DEVELOPMENT OF LECTORA INSPIRE APPLICATION-BASED E-MODULES ON THE TOPIC OF COLLOID SYSTEMS

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Abstract: The problem that often occurs during the learning process is that students feel bored and do not focus on the material taught by the teacher. Hence, students are not active during the discussion process, and these problems result in low student learning outcomes. In this case, the teacher seeks to arouse student interest and motivate students to be more enthusiastic about learning using the Lectora Inspire application-based learning media. This type of research was research and development (R&D) using the 4D model consisting of 4 stages: define, design, develop, and disseminate. The define stage was carried out by analyzing to obtain information in the field. The design was done by making an e-module design; the development stage is developing e-modules using Lectora Inspire and conducting assessments and trials. The final stage was dissemination, namely disseminating e-modules. After being validated, the research results showed that modules based on Lectora inspire applications in the colloid system course were declared feasible after being validated by material experts, media experts, teacher responses, and student responses. Assessment of material and media experts with an average percentage of 90.41% with the appropriate/valid category, the percentage of teacher responses was 84.76% with very high criteria, and the percentage of student responses was 83.54% with very high criteria. Based on the results of the n-gain score of 0.62 with a moderate category, the Lectora inspire-based e-module effectively improves learning outcomes. It can be concluded that the electronic module based on the inspirational Lectora application as an interactive learning medium effectively improves student learning at school.

Keywords: Colloid system, E-module, lectora inspire.

INTRODUCTION

The 2013 curriculum requires students to be proactive, creative, and innovative in solving problems. This requires teachers to be more innovative and creative in choosing learning methods and delivering learning materials so that students do not feel bored quickly when receiving learning materials and doing assignments given by the teacher (Prasetyo & Wijaya, 2019). In the current era of globalization, information and communication technology can be used in learning. Electronic modules, commonly called e-modules, are one example. The e-module allows teachers to develop

more varied learning resources. Teachers can not only enter information in the form of text and images. However, they can also be given interactive material and examples through their videos or from platforms like YouTube. This will make learning more interesting, fun, practical, and effective because the teacher has systematically organized it. E-modules have advantages compared to printed modules, namely that they can be equipped with video, audio, animation, and other interactive features that can be played or played back by students so that they will enrich students' learning experience (Sukirwan & Anriani, 2022). E-modules can also provide independent learning experiences to students to learn to solve problems in their way (Gufran & Mataya, 2020). In addition, e-modules can be accessed and used through electronic devices outside the classroom (Elvarita & Handoyo, 2020).

E-module is one example of useful material for students learning independently (Nora & Jusar, 2015). The use of e-modules in learning can improve student chemistry learning outcomes. E-modules effectively improved students' chemistry learning outcomes (Mufida & Subandowo, 2022). Electronic chemistry modules interest students in learning

chemistry and improve student learning outcomes (Afriani & Haris, 2022). Developing e-modules that are presented interactively with animations, images, audio, and video can create a more interactive learning atmosphere and improve student learning outcomes (Adawiyah & Laksmiwati, 2021).

One of the high school chemistry theories is colloid systems. Colloidal substances consist of the definition of a colloid system, colloid components, types of colloids, characteristics of colloids in everyday life colloid system, arsenic colloids and tenuous colloids, and colloid system forming. One of the causes of students' difficulties in understanding chemistry learning is that students tend not to understand the concepts they are learning and only remember chemical theory, especially in colloid material. This was supported by Ariani's research in the XI IPA 1 class of SMA Negeri 11 Banjarmasin in the 2012/2013 academic year, in colloidal material in particular, the completeness was only about 55% of all students (Ariani, 2015). Colloidal material was purely conceptual understanding without requiring algorithmic understanding skills (Rizki & Cawang, 2016). Therefore, to achieve 100%

student completeness should not be a difficult thing to achieve.

Teachers can make various efforts to develop student learning activities in one way or other subjects with methods of arousing student interest, motivating students, and using learning media that can arouse student enthusiasm (Friana & Dewiwati, 2018). Learning using the theoretical form module can involve students actively in cognitive, psychomotor, and scientific settings. The module is one self-directed learning resource, including a series of systematically designed and developed learning experiences to help students achieve learning goals (Jauza & Muhaimin, 2015). Theory can be more interesting with multimedia-based teaching materials, including interactive e-modules. Interactive e-module material is the process of publishing digital material consisting of text, images, or a combination of both, which are presented systematically for learning with or without a moderator and instructor, one criterion of a self-learning interactive module (Shalikhah, 2016).

According to Zuhri & Rizaleni, Lectora Inspire is a relatively soft development device that is easy to use e-learning and does not need to be brought to the level of understanding of programming languages (Eviyanti & Adawi, 2022). Lectora Inspire is one of the authoring tools (software) developed by Trivantis to develop e-learning content (Nursidik & Suri, 2018). The benefits of Lectora Inspire are that the subject matter can be designed by displaying videos and animated images related to the subject matter so that students pay more attention to what is conveyed by the teacher (Shalikhah, 2016).

It is based on previous studies, using the application Lectora Inspires as a learning media to show positive results. The software Lectora's Inspire has been stated to be appreciated by materials and media professionals (Laili & Usmeldi, 2019). Learning with effective learning media supported by Lectora Inspire software is carried out to improve student educational outcomes (Mahfudhah & Hamidah, 2022).

METHOD

This type of research is R&D (Research and Development) development research that systematically examines the design, development, and evaluation of learning programs, processes, and prod-

ucts required to meet the criteria of validity, practicality, and effectiveness (Setyorini & Carolina, 2022). The research was conducted on students of class XI IPA with 26 people and one chemistry teacher. This research used the 4D development model, which consists of four steps: define, design, develop, and disseminate the resulting product as a lectora-based e-module application on colloidal system material in high school (Herdini & Linda, 2018).

This research technique used validation sheets, questionnaires, and test instruments prepared by researchers to be analyzed, evaluated, and made to obtain e-modules of the effectiveness of Lectora data-based applications to inspire the in-depth improvement of student learning outcomes. Instrument data is obtained as qualitative data, namely from comments/ suggestions for improvement obtained from validators, which are used as a reference for improving and revising the development results. Quantitative data is obtained from the assessment score of the media and material experts' validation sheets. Data from the study results were analyzed in stages to determine the feasibility of e-modules. Instrument data is qualitative data from comments for improvement obtained from validators, which are used as a reference for improving and revising development results. Quantitative data is obtained from the assessment score of the media and material experts' validation sheets. Data from the study results were analyzed in stages to determine the feasibility of the e-module (Shalikhah, 2016)

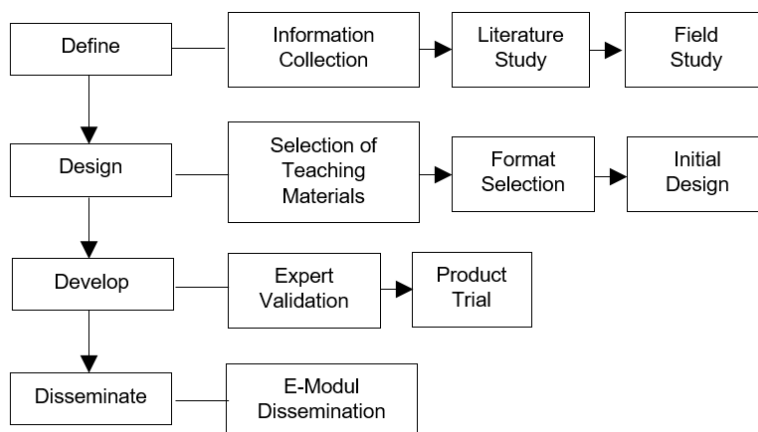The review procedure can be seen in Figure 1.

Figure 1. Procedure study.

Based on Figure 1, it was illustrated that there were four stages of development using the 4D model, including define, design, develop, and disseminate. At the define stage, researchers conducted a needs analysis of the e-module. Furthermore, the data that has been collected is used as a reference in designing and developing e-modules in the design and development stages. The e-modules that have been developed are validated by experts to get input so that the products developed are suitable and know their feasibility. After being revised and declared feasible by experts, trials were conducted with students. In the final stage, the e-module was distributed.

RESULT AND DISCUSSION
Define

E-modules are a form of learning innovation that results from the modification of modules that utilize technological advances, thus making modules more attractive and interactive. So, it is necessary to develop an e-module based on Lectora Inspire (Azzahra & Sunaryo, 2022).

At this stage, the researcher generates information as a basis for e-module development through activity analysis. The analysis was carried out at the defining stage: literature and field studies. The literature study includes basic competencies (KD), core competencies (KI), syllabus, and literature review on the development of e-modules based on Lectora Inspire on colloidal system material. The define stage was conducted through literature studies and field studies.

The literature study begins by analyzing the core competencies, basic competencies, and syllabus. The syllabus's core competencies (KI) consist of KI 1, KI 2, KI 3, and KI 4—basic competition (KD) on colloid system material in the 2013 curriculum, namely 3.15 and 4.15. The base competition 3.15 and 4.15 contains "Analyzing the role of colloids in life-based on their properties." After analyzing the syllabus, the researcher analyzed the literature on developing lectora-inspired e-modules.

Lectora Inspire learning software development is relatively easy to implement because there is no need for a sophisticated programming language (Satibi & Rudi, 2023). Another reason why this study uses the Lectora Inspire software as a learning medium is because it is a Lectora Inspire-based media, which can make it easier for teachers to create interactive and fun learning media

(Mandasari & Rahman, 2020). Because in it, lectures can easily add animation, audio, and video; in addition to that, with the use of inspiration, our lectors can easily make evaluations varying from multiple choice, true to false, short content, and match (Astuti & Parwatiningsih, 2022), drag questions and drop, as well as the problem of determining the location, besides that various forms of educational games can make the learning atmosphere in the classroom more fun (Toisuta & Sapulete, 2022).

Field studies were carried out by conducting a literature study and survey covering the areas of needs measurement, planning, analysis of student needs and characteristics, curriculum analysis, and selection and determination of theoretical trees. Before conducting the design stage, an analysis of student needs for the book to be developed was carried out. This analysis was carried out by reviewing, comparing, and seeing the differences between each chemistry book on colloidal material. Researchers used two high school chemistry books and one ordinary university book used by educators in teaching chemistry subjects in high school. Book codes made by researchers include codes A (book 1), B (book 2), and C (book 3). The reason was that the book was used as a reference in teaching and learning activities by teachers and students at SMP.

Table 1. List of Books Analyzed

Title Book	Writer	Publisher	Year Ascend
Chemical material	Unggul Sudarmo	Erlangga	2013
Chemical material	Michael Purba	Erlangga	2013
Basic Chemistry	Hardjono Sastrohamidjojo	Gajah Mada University Press	2016

The analysis of the third book using the BSNP instrument is divided into a scale of 1 to 5 over 5 components, namely content appropriateness, language appropriateness, presentation appropriateness, contextual appropriateness, and graphical appropriateness. The results of the third book analysis conducted by researchers can be seen in Table 2.

Table 2. Tabulated analysis of three chemistry books by researchers

No	Aspect Evaluation	Percentage (%)
1	Content	82.77
2	Presentation	90.61
3	Contextual	80,66
4	Graphic	83.05
5	Language	89.33
	Average	85,29
	Category	Very worth it

Table 2 shows that the chemistry of the third book (colloid system material) was analyzed by researchers in terms of

content, presentation, contextual, graphical, and language feasibility by the eligibility aspects of the BSNP. The assessment of content suitability, language appropriateness, presentation feasibility, and graphic feasibility of the third book's chemical materials gave different results. However, thirdly, this book is not an e-module-based application that Lectora inspires. For this reason, this research was designed to be useful in producing lectora-inspired-based e-modules on the subject of colloidal systems by the feasibility aspects of the BSNP. The book's chemical analysis chart can be seen in Figure 2.
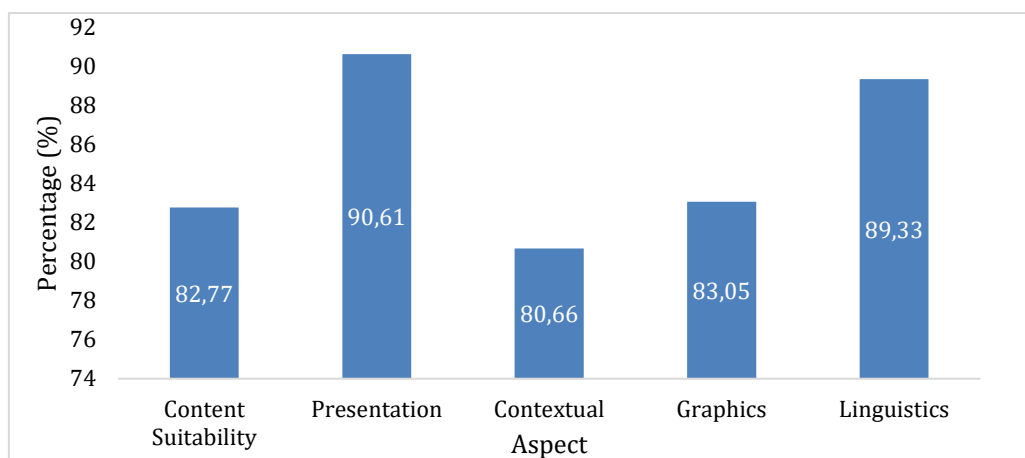

Figure 2. Chemistry book analysis.

Based on Figure 2, it can be seen that the content suitability aspect has an average percentage of 82.77 percent, the presentation suitability aspect is 90.61 percent, the contextuality aspect is 80.66 percent, the graphical aspect is 83.05 percent, and the linguistic aspect is 89.33 percent. This shows that the Lectora Inspire-based e-module is suitable for use in learning. Based on previous research, the Lectora inspire-based e-module proved feasible to use in learning with an average percentage of 83.5 percent

feasibility from experts (Fajriati, 2018). E-modules are feasible if they can be used to measure what should be measured and achieve a validation value of 60% to 80% (Sugiyono, 2014).

The contextuality aspect obtained an assessment of 82.77 percent with a very feasible category. This means that the presentation of colloidal material in the e-module was already very good, where the presentation was by the assessment indicators that had been made. The content of the e-module must

explain the material. The questions are by the indicators, and most importantly, it can make it easier for teachers and students to achieve learning goals (Nora & Jusar, 2015). In addition, Andira et al. stated that the material in the e-module is presented in full and provides additional information according to the user's level of understanding to enrich insight and knowledge (Andira & Noorhidayati, 2021).

The validator assessed the presentation suitability aspect with an average of 90.62 percent. This showed that the e-module had been described sequentially, systematically, and clearly. E-modules are self-learning packages systematically designed to help students achieve learning objectives (Aryawani & Sudatha, 2018). According to the e-module, students can learn at their own pace; students who can learn quickly can solve the questions in the e-module quickly, and vice versa. Students who are slow to learn will also be slow to complete the lesson (Pendit, 2022).

The graphical aspect scored 80.66 percent from the validators. This shows that the Lectora Inspire-based e-module has been presented interestingly and interactively. This can be seen from the e-module that uses a color combination of

illustrations and images that are appropriate and proportionate. Aspects of graphical presentation, such as images/photos, writing, layout, and design, play an important role in the feasibility of teaching materials.

Lectora Inspire-based e-modules from the language aspect were considered to have used a typeface that was easy to read, and the language was adapted to the development of students. The adolescent phase was a phase of development amid potential maturity, both from the cognitive, emotional, and physical aspects (Ali & Asrori, 2014). Children begin to develop, can think abstractly, test hypotheses, and consider what opportunities are available to them rather than just seeing things as they are (Mujab & Irawati, 2018). Thus, e-modules must be developed to achieve emotional independence and develop students' concepts and intellectual skills (Azkiya & Tamrin, 2022).

Design

At the design stage, it is carried out to produce a design or design of the e-module. Then, choose a format and compile the initial design using the lector's inspiration. This software was chosen because it is easy to operate, has

various menu options for making teaching materials, and can be downloaded for free.

The design of the Lectora Inspire-based e-module development product consists of a front cover in the form of a background for changes in preliminary materials, videos, evaluations, rosarium, summaries, and bibliography. In the introductory theory, there are in-depth concepts and maps of colloid theory and several types of colloids, as well as in the learning videos; there are animated lessons. On the Lectora inspire-based module's main menu are introductory materials, videos, evaluations, glossaries, summaries, and a bibliography. The developed e-module uses the *new Romance Times font* with a font size of 12.

The e-module components developed include the following

Figure 3. Main page.

On the main page, students will enter the cover of the e-module equipped with a username and password when they want to open the Lectora to inspire an application-based e-module on a colloidal material system. Then, students enter the application's main page, which contains menus including an introduction, material, video, evaluation, glossary, summary, and a bibliography. The main page is also equipped with a welcome greeting to students who access this e-module and displays the names of participants who opened the e-module that has been developed.

Figure 4. Introduction.

The introduction in the developed e-module contains identity modules, basic competencies, and core competencies. This is by the class XI syllabus, which discusses the subject matter of colloidal system theory.

In the contents of the material, a concept map is displayed to make it easier for students to see colloidal system material. Furthermore, students will enter the colloidal matter system which begins with the dispersion system. The contents of the material will be accompanied by pictures and tables that will make it easier for students to describe the colloidal system material.

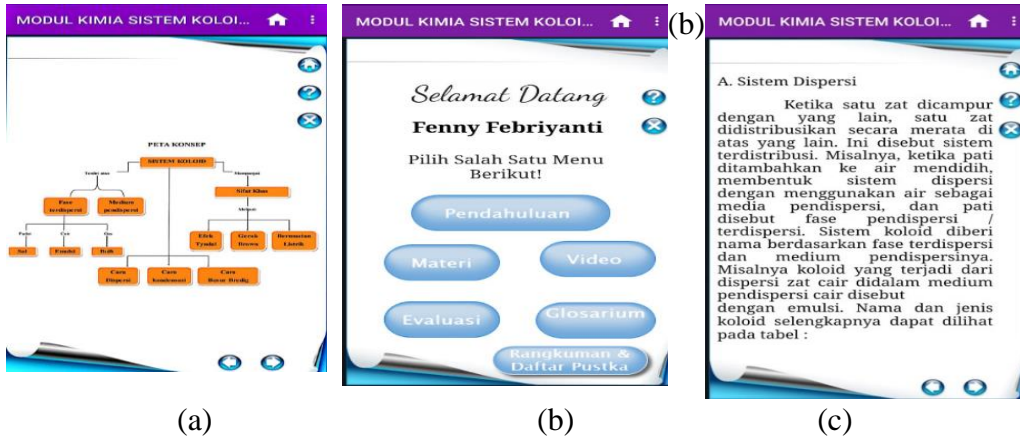

(a)   (b)   (c)

Figure 5. (a) Concept Map, (b) Main Menu, and (c) Theory

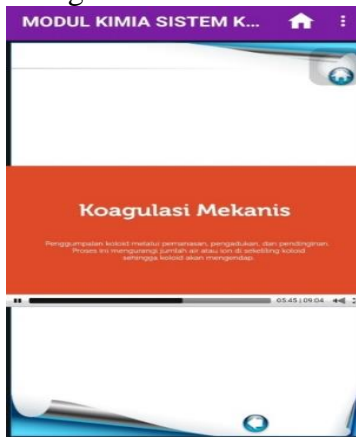.Next, there is the video menu, where the video is 9 minutes and 4 seconds long.

Figure 6. Video.

A glossary is a collection of lists of important words or terms arranged alphabetically that define a particular field of knowledge.
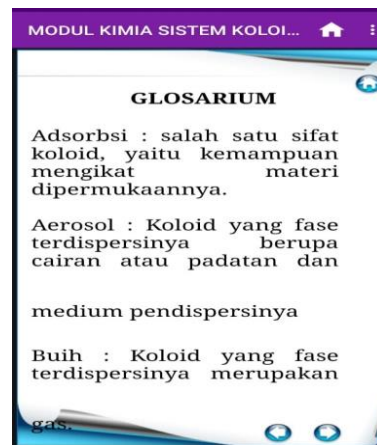

Figure 7. Glossary.

the evaluation menu developed by the researcher, there are several multiple choice test questions of 20 questions. Furthermore, a notification will appear if the student chooses a correct/wrong answer, and the evaluation results will be numerical.

(a)   (b)

Figure 8. Evaluation (a) and (b) evaluation score.

On the e-module application menu is a summary of colloidal material and a bibliography menu containing references cited from the material in the e-module.

(a)   (b)

Figure 9. (a) Summary and (b) bibliography.

Develop

After the planning stage is carried out, the product then goes through the development step, namely conducting the validation and revision stages according to the suggestions of media and material experts, as well as the stages of educators' responses to learning media and students' responses through the product trial phase against the media.

In the development stage of the e-module based on *Lectora Inspire* instruments, a questionnaire based on the National Education Standards Agency (BSNP) was used, which had five aspects: content suitability aspects, presentation suitability aspects,

contextual evaluation aspects, graphic suitability aspects, and language suitability aspects. Then, the initial product design was validated by two validators, material and media experts. It is done to produce e-modules based on *lectora-inspired* applications, which have been revised based on expert input and trials.

Validation Expert

This stage aimed to test the learning media product material's feasibility. The following opinions of material and media experts on the learning media colloidal system material developed. Then, the material and media expert assessments are averaged. The average results of the validation of material and media experts can be seen in Figure 10.

The Lectora inspired two expert validators who validated e-module-based applications as material and media experts. Based on the analysis of the second validator, the content suitability aspect has an average percentage of 91,18 percent, the presentation suitability aspect is 88,43 percent, the contextual aspect suitability assessment is 91,11 percent, the graphical aspect is appropriate 89,65 percent, and the language aspect is appropriate 91,67 percent. Furthermore, the researchers calculated the average percentage of the total assessment of the five aspects. They obtained an average of 90.4 percent with an interpretation of the percentage of the questionnaire in the category of feasible/ did not need to be revised. The results of this validation are used as one of the improvement materials for the perfection of the developed e-module. This shows that the e-module-based application developed by the Lectora is quite inspiring. It is good to be applied in chemistry learning, especially colloidal system material.
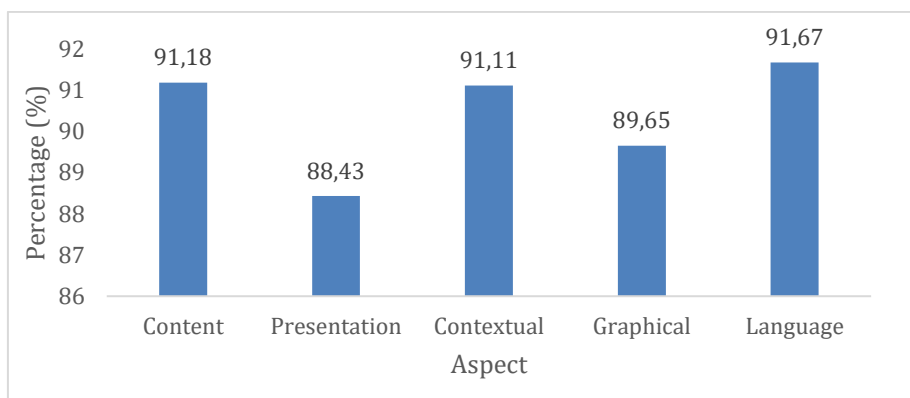

Figure 10. Average validator rating.

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