

Development of interactive multimedia based on Lectora Inspire to improve understanding about disaster mitigation material in senior high school

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Abstract. Media that gives pupils a comprehensive grasp is necessary to improve comprehension of disaster mitigation content. One of the teaching strategies that can raise the standard of geography instruction is information and communication technology-based learning. An application for creating interactive learning multimedia and e-learning content is called Based Lectora Inspire. The purpose of this study was to: (1) develop and find out the feasibility of interactive multimedia based on Lectora Inspire about disaster mitigation materials as a geography learning medium (2) determine the effectiveness of the Lectora Inspire media that was developed to improve the results of students understanding of the material. The four steps of the Borg and Gall model needs analysis, multimedia model design, media development, and multimedia evaluation are used in this study's Research and Development (R&D) methodology. The study's findings indicate that: (1) With a very good category, interactive multimedia based on Lectora Inspire on disaster mitigation materials can be used as a geography learning tool; (2) Lectora-inspired interactive multimedia effectively enhances comprehension of disaster mitigation content. Compared to audio-visual media, interactive multimedia based on Lectora has a greater impact on enhancing comprehension of disaster mitigation in this study.

1. Introduction

Having the appropriate medium to help students understand disaster mitigation materials that fit their needs and characteristics is essential to lowering the risk of disasters. Using interactive multimedia is one way to make learning engaging and enhance students' comprehension of earthquake and tsunami disaster mitigation resources. To make learning easier for pupils, books that have been used as teaching tools need to be updated. The advancement of information and communication technologies offers numerous advantages for raising the standard of geography education [1]. The position of the media is considered as a tool used by the teacher to explain the lesson. The first aids are visual aids, which are tools that can provide visual experiences to students to motivate, clarify and simplify abstract concepts and enhance students' absorption [2]. Then along with technological developments, especially audio technology, in the 20th century audio-visual aids were created that use concrete experiences to avoid verbalism. Interactive multimedia based on Lectora Inspire is one of the resources that may be utilized to teach students about earthquake and tsunami catastrophe mitigation.

The usage of interactive learning multimedia based on Trivantis Corporation's Lectora Inspire will be tested in this study. In other words, interactive learning multimedia can be understood as a multimedia application that is utilized in the learning process to channel messages (knowledge, skills, and attitudes) and to stimulate students' choices,

feelings, attention, and willingness so that learning is purposeful, controlled, and intentional [3]. Lectora Inspire is a software authoring tool for creating e-learning materials, programs to create interactive multimedia learning, create applications, create and develop online courses and presentations [4]. Lectora inspire can be the foundation for the development of other types of media.

Students are still unable to grasp and comprehend the information on catastrophe mitigation. The usage of educational materials that solely rely on textbooks is another. One of the reasons geography education in schools is viewed as unappealing is that it is typically taught verbally, lacks factual information, and does not make use of contemporary technology or tangible media [5]. Conventional learning in the form of knowledge transfer from teachers to students in one direction is still the choice of most teachers in the learning process where learning is teacher-oriented [6]. So we need a learning media that is a solution for teachers and students in improving understanding of the material. The use of multimedia in the classroom has several advantages, including making the learning process more engaging and interactive, cutting down on instructional time, improving student learning quality, enabling the process to be conducted anywhere and at any time, and improving students' attitudes toward learning [7].

Based on the problems above, the researchers will conduct a study entitled "Development of interactive multimedia based on lectora inspire to improve understanding about disaster mitigation material in senior high school". The purpose of this study was to: (1) develop and find out the feasibility of interactive multimedia based on Lectora inspire about disaster mitigation materials as a geography learning medium; (2) determine the effectiveness of the lectora inspire media that was developed to improve the results of students understanding of the material.

2. Methods

RnD was the type of research that was being conducted. The purpose of this study is to create and evaluate a product. Based on Lectora's inspiration for disaster mitigation resources, an interactive multimedia product was created. By using the Dick and Carey model for multimedia model design, the Borg and Gall model is the type of development model that serves as the framework for this study [8], as well as the Alessi and Trollip model for multimedia development and evaluation syntax [9]. Need analysis, multimedia model design, multimedia production, and multimedia product evaluation are the four main stages of the process.

2.1 Development procedure

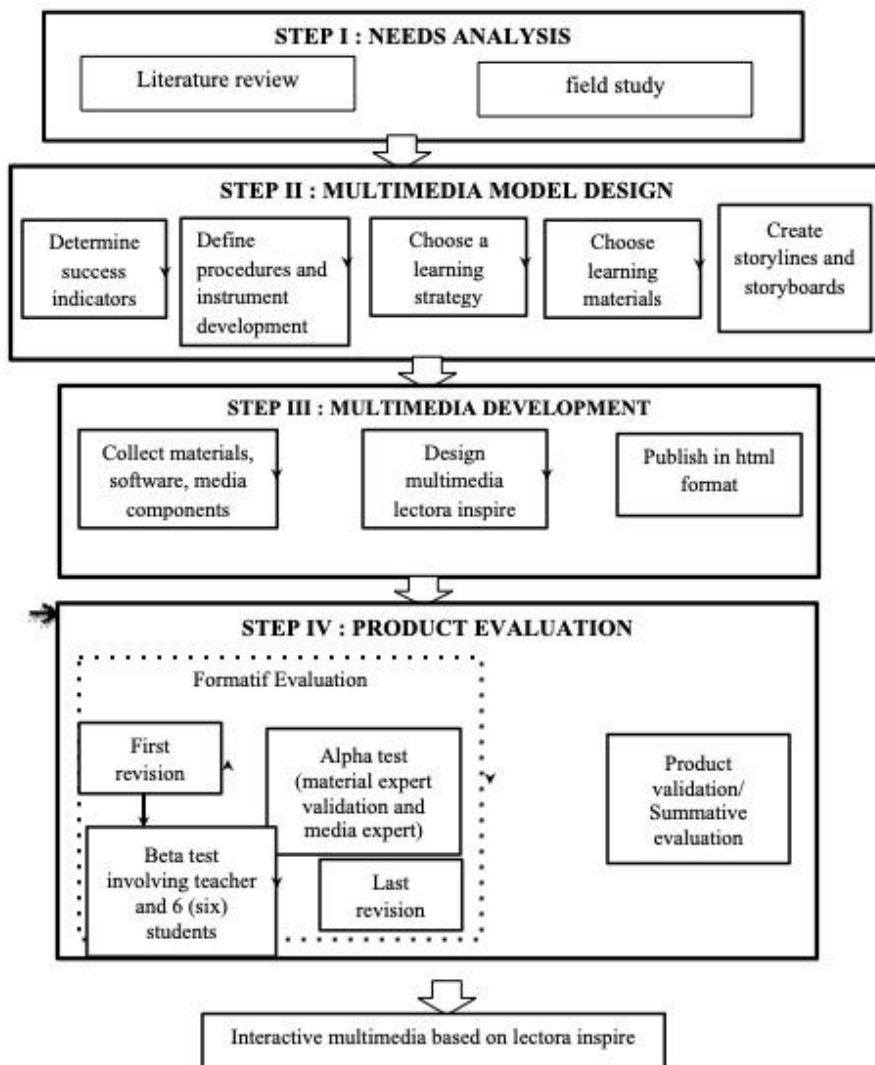


Figure 1.

2.2 The Product trial

The product trial in this study aims to collect data about the product being developed. The data obtained from the formative evaluation results are used to improve and refine interactive multimedia so that it meets the eligibility criteria. While the information gathered from the validation of the summative assessment seeks to determine whether interactive multimedia based on Lectora Inspire is practical as a geography learning tool and useful in enhancing comprehension of disaster mitigation materials.

2.2.1 Trial Design

Interactive multimedia evaluation consists of three phases, namely: (1) alpha test; (2) beta test; and (3) summative evaluation test. Alpha test is a formative evaluation involving researcher with media experts and material experts. This trial was carried out after this

product was finished. Beta test is included in formative evaluation involving teacher and students. After the interactive multimedia based on Lectora Inspire passed the alpha test stage and a product revision was completed, the beta test was conducted. Finding interactive multimedia based on Lectora Inspire that is appropriately designed as a geography learning medium and has an impact on students' comprehension of disability mitigation materials during the actual learning process is the goal of summative evaluation, a set of evaluation stages in development research.

2.2.2 *Trial Subject*

The test subjects in this development research are material expert (validator), media expert (validator), and students. At the alpha test stage, it involves media expert and material expert. The beta test involved six students representing high, medium and low abilities. In the summative evaluation of the test subjects as many 64 students. The test subject were taken by purposive sampling technique.

3. Results and Discussion

3.1 *Description of Interactive Multimedia based Lectora Inspire Development*

1. Needs Analysis

The development of interactive multimedia begins with a needs assessment via a preliminary study. The preparatory investigation comprises of a literature review and a field survey. Data acquired are:

1) Literature review

According to a review of the literature on the findings of earlier studies, using interactive multimedia in the classroom has several advantages for the learning process, including improving students' enthusiasm to learn and their comprehension of subjects. However, the learning environment that is integrated into a multimedia depends on how effective it is. One of the reasons geography education in schools is viewed as unappealing is that it is typically taught verbally, lacks factual information, and does not make use of contemporary technology or tangible media [10]. Some multimedia-based e-learning methods' primary drawbacks are that they lack sufficient content, flexibility in managing the learning process, and support for student participation [11].

The class group that uses e-learning multimedia significantly outperforms the traditional class group [12]. Education can benefit from multimedia. Multimedia's primary characteristics include user control over information delivery and interactivity, which can aid students in developing a deeper understanding, supporting the conceptualization and contextualization of newly presented material, actively involving students in the learning process, encouraging introspection, and facilitating communication between students and teachers [13]. These issues may be resolved by employing interactive multimedia learning based on Lectora Inspire.

2) Field study

The findings of field investigations carried out by researchers using observations and quick conversations with the researcher yielded information that: (1) The teacher rely on book media in geography learning. Occasionally use power point in delivering material and have never used interactive multimedia in the learning process; (2) There are a lot of learning materials that are difficult to convey by the teacher and absorbed by students and almost all geographic material is classified as abstract. (3) Reports on student learning outcomes in understanding

disaster mitigation materials are still relatively low; (4) There is a computer laboratory that is rarely used. Sometimes used for assessment; (5) Compared to other media, teachers require interactive multimedia for geography instruction.

2. Multimedia Model Design

The outcomes of the needs analysis are used to develop the multimedia model. Among the actions performed are: (1) determining success indicators, namely multimedia feasibility indicators and determining indicators for understanding disaster mitigation materials. Multimedia feasibility indicators include media and material aspects. The understanding indicators consist of three categories of translation, interpretation and extrapolation which include translating the definition of disaster, stating the types of disasters, restating the causes of Indonesia as a disaster-prone country, concluding disaster characteristics, reinterpreting the factors causing the earthquake and tsunami disaster, interpreting the impacts caused disaster, conclude signs before the tsunami occurs, predict actions to be taken during a disaster, determine the distribution of earthquake and tsunami-prone areas, conclude the stages of the disaster management cycle, finalize rescue operations during the earthquake and tsunami crisis and decide on disaster management initiatives before, during, and after the event; (2) determine the assessment procedure, namely questionnaires and tests and develop assessment instruments, namely multimedia assessment sheets and multiple-choice test results of understanding the material; (3) developing a learning strategy, namely interactive multimedia with a tutorial presentation model; (4) selecting learning materials; (5) create *storylines* and *storyboards* as a multimedia picture that will be produced.

3. Multimedia Product Development

At the product development stage, researchers carry out activities including (1) gathering and creating the required content, including text, pictures, musical instruments, animation, sound, and video; (2) designing materials using the Lectora inspire application and (3) publishing multimedia files in html and exe formats.

4. Evaluation of Multimedia Products

At the evaluation stage of this product, researchers carried out activities including (1) ongoing evaluation, namely researchers checked the interactive multimedia components as a whole; (2) formative evaluation includes alpha test, where the researcher tries out interactive multimedia by judging media experts and material experts and revises the first stage according to suggestions; beta test, namely researchers pilot interactive multimedia to users. The test was carried out in a small class setting consisting of 6 students from SMA Negeri 1 Meulaboh to use interactive multimedia and assessed the improvement in the results of understanding the material; (3) summative evaluation, where the researcher tried out interactive multimedia to students in the actual learning environment setting, namely 64 students of SMA Negeri 1 Meulaboh.

3.2 *learning media*

Lectora Inspire software was used to create interactive multimedia for the study. You could use a computer or other device to access this online. This media was used in delivering disaster mitigation materials by integrating images, animations, videos, audio, graphics, text containing learning content and instructions that are systematically arranged, containing a sequence of commands that can be easily understood, can be used repeatedly and effectively adapted to the needs of the community characteristics of students. There are three menus in the beginning of media, they are competence, theory and quiz. The information included earthquake and tsunami disaster kinds, their characteristics, the distribution of earthquake

and tsunami-prone locations, and the cycles of natural disaster management through education, traditional knowledge, and the use of contemporary technology. From Figure 2 to Figure 6, the media figure is visible.



Figure 2. The Beginning Page of Media

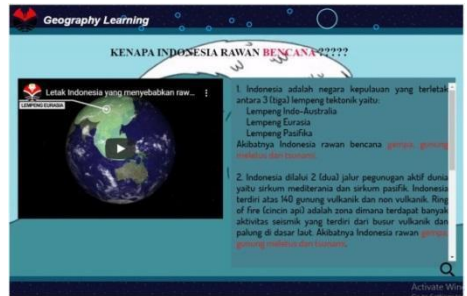


Figure 3. Material Page



Figure 4. Material Page



Figure 5. Quiz Page

Display of learning media as a whole can be accessed on multimedialectorainspire.epizy.com.

3.3 Validity of learning media

3.3.1 Alpha test

Learning media validation consists of media expert and learning expert. There are two aspects that are assessed by material experts in the alpha test, namely the learning aspect and the material aspect.

Table 1. Material Validation results

No	Aspect	Score
1	Learnig aspect	4.85
2	Material/content aspect	4.71
Average		4.78

The learning aspect comprises the following: the clarity of basic competencies and indicators of competency achievement; the relevance between KD, indicators, materials, and evaluation; the systematic presentation of material; the attractiveness of material

presentation; the provision of quizzes to master the material; the provision of opportunities for independent practice; and the provision of motivation in the very good category, as indicated by Table 1's average assessment of material experts on the learning aspect, which is 4.85. The material/content aspect, on the other hand, gets an average of 4.71 with a very good category. This includes the material's suitability for the competition, the clarity of the material description, the text's readability, the clarity of the image and video aspects, the clarity of the sound/audio aspect, the effectiveness of the examples in mastering the competence, and the relevance of the questions to the competency indicators. Thus, from a material perspective, the *Lectora inspire media* that was created was deemed viable as a geography learning medium and could proceed to the next stage, which is beta testing with modifications based on the recommendations made. The average score for both aspects of this assessment was 4.78 with a very good category.

There are three aspects that are assessed by media experts in the alpha test, namely the interface aspect, the navigation aspect and the durability aspect.

Table 2. Media Validation Results

No	Aspect	Score
1	Interface aspect	4.75
2	Navigation aspect	4.25
3	Endurance aspect	4.66
Average		4.55

According to Table 2, media experts gave the interface an average rating of 4.75, indicating that it has features for product display, organized media presentation, text, video, photos, animation, and user-friendliness.comprehended, and it falls into the very good category as a learning tool. The average score in the very good category is 4.25 for the navigation element, which comprises navigation consistency, button consistency, previous, next, exit, help, home, and user control. Meanwhile, the average score in the very good category for endurance, which covers ease of access, durability for use on other computers, and endurance for independent tasks, is 4.66. The media expert's evaluation of the two factors yielded an average grade of 4.55, falling into the very good category, so that from the media point of view, *Lectora inspire* was declared feasible as a geography learning medium and could be tested in the next stage, namely beta testing with revisions according to suggestions.

3.3.2 Beta test

Following the initial revision based on the advice and feedback of media and material specialists, users test the *Lectora Inspire media* in the beta test. In order to get an idea of how effective this multimedia is when used in real learning, the beta test was conducted to gather user feedback in this case, educators about *Lectora inspire media* and to improve the outcomes of understanding the material after using it.

The rise in students' comprehension results following their use of the *Lectora inspire media* demonstrates the validity of the program in enhancing learning outcomes. Six students with high, medium, and low ability levels participated in this small class trial.

Table 3. Understanding Material On Beta Test

Students code	Value		N-gain	Category
	Pretest	Posttest		
PD-1	54	84	0,65	Medium

PD-2	60	87	0,68	Medium
PD-3	62	86	0,63	Medium
PD-4	67	91	0,73	High
PD-5	68	89	0,66	Medium
PD-6	51	80	0,59	Medium

3.4 The effectiveness of learning media

The final stage test, known as summative evaluation, is conducted to determine whether the interactive multimedia has met its objectives, is actually practical as a geography learning medium, and is effective in enhancing the outcomes of material comprehension when applied to the actual learning environment. In this instance, comparing the improvement in students' understanding results when using Lecturer Inspire media with audio-visual media—where the increase is assessed by the N-gain acquired by students—allows us to assess how efficient Lectora Inspire is at increasing comprehension of the topic. If the average N-gain value of students' comprehension of the learning process using Lectora inspire media is noticeably higher than the average N-gain value of students' comprehension of the material using audio media and visuals, then Lectora inspire media is considered effective in improving the results of material understanding. Two classes served as the experimental class and the control class for the summative assessment. This has 64 pupils from SMA Negeri 1 Meulaboh's class XI IPS.

Tabel 4. Comparison of Material Understanding Results in Summative Evaluation

No	variabel	Eksperimental group		Control grup	
		Pretest	Posttest	Pretest	Posttest
1	Highest score	67	93	67	93
2	Lowest value	48	70	48	67
3	Average score	58,34	83,91	58,09	58,09
4	Standard deviation	4,877	5,348	4,914	6.543
5	Average N-gain	0,62		0,51	

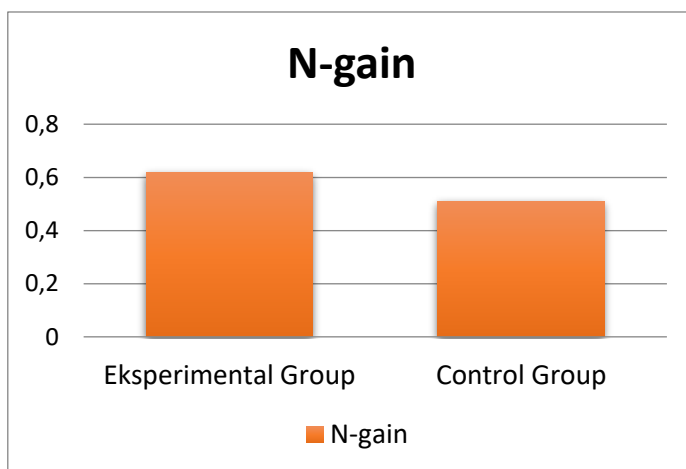


Figure 6. Ngain Score

The N-gain data in the experimental class and control class displayed a p value < 0.05, suggesting that sig (2-tailed) $0.001 < 0.05$, according to the findings of the independent sample t-test test. This indicates that understanding outcomes in the experimental group are noticeably better than those in the control group. This shows that, at SMA Negeri 1 Meulaboh, interactive multimedia based on Lectora Inspire is much more successful than audio-visual media at enhancing students' comprehension of disaster mitigation content.

4. Conclusion

The following conclusions can be drawn from the research conducted at SMA Negeri 1 Meulaboh:

1. Lectora-inspired interactive multimedia regarding disaster mitigation resources can be used as a teaching tool for geography. The entire collection of learning materials is available at multimedialectorainspire.epizy.com.
2. Experimental students at SMA Negeri 1 Meulaboh showed a notable shift in their comprehension of disaster avoidance before and after utilizing interactive multimedia based on Lectora inspire.
3. The impact of interactive multimedia based on Lectora inspire and audio-visual materials on the experimental and control classes' comprehension of disaster mitigation information varies. Compared to audio-visual media, interactive multimedia built on Lectora inspire yields better results when it comes to learning disaster mitigation content.

References

- [1] Arrasyid, R., Setiawan, I., & Sugandi, D. Developing Learning Media Based on Geographic Information System for Geography Subjects in Senior High School. *Journal of Social Science Education*, **28**(1). <http://dx.doi.org/10.17509/ipis.v28i1.12163> (2019)
- [2] Yani, A. *Learning Media for Environmental Education*. Bandung: PLPG Rayon UPI Bandung. (2009)
- [3] Munir. *Multimedia: Concepts and Applications in Education*. Bandung: Alphabeta (2015)
- [4] Tompo, B. *Creating interactive learning applications and media with Lectora Inspire 16*. Yogyakarta: DIY Indonesian Teachers Association (2017)
- [5] Maryani, E. *Geography in the Perspective of Science and Education in Schools*. *Educational Sciences*, 1-**39** (2006)
- [6] Wiana, W, dkk. The Effectiveness of Using Interactive Multimedia Based on Motion Graphic in Concept Mastering Enhancement and Fashion Designing Skill in Digital Format. *Journal: International Journal of Emerging Technology in Teaching*, **13**(2), 4–20. doi: <http://journals.sfu.ca/onlinejour/index.php/ijet/article/viewFile/7830/4805oc1> (2018)
- [7] Simartama, J & Mujiarto. *Learning Multimedia*. Bandung: Alfabeta (2019)
- [8] Dick, W., Carey, L., & Carey, J. O. *The Systematic Design of Instruction 7th Ed*. New Jersey: Pearson Education, Inc (2009)
- [9] Alessi, S. M., & Trollip, S. R. *Multimedia for Learning: Methods and Development*. Massachusetts: A Pearson Education Company (2001)

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- [10] Maryani, E. Geografi dalam Perspektif keilmuan dan Pendidikan di Persekolahan. Tersedia: http://file.upi.edu/Direktori/FPIPS/Jur._Pend._Geografi/196001211985032enok_Maryani/Geografi. (2006)
- [11] Zhang, D., and J. F. Nunamaker. A natural language approach to content-based video indexing and retrieval for interactive e-learning. *IEEE Transactions on Multimedia* **6** (3): 450–458 (2004)
- [12] Zhang, Dongsong. Interactive Multimedia-Based E-Learning: A Study of Effectiveness. *American Journal of Distance Education*, **19**(3), 149–162. doi:10.1207/s15389286ajde1903_3 (2010)
- [13] Cairncross, Sandra; Mannion, Mike. Interactive Multimedia and Learning: Realizing the Benefits. *Innovations in Education and Teaching International*, **38**(2), 156–164. doi:10.1080/14703290110035428 (2001)