rizal Nur.

Susanto A. (2014). Teori Belajardan Pembelajaran di Sekolah Dasar. Jakarta: Kencana.

Susilo M. J. (2007). Kurikulum Tingkat Satuan Pendidikan: Managemen Pelaksanaandan Kesiapan Sekolahmenyongsongnya. Yogyakarta. PustakaPelajar.

Susilaningrum D. F. Santosa S., Ariyanto J. (2017). Studi Komparasi Antara Penerapan Model Learning cycle 5E dan Discovery Learning terhadap Capaian Keterampilan Proses Sainsdan HasilBelajar Kognitif PadaMahasiswa Kelas X SMA Negeri 3 Boyolal. Proceeding Biology Education Conference Volume 14, Nomor 1 ISSN: 2528-5742.

Tania B., Murni (2017). Penerapan Model Pembelajaran Learning cycle 5e Untuk Mening katkan Keterampilan Proses Sains Mahasiswa. Jurnal Gravity Vol.3 No. 1. ISSN 2442-515x, e-ISSN 2528-1976

Thiagarajan S., Semmel DS, Semmel MI (1974). Instructional Development for Training Teachers of Exceptional Children. Minneapolis, Minnesota: Leadership Training Institute/Special Education, University of Minnesota.

Wena M. (2009). Strategi Pembelajaran Inovatif Kontemporer. Jakarta: BumiAksara.

Wiratana, Saida, Suma (2013). Pengaruh Model Pembelajaran Kooperatif Tipe Investigasi Kelompok (Group Investigation) Terhadap Keterampilan Proses danhasil Belajar Sains Mahasiswa SMP. E-Journal Pascasarjana Universitas Pendidikan Ganesa Program Studi IPA. Volume 3: 1-12. http://jurnal.unram.ac.id/index.php/jpp-ipa.

Warsono, Hariyanto (2014). Pembelajaran Aktif: Teoridan Asessment. Bandung: PT Remaja Rosdakarya.

DOI: http://dx.doi.org/10.46827/ejes.v0i0.2569

Refbacks

- There are currently no refbacks.

European Journal of Education Studies
ISSN: 2501 - 1111
ISSN-L: 2501 - 1111
Available on-line at: www.oapub.org/edu

doi: 10.5281/zenodo.3365457 Volume 6 | Issue 4 | 2019

THE DEVELOPMENT OF *INQUIRY BY LEARNING CYCLE* (*RYLEAC*) MODEL ON ELECTRICITY AND MAGNETIC CONCEPT TO INCREASE SCIENCE PROCESS SKILL AND THE ACADEMIC ACHIEVEMENT OF STUDENTS

Tirtawaty Abdjul[i],
Mursalin,
Elya Nusantari,
W. Dj. Sarson Pomalato
Department of Mathematics and Natural Sciences,
Universitas Negeri Gorontalo,
Indonesia

Abstract:
This study aims at developing an inquiry by learning cycle (RYLEAC) model in electricity and magnetic concept to increase science process skill and the learning achievement of students at physics department of Universitas Negeri Gorontalo and to describe factors supporting and inhibiting the RYLEAC learning model in basic physics subject, especially in electricity and magnetic concept. This study was a development study with 4D model. This study revealed: (1) the 4D development of RYLEAC learning model with the following steps of 4D: (a) define, (b) design, (c) develop, and (d) disseminate; (2) factors supporting the implementation of RYLEAC model implementation were (a) sufficient laboratory condition and facilities; (b) interaction among students, between students and lecturer, environment, and learning resources, lecturer allocated time to interact students and provide them with opportunities to ask questions. Meanwhile, the inhibiting factors were: (a) tools and media to carry out experiments were insufficient; (b) lack of reading the relevant books, making notes on what was gained from reading, discussion with friends, and lack of concentration during teaching and learning process.

Keywords: electricity, magnetic concept, RYLEAC learning model, science process skill

1. Introduction

Science is "*knowledge gained through learning and proofing*" or "*knowledge that encompasses general truth of the natural law*". Science, in this sense refers to a system to obtain

[i] Correspondence: email abdjultirta@gmail.com

knowledge through observation and experiment activities to portray and to describe the natural phenomena. Science or natural resource (hereinafter will be referred to as IPA) is an ideal way to obtain competencies such as skills, maintain attitude and develop concepts related to daily experiences (Suastra as cited by Ali, Suastra, Sudiatmika; 2013, 2).

One of the essences of IPA is as a process. The process to learn IPA or science is directed to make students willing to work on something not only understanding something, but also to make them actively participate in learning (Sujana, 2012: 27). Students should be allowed to have direct contact with objects that are currently or would be learnt. They are guided to carry out learning activities, such as carrying out problem identification, finding out various explanations on the discovered phenomena, develop minds-on (cognitive and affective) and develop hands-on skills (motoric) through experimental activities to solve problems.

Hands-on skills (motoric) in IPA learning are called science process skills. The science process skill is an activity that facilitates science learning, thus, enables students to actively participate in problem solving process and develop responsibility by using scientific methods (Rahmawati & Dasna, 2016: 1063). In physics science process skill, students are enabled to experience the essence of physics to make them skilled in carrying out activities related to physics. Wiratana (2013; 3) argued that science process skill of the students have large impact on their learning achievement.

Avianti & Yonata, 2015: 225), on one hand, mentioned that the advantages of the process skills are it is able to make students more creative, active, skilled in thinking, and skilled in obtaining knowledge. In order for those advantages to happen, a learning model specifically designed to make students active in a learning process is needed.

On the other hand, the situation is yet as expected. The data show that obstacles in physics learning, especially on process skill in physics learning are many. Based on the interview with one of the basic physics 2 lecturer, students' skills in physics learning were far from the expectation, they were lacking in observation skill, observation data trends interpretation skill, determining the variables, drawing conclusion and the skill to process and analyze observation data.

In addition to process skill, on the topic of electricity and magnet, students' learning output was relatively low. There were 40% of the students who enrolled in this subject got the C and D grades. This was due to their conceptual understanding on that topic was still lacking. The learning outcome is changes of learners' behavior due to teaching and learning process, such as changes in cognitive, affective, and psychomotor aspects.

To solve the problem above, a model specifically designed to develop students' thinking skill, like inquiry model, to be active in learning process is needed. Piaget (as cited in Setyowati; 2014: 9), mentioned that inquiry learning model is a learning model that prepare students for situations where they have to carry out experiment themselves, to see what was happening, willingness to do something, pose questions,

and inquire for the answer themselves, as well as correlating one finding with another, and compare what has been previously discovered with other students.

Inquiry learning model made students actively involved in exploration activities, thus, effective to teach science concepts. This strengthened Neka, Marhaena and Suastra (2015:9) who argued that inquiry learning model can provide opportunities for students to actively participate in teaching and learning process.

Sanjaya (Astuti; 2015: 10), argued that several benefits of inquiry learning models were: 1) emphasizes on development of cognitive, affective, and psychomotor aspects proportionally, thus, learning through inquiry is considered as more meaningful.

In addition to implementation of inquiry learning model, one of the learning model to make students participate actively in learning is learning cycle model.

Learning cycles stages of activities organized to make students master the competencies that should be mastered in learning through active participation. 5E learning cycle model guides students to develop their own knowledge through 5E stages, which comprised of *engagement, exploration, explanation, elaboration, and evaluation* (Chiappetta & Koballa, 2010:129). The advantage of learning cycle model according to Warsono and Heriyanto (2014:35) were that: provide opportunities for students to think, inquire, discover, and describe the example of concepts that they learnt.

Based on the definition of inquiry model and learning cycle model, it can be concluded that RYLEAC learning model is a learning model who prepare students through experimental activities. Therefore, there is a need for the development of inquiry and learning cycle or abbreviated into RYLEAC model. This RYLEAC model is expected to increase the science process skill as well as students' learning outcome, especially in electricity and magnetic concepts.

Based on the problems identified above, the problem statements of this study were: How was the development of RYLEAC learning model and What were the supporting factors and inhibiting factors of RYLEAC learning model in basic physics 2 learning on electricity and magnetic concepts to increase science process skill and learning outcome of the students at the department of physics, Universitas Negeri Gorontalo?

Therefore, this study aims at developing a RYLEAC learning model and describing the supporting factors and inhibiting factors of the implementation on electricity and magnetic concept to increase science process skill and learning outcome of the students at the physics department of Universitas Negeri Gorontalo.

2. Methods

This study was carried out in the Department of Physics Department of Mathematics and Natural Science Faculty of Universitas Negeri Gorontalo. The limited trial subjects in this study was 1 classroom who enrolled in Basic Physics 2 subject at the Department of Chemistry Education, whereas the mass trial of this RYLEAC learning model was implemented in Class A, B, and C of the Physics Department who enrolled in the Basic

Physics 2 subject in the academic year of 2017/2018. This was a research and development study with 4D (*define, design, develop* and *disseminate*) originally developed by Thiagarajan, et al., (1974; 6) through descriptive quantitative approach.

This study produced several products such as learning model text book and RYLEAC learning media which consisted of :(1) lesson plan, (2) syllabus, (3) student worksheet, (4) teaching materials Ajar, (5) learning outcome test and process skill test.

This research was designed with *one group pretest post-test design.* The data obtained from this study were qualitative data (from the observation sheet to see factors that support and inhibit the implementation of the developed model and its learning media) and quantitative data (from the validity, practicality, and effectiveness test and the responses of the students toward the developed model and its learning media).

The quality of the developed RYLEAC learning model was determined based on:

A. Validity

Validity of the learning media in this study was obtained from the validity result from the experts using the validation sheet.

Validity sheet of the developed RYLEAC learning model consisted of 4 categories: very good, good, moderate, and not very good with the following indicators: (a) the syntax of RYLEAC learning model, (b) social system, (c) reaction principle, (d) support system, and (e) the direct and indirect impact. In the implementation of the developed model, learning media which comprised of lesson plan, syllabus, student worksheet, learning materials, process skill test and learning outcome test, and questionnaire (response questionnaire and questionnaire to find out the supporting and inhibiting factors of the RYLEAC learning model implementation), which need validation from the validators.

B. Practicality

The practicality of the model and the developed RYLEAC learning media inn the classroom and students' responses toward the implementation of RYLEAC learning model and its instruments are as follow:

a) Observation sheet on the implementation of learning process consists of the syntax of the RYLEAC model. The observers will provide a checked (√) sign on the Yes option for each syntax implemented by lecturer and checked (√) on the No option for each syntax that was not implemented by the lecturer.
b) Questionnaire was implemented to see the students' responses on the implementation of RYLEAC learning model. This was an 18 items statement. The scoring used Likert scale.

Table 2: Likert Scale Scoring

Category	Statement Score	
	Positive	Negative
Strongly Agree	5	1
Agree	4	2
Undecided	3	3
Disagree	2	4
Highly Disagree	1	5

C. Effectiveness

Effectiveness of the developed learning model using the observation sheets (students' activity and process skill) and test instrument (cognitive learning outcome). For observation sheet, each observer gave the score (4,3,2,1) in each aspect of activity and observed process skill, as well as cognitive learning outcome using the essay test type with the determined indicator.

D. Validity Analysis of the Model and Learning Media

Validity of the developed learning model is validated by the validator. The average score is described as follow:

Table 3: Validation Category of RYLEAC Learning Model

Average	Assessment Criteria
4,0 ≤ SV ≤ 5,0	Highly Valid
3,0 ≤ SV ≤ 4,0	Valid
2,0 ≤ SV ≤ 3,0	Moderately Valid
1,0 ≤ SV ≤ 2,0	Less valid
0,0 ≤ SV ≤ 1,0	invalid

(Arikunto, 2010:44)

E. Students' response and obstacle questionnaire

The result of students' responses and students' obstacle on learning implementation were analyzed using percentage of students' responses with the formula:

$\frac{F}{N}$P = x 100%

The model is said practical when 80% of the students responds positively and the percentage of the RYLEAC model implementation is in excellent and good category.

F. Effectiveness Analysis of the RYLEAC Learning Model Students' Activity and Process Skill

Data on the students' activity and students' process skill obtained during the learning process were analyzed using the following:

% of students' activity = $\frac{total\ obtained\ score}{maximum\ score} x\ 100\ \%$

The analysis of the average score of students' activity and process skill used the following category:

Table 5: The Criteria of Students' Activity and Process Skill

Percentage Range	Category
81% - 100%	Excellent
61% - 80%	Good
41% - 60%	Moderate
21% - 40%	Low
0% - 20%	Very Low

(Arikunto, 2010: 44)

G. Cognitive Learning Outcome Test

Data on the cognitive learning outcome in pretest and posttest were analyzed using N Gain analysis as presented below:

$$\langle g \rangle = \frac{\langle G \rangle}{\langle G \rangle_{maks}} = \frac{\bar{X}_{post} - \bar{X}_{pre}}{X_{maks} - \bar{X}_{pre}}$$

The analysis used the following criteria:

Table 6: Classification of the average N gain test

Value	Criteria
(<g>) ≤ 0,3	Low
0,3 < (<g>) < 0,7	Moderate
(<g>) ≥ 0,7	High

Source: Hake (1999).

3. Results

3.1 The Developed Model

The developed RYLEAC model refers to the characteristics of the model proposed by Bruce and Weil (1992: 135-136) which consisted of the syntax for RYLEAC learning model, social system and activity principle/reaction, support system, and instructional impact and indirect impact.

3.2 Syntax

Table 7: The Syntax of RYLEAC Learning

Syntax	Learning Direction
Engagement	➢ Demonstrate or present video about daily lives' phenomena ➢ Information and experience exchange by posing questions
Orienting	➢ Deliver the topic and describe learning objectives. ➢ Divide students into several groups, then distribute teaching material and students' worksheet to each group
Formulate problem	➢ Present problem to be addressed through learning activities
Formulate hypothesis	➢ Formulate hypothesis based on the determined problem
Collect data through	Provide opportunity for students to collect data through exploration activities

exploration	
Test hypothesis	Determine the acceptable answer based on the data or information obtained from data collection activities.
Explain	Describe a concept using their own sentences based on their exploration
Elaboration	Apply the concept that they obtained from exploration activity to answer advance questions
Formulate conclusion	Formulate conclusion based on the result of hypothesis testing
Evaluate	Carry out assessment on the knowledge and science process skill of the students

3.3 Social System and Reaction Principle

Lecturer and students participate in all relevant ideas. The reaction from this RYLEAC learning model is found within the engagement, exploration, and explanation stages. In engagement phase, lecturer present demonstration of things related to daily activities. Based on those demonstrations, students are expected to be able to construct initial knowledge to answer questions based on the presented demonstration.

3.4 Support System

Optimum support systems needed in RYLEAC learning model are: 1) lesson plan, 2) Syllabus, 3) teaching material for students reference in correlating the information based on the given tasks, 4) students' worksheet, 4) assessment tools, and 5) sufficient laboratory to support students in their experiments.

3.5 Instructional Impact and Indirect Impact

The indirect impacts of these learning models are: ability to honest in presenting their observation result, ability to respect others' opinion, ability to see the problem from various perspective, creative thinking, self-confident, and motivation.

3.6 4D Development Model

The developed RYLEAC with 4D (define, design, develop, and disseminate) model developed by Thiagarajan & Semmel (1974) described as follow:

Stage 1: Define

This stage consists of five main steps namely: preliminary-final analysis, students' analysis, task analysis, concept analysis, and formulate learning objectives.

a. Final-Preliminary Analysis

Interview with one of the lecturer who teach basic physics 2 subject, revealed that students process skill are still low in aspects such as, observation skill, formulating hypothesis, formulating problem statement, and skill to present the exploration result in front of the class. Students' cognitive were also relatively low. This was evident on their learning outcome, where 40% of the students got the Cs and Ds. Many of the students had never gained experience related to the concept being taught. In utilization of learning resources, lecturer mostly used text book and internet.

b. Students' Analysis

Based on the interview result, it was obtained that the students' background on electricity concept and magnetic concept were from different cognitive level. There were several students who can quickly understand the concept being described, and there were many students who slowly understand the described concept. Their economic background was also varied, some were from low economic background, and some were from middle class family. Their origin were also different, 25% of the students were from the South, 20% from the South East and 55% were originally from Gorontalo. Most of the students live in the dormitory or rent rooms, and there were students who still live with their parents. Based on their age and gender, the average age was 18-23 years old and from both sexes.

c. Task Analysis

The task analysis was aimed at identifying the main tasks that would be carried out during the learning process. The given tasks were done in groups based on the achievement analysis related to the concept being learn at the present, and it consisted of observing, formulating the problem statement, formulating the hypothesis, collecting the data, drawing conclusion, prove hypothesis with engagement, and elaboration.

d. Concept Analysis

This analysis was aimed at determining the content of the concept that would be developed.

e. Specifying Instructional Objectives/Learning Objectives Analysis

The formulation of learning objectives were based on the basic competencies and indicators mentioned within the curriculum. Based on the indicators on electricity and magnetic concept, the learning objectives that would be achieved are as follow:

- Basic process skill. Through experiment, students are expected to a) observe cases through presented pictures, b) classify experiment data, c) interpret observation result through presented pictures, d) formulate hypothesis based on the presented case, e) communicate experiment data using their own sentences, and f) formulate conclusion.
- Cognitive learning outcome comprised of several expected objectives, namely: a) describe the differences between open circuit and closed circuit, b) describe which circuit picture can conduct electric current, c) determine the amount of the flowing electricity and the amount of electron that goes through a point within the circuit using a presented case, d) determine the direction of the electricity current and the direction of the electron movement using the presented picture, e) determine the degree of the isolation and the current through presented case, f) calculate the electricity power within an electric circuit, g) show the position of the switch in a closed circuit through presented case, h) determine the polar produced in a magnetic production through induction process, i) classify the characteristics of materials based on its magnetic characteristics, j) describe the concept of magnetic power of an electric conductor within the magnetic field, k) determine the magnetic induction at the center and the tip of celenoid, l)

determine where the C wire should be placed in order for the force resultant in C to be zero through the presented picture, m) determine the direction of Lorentz power experienced by the wire, and n) compare the maximum GGL in Generator A and Generator B through the presented picture.

Stage 2: Design Phase

The activities in this stage were: (a) formulation of test (criterion-test construction); Construction of test instrument based on the learning objectives as the benchmark for students' ability such as product, process, and psychomotor; (b) media selection. The learning media that would be used are LCD, internet, and white board. Media selection was carried out to identify relevant learning media with the characteristic of the concept and their relevancies to students' needs. This was in order to help students to achieve the expected standard of competencies and basic competencies; (c) format selection. Format selection in the development of model and learning media was intended to design the content of the learning, strategy selection, approaches, learning methods, and learning sources. Strategies, approaches, methods, and learning sources especially on electricity and magnetic concepts were described within the Lesson Plan and the developed lesson plan; (d) initial design. The initial design is the design of all model and learning media that should be carried out before the trial was implemented.

Stage 3: Develop

The define and design stages produced an initial learning model called the first draft, which later validated by experts and following this validation would be tried on limited classroom trial. Validation was the first step of the develop program, which focused on format, content, and language of the developed learning model. Three experts validated the developed RYLEAC learning model. The results of validation such as the validation score, correction and recommendation were used to revise the developed learning model. The result of this revision was a valid model called draft 2.

Stage 4: Disseminate

The dissemination stage was the last stage of the development model in 4D development model. Dissemination of research result was carried out through a publication in internationally reputable journal called, *Global of Educational Studies* with ISSN 2377-3936 in 2018.

4. The Quality of RYLEAC Learning Model

4.1 Validity of RYLEAC Learning Model

Validation was carried out by three validators to see the validity of the learning, content and language, which comprised the model and all developed RYLEAC learning media in Basic Physics 2 subject. The validation result is presented in Table 1 below.

Table 1: Validation Result of RYLEAC Learning Model

Validation Aspects	V1	V2	V3	Average	Notes
Learning Syntax	5.00	5.00	4.92	4.97	Highly Valid
Social System and Reaction Principle	4.80	4.80	4.60	4.73	Highly Valid
Support System	5.00	5.00	5.00	5.00	Highly Valid
Instructional and Indirect Impact	4.75	4.75	4.75	4.75	Highly Valid
General conclusion of the validation	5.00	4.50	4.50	4.67	Highly Valid
Average	4,91	4,81	4,754	4,824	

Based on Table 1, it is seen that the developed learning model was highly valid, which means that the developed learning model is appropriate for learning. The implementation of RYLEAC learning model needs valid learning media. Below is the validation result of RYLEAC learning media.

Table 2: Validation Result of RYLEAC Learning Media

Learning media	Average	Category
Lesson plan	4,42	Highly Valid
Syllabus	4,43	Highly Valid
Students' worksheet	4,42	Highly Valid
Learning materials	4,54	Highly Valid
Test	RK	RK

Based on Table 2 above, it is evident that the developed RYLEAC learning media were appropriate to be implemented in learning Basic Physics 2, especially on the electricity and magnetic concepts.

4.2 Practicality

Practicality of the developed model was assessed form the implementation of the learning and students' responses toward the implementation of this developed RYLEAC learning model:

4.2.1 Implemented Learning

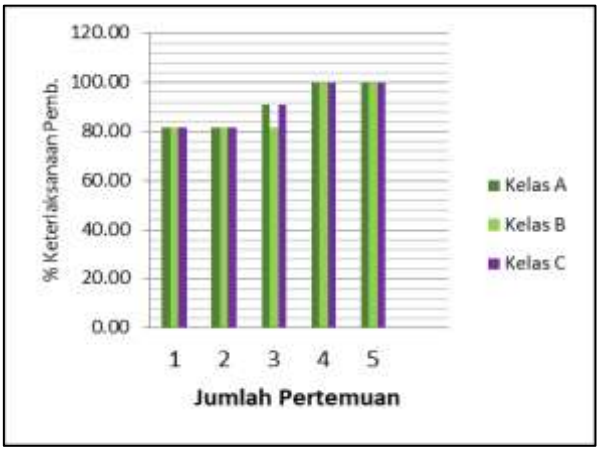


Figure 1: RYLEAC Learning Model Implementation on Large Scale Trial

Figure 1 above describes that the average implementation of RYLEAC learning model in limited classroom was 89.08 (excellent category) and on large scale trial was 90.03, with excellent category. The factors that support the well implementation of this RYLEAC learning model based on observation was that lecturer's performance was excellent in planning and implementing the learning process, group experiments, lecturer provides opportunities for students to voiced their opinion and ask question, students were actively and directly involved in learning process, and lecturer's role as facilitator in learning. This is similar with Arends (2012; 46), who stated that teacher's role is not only to deliver knowledge and truth, but also as facilitator and guide. Based on these descriptions, it can be concluded that developed RYLEAC learning model is appropriate to be implemented in Basic Physics 2 learning.

4.2.2 Students' Responses

Students' responses on the implementation of RYLEAC learning model is presented in the following Figure 2:

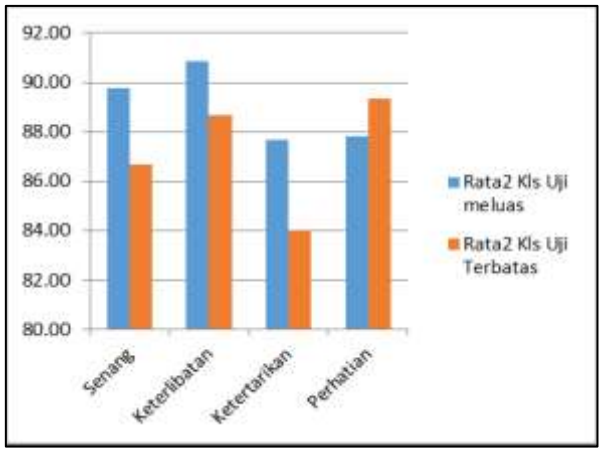


Figure 2: Students' Responses on Limited Trial Class

Based on Figure 2, students, both on limited trial class and large scale trial showed that large proportion of students highly agree with the implementation of RYLEAC learning model.

Based on these data, it can be concluded that the developed learning model was practical to be implemented in basic physics 2, especially on electricity and magnetic topic

4.2.3 Effectiveness

Learning Activity

Below is the students' learning activity in limited and large-scale trial:

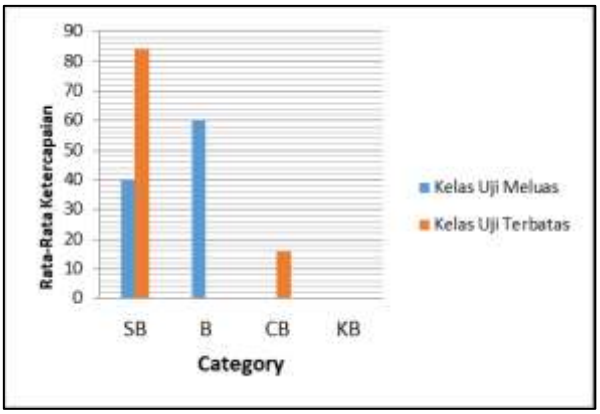


Figure 3: Students' Learning Activity on the Implementation of RYLEAC Learning Model

Based on Figure 3 above, it can be concluded that RYLEAC learning model encouraged students to actively participate in basic physics 2 learning. The learning process emphasized and encouraged that students be actively participated in learning (*student centered learning*) (King, Goodson & Rohani, 2011; 125). Students who actively participated in learning would construct their understanding with the knowledge; hence, it is expected to maximize their learning outcome. Maftuhah and Rahman (2015; 64) insisted that student-centered learning provide opportunities for students to apply the materials, develop knowledge and work in group; thus, can develop their scientific attitude, which in turn, increase their concept mastery. Ideally, students actively participate in learning activity, thus, learning would be meaningful and useful.

4.2.4 Learning Outcome

Students' Process Skill

The result of students' science process skill in the first, second, third, and fifth meetings for class trials are presented in the following figure:

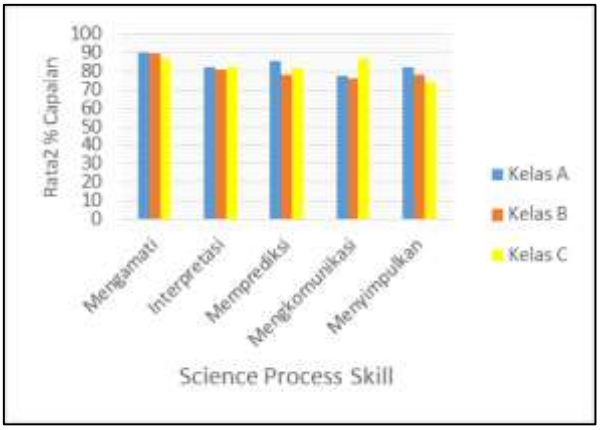


Figure 4: Students' Process Skill

The data on the students' process (Class, A, B, and C) through RYLEAC learning model could increase students' process skill. Inquiry learning used in increasing the science process skill contributed toward the science process skill and science concept

(Rizal, 2014; 76). In addition to inquiry model, 5E learning cycle could also increase students' science process skill, especially on exploration phase, as students carry out exploration and investigation activities. Thus, students could train their observing, communicating, classifying, measuring, inferring, predicting, hypothesizing, and defining variables (Tania & Murni ; 2017; 72)

4.2.5 Cognitive Learning Outcome

The cognitive learning outcome was presented in the following figure:

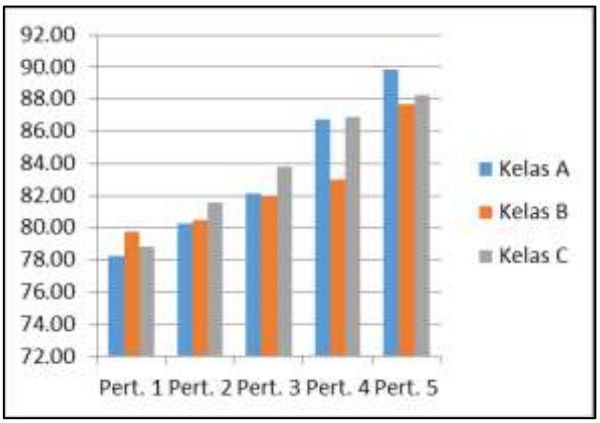


Figure 5: Cognitive Learning Outcome

Classically, students who accomplished this basic physics 2 subject, especially on electricity and magnetic topic in limited trial class was 87% and students who could not accomplish this subject was 13%. Based on the N gain test analysis, it was obtained that the students' learning outcome was on moderate category with the average achievement of 0.69.

Based on the N gain test, the average cognitive learning result test of class A was 0.78 or high category, Class B was 0.69 or moderate category, and Class C was 0.69 or moderate category. Learning result is essentially a change of students' behavior (Setiasih, 2016; 132). The success of a learning can be seen from the increase of learning ability of the students themselves (Arends, 2001 as cited in Eronika, Santoso & Maryami; 2013).

The description above showed that the developed RYLEAC learning model was valid, practical and effective; hence, could be used in teaching Basic Physics 2 subject on the topic of Electricity and Magnetic Concepts.

4.3 Supporting and Inhibiting Factors of Implementation of RYLEAC Learning Model and Media

The supporting factors in implementation of RYLEAC learning model based on the questionnaire distributed to students were 1). The facilities and infrastructure to implement RYLEAC learning model were sufficient to support learning activities, such as well-stuffed and well-maintained laboratory. Thus, students and lecturer felt

comfortable to learn using RYLEAC learning model and motivated to participate in learning activities; 2) the learning model was well implemented as there were interactions among students, lecturer, environment, and learning resources; lecturer provided time for consultation to help students solve their learning problems, and provided opportunities for students to ask questions.

In addition to supporting factor, there were also several inhibiting factors in implementation RYLEAC model, such as 1) the lab facilities for practicum were yet sufficient. This was due to lack of experiment materials to be used. Therefore, in learning, students had to be distributed into three groups in learning. This was due to many laboratory facilities that were broken and could not be used; 2) some students' habit that were not used to read relevant books and made notes on what they have read and obtained during discussion in class, and lack of concentration in learning. These influenced the learning outcome; thus, there were students who could not accomplish the learning.

4.4 The Advantages and Disadvantages of RYLEAC Learning Model

In implementation of this learning model, several advantages and disadvantages were also found. Some advantages found in this study were: (1) students have active and hands-on learning experience. This was evident in their involvement in observation/experiment solving problems together through group discussion and present the result of their observation; (2) students understand the electricity and magnetic concepts. Their concept mastery was the evident from the increase of their learning outcome from the 1st, 2nd, 3rd, 4th, and 5th meeting; (3) students were able to solve problems presented through story or phenomena; (4) students' learning motivation increased as they were actively involved in learning process; (5) Due to their active participation in learning and exchange of information among students and lecturer, learning became more meaningful; (6) RYLEAC learning modelwas based on constructivism learning; (7) This model reduced the cognitive conflict on students during learning.

The advantages found in this study are similar to those of learning cycle according to Warsono and Heriyanto (2014:35) who argued that the advantages of learning cycle were: 1) increase students' learning motivation as students are actively involved in learning process, 2) assist in developing students' scientific attitude, and 3) more meaningful learning.

Aside from those advantages, there were also several disadvantages of RYLEAC learning model implementation, such as: 1) it needed shifting of students' way of learning from only receiving information without direct involvement in learning to active participation, 2) it needs more time in planning and implementing this learning model. This was evident from the amount of time spent in learning is longer than the conventional model time. This was due to students that were still not used to implement stages in RYLEAC learning model. This was in agreement with Sanjaya (as cited in Astuti; 2015: 11) where he stated that some disadvantages of inquiry learning

model is that it takes more time in implementation. Ngalimun (2014; 35) also agreed that learning cycle has disadvantage such as it needs more time and resources in developing and implementing the learning.

5. Conclusion, Implication and Recommendation

5.1 Conclusion

The developed RYLEAC learning model based on 4D development model are:

a. Define Stage

In this stage, several analysis such as, preliminary-final analysis, students' analysis, task analysis, concept analysis, and formulate learning objectives were carried out.

b. Design Stage

The developed RYLEAC learning model design based on the result from the define stage and would be validated before the trials were carried out. The tests consisted of process skill test to find out the level of process skill and students' learning outcome test to find out the students' cognitive level.

c. Develop Stage

Define and design stages produced draft model of the learning called the first draft. This first draft would be validated by experts and would go through field trials. The steps in RYLEAC learning model were: (a) engagement, (b) orienting, (c) formulating the problem statement; (d) formulating the hypothesis; (e) collecting the data through exploration activity; (f) test the hypothesis; (g) explain; (h) elaborate; (i) formulate conclusion; and (j) evaluation.

d. Dissemination Stage

Dissemination stage was the final stage of the 4D development model. The dissemination of this study was through publication in international journal of Global of Educational Studies with the ISSN 2377-3936. Factors that support the implementation of this RYLEAC development model based on the questionnaire distributed to students were:

1) The facilities and infrastructure to implement RYLEAC learning model were sufficient to support learning activities, such as well-stuffed and well-maintained laboratory. Thus, students and lecturer felt comfortable to learn using RYLEAC learning model and motivated to participate in learning activities
2) The learning model was well implemented as there were interactions among students, lecturer, environment, and learning resources; lecturer provided time for consultation to help students solve their learning problems, and provided opportunities for students to ask questions.

The lab facilities for practicum were yet sufficient. This was due to lack of experiment materials to be used. Therefore, in learning, students had to be distributed

into three groups in learning. This was due to many laboratory facilities that were broken and could not be used; 2) lecturer distributed students into groups based on the sitting arrangement, and often they decided themselves; and 3) time limitation.

RYLEAC learning model has several benefits namely: (1) students have active and hands-on learning experience; (2) students understand the electricity and magnetic concepts; (3) students were able to solve problems presented through story or phenomena; (4) students' learning motivation increased as they were actively involved in learning process; (5) learning became more meaningful; (6) RYLEAC learning model was based on constructivism learning; (7) this model reduced the cognitive conflict on students during learning.

Apart from those advantages, this learning model also has some disadvantages such as, 1) it needs shifting of the students' way of learning from only receiving information without direct involvement in learning to active participation, 2) it needs more time in planning and implementing this learning model.

5.2 Implication

The reasoning behind the implementation of RYLEAC learning model in basic physics 2 learning, especially in electricity and magnetic concept was that students' were actively involved in carrying out investigation, trained students to interact, and focused on understanding physics concepts, thus it could increase students' science process skill and students' learning outcome. Therefore, it is expected that students would get better understanding on basic physics 2 learning, especially in electricity and magnetic concept.

The result from this study was used as input for lecturers and students as candidates of physics teacher to equip themselves to develop learning media, which can increase students' science process skill and learning outcome in basic physics 2 at Universitas Negeri Gorontalo.

5.3 Recommendation

Based on the result of this study, the following things were recommended:

1) RYLEAC learning model could be treated as an alternative model in increasing students' learning outcome, especially students' science process skill, as students were actively and directly involved in learning process from engagement, formulating problem statement, formulating hypothesis, carry out exploration, explain, elaborate, and formulate conclusion; hence, students' science process skill and cognitive learning outcome could be increased.
2) In this study, implementation of RYLEAC learning model needed more time, thus, in implementation of learning needs more time for better planning to obtain better result.

RYLEAC learning model has only been implemented in electricity and magnetic concept to increase science process skill and learning outcome. Therefore, the design of this learning model needed to be implemented as reference in other materials within

the basic physics 2 subject to increase the level of students' science process skill and students' cognitive.

References

Ali, L. U., Suastra I. W, Sudiatmika A. A. I. A. R. (2013). Pengelolaan Pembelajaran IPA Ditinjau Dari Hakikat Sains Pada SMP Di Kabupaten Lombok Timur. E-journal Program Pascasarjana Universitas Pendidikan Ganesha Program Studi IPA, Volume 3, Tahun 2013.

Arends, R. (2012). Belajar untuk Mengajar. Yogyakarta: Pustaka Pelajar. Arista S. A., Irawati S. Primayriani A. (2017).Penerapan Model Pembelajaran Inquiry Untuk Menigkatkan Keterampilan Proses Sains Mahasiswa Kelas VIII.1.Jurnal Pendidikan dan Pembelajaran Biologi 1 (1): 103-108 (2017). ISSN 2598-9669.

Avianti, R. & Yonata, B. (2015). Keterampilan Proses Sains Mahasiswa Melalui Penerapan Pembelajaran Model Kooperatif Konsep Asam Basa Kelas XI SMAN 8 Surabaya. Journal of Chemical Education. Vol.4 (2): 224-231.

Astuti, T. (2015). Kekurangan dan Kelebihan model Inquiry. Bandung.

Bruce, J. & Weil, M. (2000). Model of Teaching Boston London, Toronto, Tokyo, Singapore Hall Inc.

Chiappetta, E. & Koballa T. R. (2010). Science Instruction in the Middle and Secondary Schools. United State: Pearson Education Inc.

Eronika, S., Santoso, A., & Maryami, T. (2013). Pengaruh Penerapa Model Pembelajara Learning cycle 5 Fase Terhadap Prestasi Belajar Mahasiswa Kelas X SMA Negeri 1 Batu T.A 2012/2013 Pada Konsep Stoikiometri.

King, F. J., Goodson, L., & Rohani, F. (2011). Higher Order Thinking Skills. A publication of the Educational Services Program, now known as the Center for Advancement of Learning and Assessment, (Online), (www.cala.fsu.edu), diakses 5 Juni 2018.

Maftuhah & Rahman, T. (2015). Penerapan Learning cycle Untuk Meningkatkan Penguasaan Konsep Sistem Koordiasi Pada Mahasiswa SMA. Prosiding Simposium Nasional Inovasi dan Pembelajaran Sains.

Neka, I. K., Marhaeni, A. A. I. N., & Suastra, I. W. (2015). Pengaruh Model Pembelajaran Inquiry Terbimbing Berbasis Lingkungan terhadap Keterampilan Berpikir Kreatif dan Penguasaan Konsep IPA Kelas V SD Gugus VIII Kecamatan Abang, eJournal Program Pascasarjana Universitas Pendidikan Ganesha Program Study Pendidikan Dasar, (Online). (http://www.pasca.undiksha.ac.id), diakses 29 September 2018.

Ngalimun. (2014). Strategi dan Model Pembelajaran. Yogyakarta. Aswaja Perissindo.

Rahmawati K. S., Dasna W. (2016). Kajian Pengaruh Learning cycle 5E Terhadap Keterampilan Proses Sains Mahasiswa SMP. Pros. Semnas Pend. IPA Pascasarjana UM.Vol. 1 2016. ISBN: 978-602-9286-21-2.

Rizal M. (2014). Pengaruh Inquiry Terbimbing Dengan Multi Representasi Terhadap Keterampilan Proses Sains dan Penguasaan Terhadap Konsep IPA Mahasiswa SMP. Jurnal Pendidikan Sains Vol. 2 No. 3.

Setiasih S. P. (2016). Penggunaan Model Pembelajaran Inquiry Untuk Meningkatkan Hasil Belajar Mahasiswa Pada Konsep Sifat-sifat Magnet Di Kelas V SD Sukajaya Kecamatan Jatinunggal Kabupaten Sumedang. Pena Ilmiah 1 (1).

Setyowati A., Subali B., Mosik (2014). Implementasi Pendekatan Konflik Kognitif Dalam Pembelajaran Fisika Untuk Menumbuhkan Kemampuan Berpikir Kritis Mahasiswa SMP Kelas VIII. Jurnal pendidikan Fisika Indonesia 7 (2011): 89-96. Issn: 1693-1246. http://journal.unnes.ac.id.

Sujana A. (2012). Pendidikan IPA teori dan praktik. Sumedang: Rizal Nur.

Tania B., Murni (2017). Penerapan Model Pembelajaran Learning cycle 5e Untuk Meningkatkan Keterampilan Proses Sains Mahasiswa. Jurnal Gravity Vol.3 No. 1. ISSN 2442-515x, e-ISSN 2528-1976

Thiagarajan S., Semmel DS, Semmel MI (1974).Instructional Development for Training Teachers of Exceptional Children. Minneapolis, Minnesota: Leadership Training Institute/Special Education, University of Minnesota.

Warsono, Hariyanto (2014). Pembelajaran Aktif: Teori dan Asessment. Bandung: PT Remaja Rosdakarya.