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Yogyakarta, Indonesia, 6-7 May 2015

Rector,

Prof. Dr. Rochmat Wahab, M.Pd., M.A.
ID 19570110 198403 1 002

Head of
Institute of Research and Community Services,

Prof. Dr. Anik Ghufron, M.Pd.
ID 19621111 198803 1 001

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Edited by
Prof. Dr. Sri Atun,
Christopher Drake,
Dr. Elizabeth Hatnell-Young,
Dr. Mohamed Bahaaeldin
Prof. Dr. Sudji Mudadi,
Dr. Ing. Satoto Endar Nayoro, S., M.Eng., M.Sc.,
Retna Hidayah, ST., MT, Ph.D.,
Dr. Setya Raharja,
Dr. Widiyanto,
Dr. Arif Rohman,
Apri Nuryanto, MT.

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MESSAGE FROM THE RECTOR OF YOGYAKARTA STATE UNIVERSITY

Welcome to Yogyakarta, Indonesia!

It is a great honor and pleasure for me to welcome you all to the 3rd International Conference on Educational Research and Innovation held in Yogyakarta, Indonesia. On behalf of Yogyakarta State University and the committee, let me extend my warmest greetings and appreciation to all speakers and participants who have travelled hundreds or even thousands of miles by various transportation means to come to Yogyakarta to attend this conference. It is my strong belief that your safe journey has been due to the blessings granted by God the Almighty and the Most Merciful to Whom we without any further due have to express our gratitude and praise.

It is indeed a privilege for Yogyakarta State University to have the opportunity to organise this very important conference in which educational researchers and practitioners get together to share ideas, experiences, expectations, and research findings. This conference is held as one of the agendas of Yogyakarta State University to celebrate its 51st anniversary. The theme of this year's conference is "Ethics in High-Quality Research".

Research is one of the activities among the academic members of a university. It is a systematic effort to solve the problems or answer the questions by collecting data, formulating the generalities based on the data, then finding and developing organized knowledge by scientific method. It is expected that from research activities valuable empirical facts can be obtained to improve and develop the theory and practice to bring a better quality of education.

Unfortunately, currently issues on ethics are regaining their popularity in various practices of research, such as inaccurate data analyses, data manipulations, and plagiarsm. In response to this, in this year to support the roles of the Institute of Research and Community Services of Yogyakarta State University in encouraging researchers to conduct high-quality researches, an International Conference on Educational Research and Innovation (ICERI) is held under the umbrella theme of Ethics in High-Quality Research. It provides teachers/lecturers, education practitioners, college students, and policy makers the opportunity to share their knowledge, experiences, and research findings which are innovative and relevant to develop the educational practices focusing on the process and product.

This third conference is aimed at discussing the papers on the research findings related to research ethics, and researches on character education, teaching innovations, as well as educational policies. It is expected that this conference will reach its declared objectives succeesfully as a strategic forum to yield recommendations on the importance of ethics in the research to produce high-quality research for the benefits of the human's welfare.

To conclude, let me wish you a fruitful discussion during the conference and an enjoyable stay in Yogyakarta. And finally, hopefully all materials in this conference compiled into a proceeding are useful for us to improve the quality of education and educational research.

Thank you very much for your attention.

Wassalamu'alaikum warrahmatullah wabarakatuh.
May peace and God's blessings be upon you all

Yogyakarta, 6 May 2015
Rector,

Prof. Dr. Rochmat Wahab, M.Pd., M.A.

MESSAGE FROM THE ORGANIZING COMMITTEE

His Excellency Minister of Research and Technology and Higher Education,
Vice Rectors and Deans of all faculties,
Honourable Heads of Institutes of Research of the surrounding universities,
Distinguished all invited speakers and all other speakers,
Distinguished guests,
All participants,
Ladies and gentlemen,

Assalamu' alaikum warrahmatullah wabarakatuh
May peace and God' s blessings be upon you all
Good morning

First of all allow me to extend my warmest greetings and welcome to you all to the 3rd International Conference on Educational Research and Innovation, held by Yogyakarta State to celebrate its 51st anniversary.

Raising the theme – Ethics in High-Quality Research - this conference is designed to discuss the papers on the research findings related to research ethics, and researches on character education, teaching innovations, as well as educational policies. Hopefully, all discussions in this conference can be inspiring and useful for us to improve the quality of education and educational research.

Ladies and gentlemen

For your information, we will proudly present one keynote speech, four plenary presentation sessions and four parallel presentation sessions. Four outstanding speakers in the field of character education and educational research have been invited. They are Christopher Drake from Association for Living Values Education, Hong Kong, Dr. Elizabeth Hartnell-Young from Australian Council of Educational Research, Dr. Mohamed Bahaaeldin from Faculty of Education, Technische Universitat Dresden, Germany, and Dr. Nurul Taufiqurahman, Head of Innovation Center of the Indonesian Institute of Sciences (LIPI), Indonesia.

Ladies and gentlemen

We have done our best to prepare for this conference. So, my highest appreciation and heartfelt thanks to all committee members. As to err is human, shortcomings may

occur here and there. On behalf of the committee, I would therefore like you all to accept our apologies.

At the end of my speech,I would like to kindly request the Rector of Yogyakarta State University to officially open the conference.

To conclude, let me wish you a productive discussion and a fruitful conference.
Thank you very much for your attention.

Wassalamu' alaikum warrahmatullah wabarakatuh.
May peace and God' s blessings be upon you all

Yogyakarta, 6 May, 2015
Head of Research Institute and Community
Service of Yogyakarta State University

Prof. Dr. Anik Ghufron, M.Pd.

FOREWORDS FROM THE HEAD OF COMMITTEE

Assalamu'alaikum wa Rahmatullohi wa Barokatuh
May peace and God's blessings be upon us all

Your Excellency The President of Yogyakarta State University Prof. Dr. Rochmat Wahab, M.Pd, M.A, ladies and gentlemen, good morning and welcome to Yogyakarta State University.

The seminar entitle International Conference on Educational Research and Innovation (ICERI) is held under the umbrella theme of Ethics in High-Quality Research. The seminar is organized by Institute of Research and Community Services, Yogyakarta State University, working together with ACER, LIPI, and University of Dresden. This seminar also dedicated to celebrate the 51st Commemoration of Yogyakarta state university.

Ladies and gentlemen, on behalf of the commitee of this conference, I would like to express highest appreciation and gratitude to the keynote speakers **Prof. Drs. Muhammad Nasir, Akt, M.Si, Ph.D** (Minister of Research, Technology and Higher Education) and four inveted speaker :

- **Christopher Drake**
  (Association for Living Values Education, Hong Kong)
- **Dr. Elizabeth Hatnell-Young**
  (Australian Council for Educational Research, Australia)
- **Dr. Bahaaeldin Mohamed**
  (Faculty of Education, Technische Universitat Dresden, Germany)
- **Dr. Nurul Taufiqu Rahman, M.Eng.**
  (Head of Innovation Center, Indonesian Institute Sciences (LIPI), Indonesia)

The conference is around 200 participant with 121 orally presented article from lecture, researcher, teacher, and student from about 45 universities. The conference is aimed at discussing the papers on the research findings related to research ethics, and researches on character education, teaching innovations, as well as educational policies. It is expected that this conference yields recommendations on the importance of ethics in the research to produce high-quality research for the benefits of the human's welfare.

This conference will be far from succes and we could not accomplish what we do without the support from various parties. So let me extend my deepest gratitude and highest appreciation to all committee members. I would also like to thank each of participants for attending our conference and bringing your expertise to our gathering. Should you find any inconveniences and shortcomings, please accept my sincere apologies. In conclusion, I hope that your discussions produce something useful and very pleasant stay in Yogyakarta.

Wassalamu' alaikum wa Rahmatullohi wa Barokatuh
Thank you

Por. Dr. Sri Atun

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SMART CHEMIST:THE MEDIA FORCHEMISTRY LEARNING ON ATOMIC STRUCTURE AND PERIODIC SYSTEM OF ELEMENTS

Ari Wahyu Saputro[1], Jaslin Ikhsan[2]

Faculty of Mathematics and Natural Sciences, Yogyakarta State University
Karangmalang, Yogyakarta, Indonesia, 55281
[1]a.wahyusaputro@gmail.com, [2]jikhsan@uny.ac.id

Abstract

This research developedthe mobile game "Smart Chemist" as chemistry learning media for senior high school on atomic structure and periodic system of elements. The media was evaluated by chemistry teachers for the eligibility of use as learning media. The game was developed using ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model. First product of the game was reviewed and commented by supervisor lecturer, a chemistry expert, amultimedia, technology and information expert, and 3 peer reviewers. Product revision was done based on the comments, and evaluated by 5 Chemistry teachers on the aspects of subject matter, language, operational process, audio-visual, and software designby using a Lykert quistionnaire. Finally, the mobile game was produced and easily played on Android mobile phone.Based on teachers evaluation, the score of criteria was $\bar{X} = 109.2$ ($\bar{X} > 105.1$). The criteria suggest that the mobile game was very good, close to ideal learning criteria, as indicated by the ideal percentage of 87,36%.

Keywords: Learning Media, Mobile game, ADDIE,Android, Atomic structure, Periodic system of elementer

1. Introduction

Within the past five years, the use of mobilegames as learning media has snowballed. [1].Games can now be played everywhere in technology-rich environments equipped with laptops, smart phones, game consoles (mobile and stationary), set-top boxes, and other digital devices. From this phenomenon, it is believed that the intrinsic motivation that young people show towards games could be combined with educational content and objectives into what Prensky calls "digital game based learning [2].

Based on observation in Magelang regency, The use of mobile game as learning media is still fairly new. Mostteachers have not used a mobile game as a learning media yet. The use of mobile game is expected to be an interesting learning media. It introduces chemistry lesson. Learning process byusingmobile gamemakes the students interestedandfun. The learning processwill beeffectivewhenstudentsarehappycondition [3].

Therefore, it was necessary to make learning media that can simpifly the learning material. The research was to develop Android Mobile Game as chemistry learning media on atomic structure and periodic system of elements. The mobile game was evaluated by 5 chemistry teacher to determine the quality of mobile game.

2. Literary Review

2.1 Research and Development

Research and development (R and D) is a method that used to result a certain product

and to review the effectiveness of the product [4]. There are two models in research and development. They are conceptual model and procedural model [5].

2.2 ADDIE Model

ADDIE is one of procedural model in research and development. In this model, there are five phase to result certain product. There are analyze phase, design phase, development phase, implementation phase and evaluation phase [6].

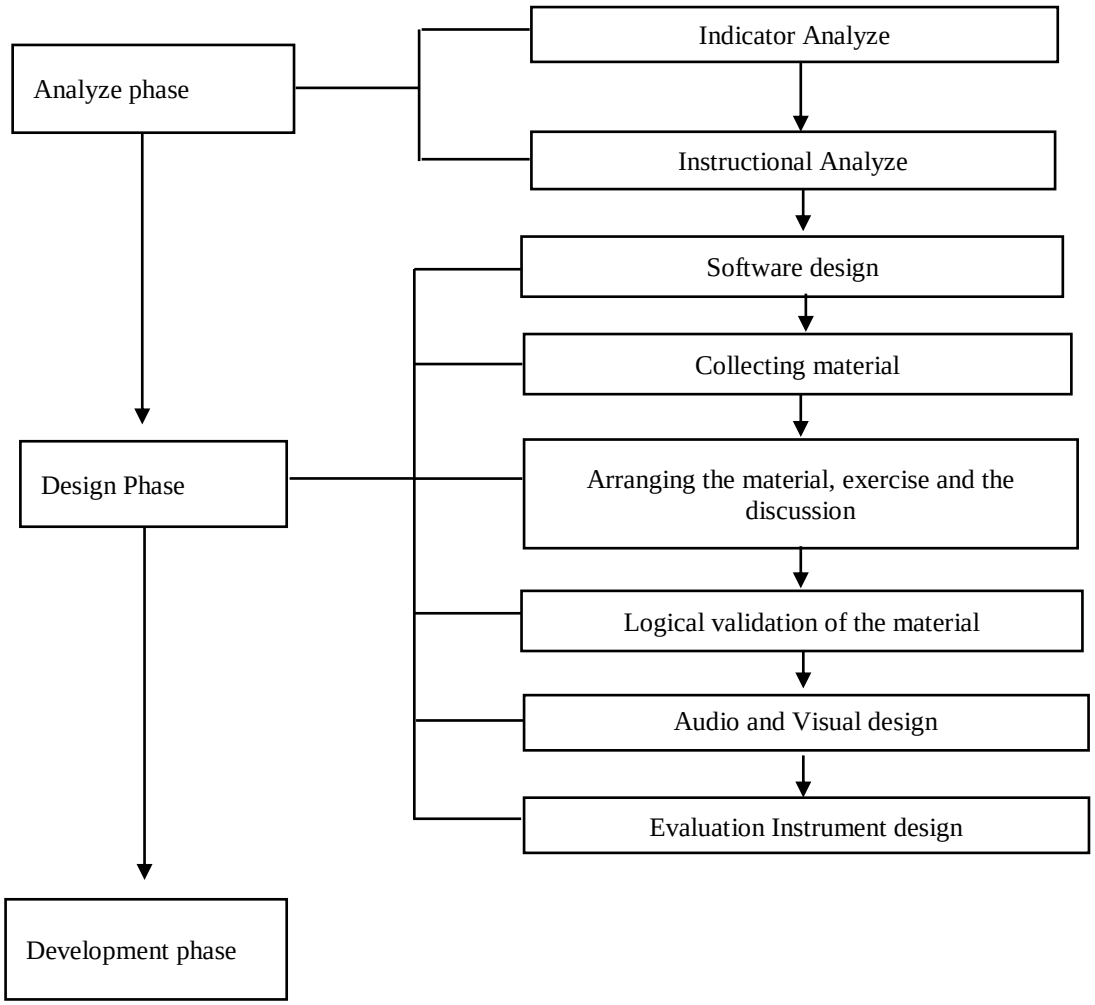
2.3 Learning Media

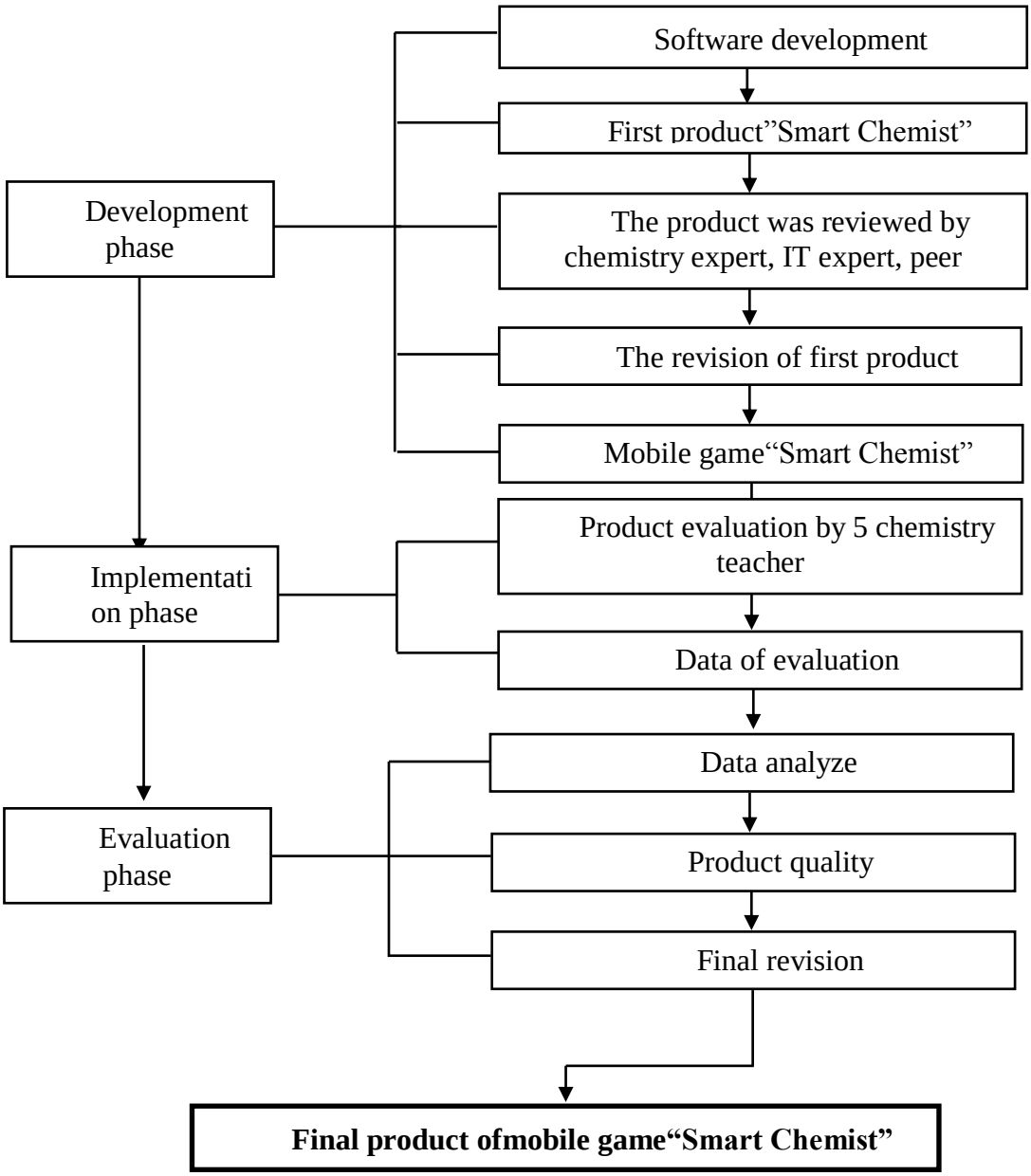
Learning media is something that used to deliver information between teacher and students [7].Learning mediacanrepresentthe role of teacher. Evenlearningmaterials can be made more tangible bythe presence ofthe media. Thus, the studentsmore easilyunderstand the material. The level of difficulties of materials can be reduced by using learning media[8].

2.4 Chemistry lesson

Chemistry is a branch of science that learn the chemical and its changing. Elements and solution are the component that include in chemical changing [9]. The first material of chemistry in senior high school is atomic structure and periodic system of elements.

3. Diagram of research methods





4. Result and Discussion

4.1 Result

The mobile game was evaluated by 5 chemistry teachers. The aspect that evaluated were subject and matter, language, operational, audio visual, and software design.The evaluation data of each aspect by teachers can be seen at Table 1.

Table 1. Evaluation data of teachers

No	Aspect	Average Score ($\bar{X}$)
1.	Subject Matter	26.40
2.	Language	8.20
3.	Operational	18.00
4.	Audio and Visual	33.40
5.	Software design	23.20
Total Score		**109.20**

4.2 Discussion

The result of this research was the product of mobile game "Smart Chemist". This mobile game was developed by using Construct 2 program. The first product game was reviewed and commented by supervisor lecturer, a chemistry expert, a multimedia, technology and information expert, an instructional design expert and 3 peer reviewers. Then, the product was evaluated by 5 chemistry teachers.

a. Subject matter aspect

Subject matter aspect was only evaluated by teacher. Based on the data, the average score of subject and matter evaluation was 26.40 ($\bar{X}$ > 25.20). The maximum score of this aspect was 30. The criteria suggest that subject and matter aspects were very good, closed to ideal learning criteria, as indicated by the idealpercentage of 88%. It means that subject matter provided in the game was appropriate and in line to the indicator of curriculum. It means that the subject matter in the game was good and appropriate as learning materials for students in the point of levels of width and depth of materials. Each exercise of this game has only one answer [10].

b. Language aspect

There are 2 indicators in this aspect. The maximum score of this aspect was 10. Language aspect was evaluated by teachers and students. Based on teacher's evaluation, the average score of this aspect was 8.20 ($6.80 < \bar{X} \leq 8.39$). So, the criteria suggest that language aspect is good, close to ideal learning criteria. Good languageis language that arranged by communicativesentence, using good and true Indonesian, does not causea doubleinterpretation, and does notoffendthe student [11].

c. Operational aspect

There are 4 indicators in operational aspect. The maximum score of this aspect was 20. Based on the evaluation, the average score was 18.00. The criteria suggest that operational aspect is very good, close to ideal learning criteria, because the average score $\bar{X}$ >16.80.

d. Audio visual aspect

There are 8 indicators in this aspect. The result of evaluation, the average score was 33.40. The maximum score of this aspect was 40. So, the criteria suggest that audio visual aspect is good, close to ideal learning criteria because the average score $27.20 < \bar{X} \leq 33.59$. Based on learning cone of Edgar Dale, audio visual was included enactive category. Enactive category is the experience that people get as the own experience. Enactive is placed in the bottom of Edgar Dale's cone. It means that the knowledge that people get is higher than ionic or abstract category [12].

e. Software design aspect

Total indicator in this aspect was 5. The maximum score of this aspect was 25. Based on the evaluation, the average score of software design was 23.2. So, the criteria suggest that software design aspect is very good, close to ideal learning criteria. Because the average score $\bar{X} > 20.99$. This aspect get highest score than other aspect, because in software design aspect teachers and students assume that the mobile game is the new learning media that they have been never used before.

5. Conclusion

The mobile game "Smart Chemist" was developed and easily played on Android mobile phone. The game was very good based the review of teachers.Based on teachers evaluation, the score of criteria was $\overline{X} = 109.2$ ($\overline{X} > 105.1$). The criteria suggest that the mobile game was very good, close to ideal learning criteria, as indicated by the ideal percentage of 87,36%.

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