DESIGNING WEB-BASED LEARNING TO ENHANCE STUDENTS' HIGHER ORDER THINKING SKILLS (HOTS)

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Abstract:
The application of e-learning as a form of cyber teaching in learning practices is regarded as no longer a new term, however, it has become a strong demand for learning practitioners to result a competitive output. The research was focused on the enhancing students' reading skill in the level of higher order thiking skills through exploring in depth the implementation of website-based learning media in literacy-based courses considered as one of the courses required to apply internet and information-based technology, provide a more interesting and broad experience with an easily accessible media, and fun learning material and practices. The activities of designing and formulating web-based media learning process of Reading for Academic Purposes course in one private university were explored as the main data of the research. The finds indicated that five main phases in designing and formulating the web-based learning media in Reading for Academic Purposes course had to be developed. Student learning activities for higher order thinking skills were emphasized on the learning activities at the level of analyzing, evaluating, and creating with the context of applying case studies in the daily life. Developing critical questions in reading response activities, then were developed to create students' critical thinking skills. Web-based learning media got the positive response from the students. Seen from the terms of responses of Perceived Usefulness, Perceived Ease of Use, and attitude.

Keyword: web-side; learning media; higher order thinking skills; reading for academic purposes

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INTRODUCTION

In education, a learning system is considered an area that is greatly impacted by changes and accelerations in technology and information systems. Learning process, as a consequence, is required to have innovation values that generally can be applied and accessed easily and affordably. At the higher education level, for example, lecturers are expected to be able to integrate these two areas of development in their teaching and learning practices so that the use of technology in the learning process is viewed inevitable. Lecturers are required to be able to create and develop new learning methods and combine them with practice in actual learning contexts in

order to the students explore interesting, responsive and innovative learning experiences. A comprehensive concept is needed that technology can facilitate learning with different learning experiences and the concept of technology in learning needs to be understood by lecturers as learning agents. Therefore, lecturers are demanded not only to be internet literate but also capable of implementing it. In relation to the innovative learning process, the application of e-learning as a form of cyber teaching in learning practices is regarded as no longer a new term, but it has become a strong demand for learning practitioners to result a competitive output highly. Cyber teaching is a learning model that applies media internet-based of communication and information technology. Website-based learning is known to be familiar for this media with a different pattern of learning that is compared with traditional learning patterns (Rusman, 2011). It is signed by e-learning capability of delivering learning process in a wide range because it is supported by the use of internet technology and is viewed has a positive impact on students to increase sensitivity to problems around them and improve their ability to communicate with other students outside the classroom.

In addition, previous research indicated that the freedom to choose learning materials and complete exercises and practice independently in learning media based-internet supported by relevant references gives students rich experiences in solving problems in some points (Saputra, 2016).These learning experiences are considered useful to build the students' thinking patterns that are more critical and broader towards a problem compared to reading skills as memorizing facts, stating facts, or applying rules, formulas and procedure. In this process, the students are introduced to the higher order thinking skills (HOTS).

HOTS is known as high-level thinking skills which are developed by considering cognitive concepts in various learning concepts and taxonomies including problem solving, Bloom's taxonomy, learning taxonomy, and assessment. HOTS also includes the ability to solve problems, argue opinions, think and take decision creatively and critically (Saputra, 2016). Furthermore, Widodo & Kandarwati (2013) explained that students with higher order thinking skills will be able to differentiate ideas or thoughts clearly, argue well, be able to solve problems, be able to construct explanations, be able to hypothesize and understand complex things more clearly. Meanwhile, Ariyana et al. (2018) explained in their research that there were at least four triggers for the HOTS-oriented learning concept, e.g. learning situations requiring specific learning strategies, intelligence seen as a unit of knowledge influenced by learning environmental factors, strategy and awareness in learning shifting interactively, and specific higher level thinking using reasoning, analytical skills, problem solving, and critical and creative thinking skills. Critical thinking skills can be helped by applying appropriate learning media (Umam, 2018) and can be obtained through an exercise or situation deliberately created to stimulate someone to think critically (Shafrillia et al., 2022). In addition, (Yanuschik et al., 2015) stated that the use of web-based instruction as an e-learning model was able to create 30% more levels of discipline in learning with electronic applications. Meanwhile, Hendi et al. (2020) believed that the ability to think critically is everyone's ability to solve a problem can be built by focusing on the processes and steps taken carefully. (Browne & Keeley, 2007)added that viewing the questions for critical thinking, they are considered more complex and structured, tend to lead to a conclusion, be asking the 'why' of things and should not be ambiguous.

In accordance to the phenomena, the research was aim at exploring in depth formulating and designing process of website-based learning media in literacy-based

courses to enhance higher order thinking skills students through structured reading activities. The Reading for Academic Purposes course was chosen to be the subject of the research as the main source to collect the data since it was considered as one of the courses required to apply internet and information-based technology, provide a more interesting and broad experiences, apply interesting and easily accessible media, gain varied and fun learning material and explore practices that was not monotonous. The research findings, therefore, focused on the process of five main stages of developing the web-based learning media: formulating learning objectives, developing teaching material and web-based learning media, designing e-learning media (Moodle), doing class engagement, and formulating critical question as assessment and feedback. In addition, the taxonomy bloom was used to explore measurable and observable activities enhanced the students' critical thinking skills that were considered important to them to become sensitive to the problems that were going to face the real world of work. As an effect, the application of appropriate, interesting and interactive learning media can support to realize the Independent Curriculum which is designed to produce graduates who are competitive, responsive and able to solve problems in real life.

METHOD

A descriptive qualitative research design was implemented in this research. It is a research design that explores problems in depth to find out solutions or strategies for phenomena or issues as a concern (Cresswell, 2015). Research data were taken from learning and teaching activities in the Reading for Academic Purposes course to the second language students at a private university in Indonesia which was analyzed by identifying, categorizing, analyzing and interpreting to obtain a comprehensive description of the research results. Meanwhile, to understand the context of implementing this website-based learning media, Bloom's Taxonomy (Krathwohl, 2002) is used to formulate sequential stages of skill achievement from lower to higher.

Exploring in depth the implementation of website-based learning media in literacy-based courses as one of the courses required to apply internet and information-based technology, provide a more interesting and broad experience with an easily accessible media, and fun learning material and practices to enhance students' critical thinking in higher order level was regarded as the main focuses of this research. In relating to the focus of the research, the research was developed in the three main stages e.g. designing website-based learning media, developing teaching materials that refer to reading activities for the purpose of critical thinking at a higher order level, and measuring the students' responses to the web-based learning media.

The stages of designing learning media begun with analyzing the students' needs and types of simple devices that would be applied in reading courses for academic purposes, creating a design for the screen displays and features used. Meanwhile, in the stage of developing material, the stage begun with formulating learning objectives, formulating learning materials, forms of learning activities, and formulating appropriate forms of evaluation and feedback. Finally, the students' responses were identified to know the positive responses on the learning media implementation. In order to know the students' responses of implementation of learning media in Reading for Academic Purposes course, Technology Acceptance Model (TAM) developed by Davis (1989) was applied. The purposes of TAM were to know and identify the responses level of how individuals accept or reject a new technology introduced. Therefore, TAM was focused on three main individuals' intentions to use a technology--**Perceived Ease of Use** which refers to the perception

of the ease of use of the learning media implemented, **Perceived Usefulness** which refers to the perception of the usefulness or benefits of using the learning media in supporting their learning, and attitude to gain description of students' responses to the web-based learning media implemented.

RESULTS AND DISCUSSION

Data of the research indicate that the use of web-based learning media in Reading for Academic Purposes course had two fundamental emphases e.g. learning design based on Bloom's taxonomy and web-based media designing. Formulating a learning design was regarded as an important process in teaching and learning process in Reading for Academic Purposes course. It was containing planning and development of learning activities as forms of activities carried out by both lecturer and students. Moreover, it was aimed at ensuring that the material presented met the learning objectives as the indicators in improving critical thinking skills. In the process of media designing, it's found that the web-based Reading for Academic Purposes learning design formulation could be categorized into five main stages: formulating learning objectives, developing teaching material and web-based learning media, designing e-learning media (Moodle), doing class engagement, and formulating critical question as assessment and feedback.

Formulating learning objectives

The learning objectives designed for the Reading for Academic Purposes course were designed in accordance with the skill levels initiated by Bloom known as Bloom's Taxonomy, which consists of 6 levels such as remembering, understanding, applying, analyzing, evaluating, and creating Krathwohl (2002)Student abilities developed in the learning objectives of Reading for Academic Purposes course were indicated by the learning activities based on the Bloom's taxonomy formulated are figured out in Figure 1.

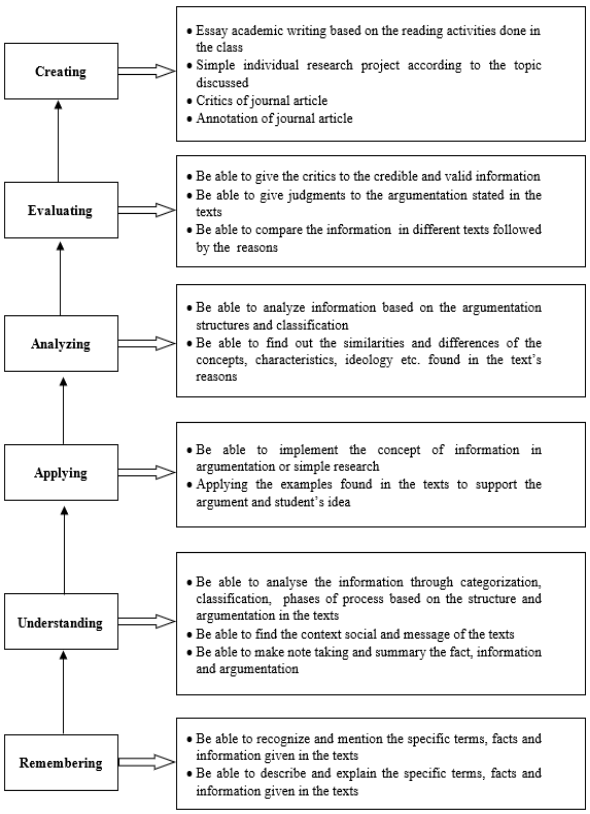

Figure 1. The learning objectives of Reading for Academic Purposes course According to Bloom's Taxonomy

Figure 1 shows that the skill levels in the Reading for Academic Purposes material were formulated structurally from the lowest skill (remembering) to the highest level (creating). The formulation of learning objectives in this course was purposed to ensure that the learning and teaching process in the Reading for Academic Purposes course was in accordance with the objectives to be achieved and provides students with effective, structured, measurable and interactive practices.

Developing teaching material

Reading for Specific Purposes course material ws designed and formulated in the learning media according to the decided topics and must be relevant to the learning objectives (Figure 1) and contained discussions that encourage students to argue and provide new concepts in material from research results such as journal articles, news in the media, debate broadcasts, talk show broadcasts and the like. The material was varied, such as article text, videos and power point presentations which were presented on an e-learning platform (Moodle). Students could access the material by logging in to the media used and were allowed to access the material according to the discussion topic and scheduled time.

In addition, the topics developed in this Reading for Academic purposes course were based on general areas of discussion, e.g. social, cultural, economic, science and technology in the forms of news articles, journal articles, proceeding articles, and opinion articles. Each subject area had a different name of column so that students could choose and adjust the reading material appropriate to the material interested. The example of material development formulation in reading for academic purposes for critical thinking skills is presented in Task 1. According to Task 1 activities, the formulation of material development divides the activities preparation into 3 stages activities such as class preparation activities, during class activities, and evaluation activities

Task 1
Article: journal article
Participants: second semester students in the Reading for Academic Purposes class.

Class preparation activities

1. Determining the topic and reading text
2. Formulating activities
    - Activity 1: Reading the text and mark terms/sentences that attract students' attention
    - Activity 2: Giving feedback to the text are reading which is guided by questions
    - Activity 3: Providing views or opinions given by other students according to the content of the text
    - Activity 4: Extending the author's ideas according to the text given
3. Formulating the form of activities carried out by students based on the activity formulation that has been created

- Form of activity 1: written activities such as marking and taking note terms or sentences considered new or interested, and giving reasons why it is interesting or not interesting
- Form of activity 2: Answering critical essay questions
- Form of activity 3: oral activity such as expressing agree or disagree with other students' views
- Form of activity 4: determining the author's point of view regarding the written text

4. Formulating evaluation as a tool to measure the success of activities
    - Individual direct questions and answers
    - Leading exercises in daily life context (written answers)
    - Oral Opinion response

During class activities

- Accessing the Moodle to login
- Accessing the materials and activities
- Doing the exercise downloaded from the Moodle activities
- Having a direct class discussion
- Sharing opinions in forum activities

Evaluation activities

- Writing academic essay as a reflective response of the class activities.

Designing learning media e-learning (Moodle)

The aim of designing learning media in the form of e-learning was to provide the students easy services and the lecturers applicable development of teaching materials in accordance with the learning objectives that had been formulated since lecturers were given access to modify materials that were deemed appropriate and made students interact interactively. Figure 2 is the design stages for creating a learning media platform in Reading for Specific Purposes course.

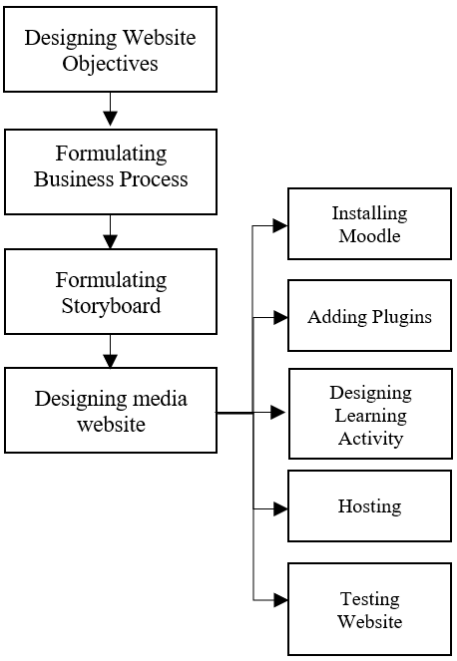

Figure 2. the design stages for creating a learning media platform in Reading for Specific Purposes course

The process of designing this learning media was begun by creating a website specifically intended as a learning media. The design of leaning media was aimed at providing the flow of media that was used meets the achievements of the activities carried out. The learning media designed must contain a storyboard to provide information on the display of the media flow that would be carried out on each website page. Thus, the website design must have media stages that were tailored to the needs of the Moodle platform.

In addition, business process phase was formulated to create series of learning activities that were arranged in a structured and repetitive manner in web-based learning media. It was an essential one to provide appropriate and effective learning activities to achieve learning objectives. As an effect, according to the activities in the structured business process, this tool was expected to be able to provide well-organized learning activities in managing materials, assignments, discussion forums, forms of training and assignments, and evaluation of activities in the application tool. Furthermore, in the context of reading for academic learning, this formulation included structured steps such as formulating learning objectives, preparing material, determining the individual involvement, formulating learning input and output, and evaluating learning outcomes which are described as in the Table 1.

Table 1. the example of business process in Reading for Academic Purposes

Phases	Individual Involvement	Forms of Activities
Formulating learning outcomes	Lecturer	Learning outcomes

Deciding learning material	Lecturer	Science and technology
Inputting learning material	Lecturer	Text entitle "The Roles of AI in language teaching and learning"
Creating assignments	Lecturer	Essay questions
Doing register to access learning material and activity	Students	Login of Moodle
Reading practice and discussion forum	Students	Critical Reading
Class presentation	Students	Students' presentation as reading response of the topic discussed
Responding learning activity as outputs	Lecturer	Giving responses in the forum activity
Evaluating as report	Lecturer	Students' progress repot

Installing was then needed. The convenience of web-based learning was that learning materials and media could be applied easily by installing Moodle and adding plugins on a computer device or laptop that was easy to carry. After successfully installing this platform, lecturers could enter content that had been formulated in the form of teaching materials, quizzes and courses. This device would be ready for use when the platform has successfully hosted. The stages of this design process can be figured out in Figure 2.

Doing Class Engagement

The class engagement of Reading for Specific Purposes was focused on student activities in the form of active reading activities accompanied by utilizing tools such as annotation features, highlighting, note taking, and academic essay writing and critical thinking activities such as activities that trigger questions, analyze material, express opinions, differentiate and identify new concepts, applying concepts from other sources to support one's own concepts and other critical thinking activities. In this class engagement activity, academic essay writing was considered by students to be an encouraged activity that encouraged critical thinking because it had several levels of complex skills from the easier to the difficulties one. Academic essay writing required the students to understand, identify, examine, provide arguments, compare and apply the content of the information they read to create new arguments and experiences based on the specific themes.

Formulating critical questions as the assessment and feedback

Critical questions in reading for HOTS in Reading for Academic Purposes course were questions related to the content of the information provided to measure understanding and the level of critical skills being measured of the students. The questions could be in the form of quiz or tests. The types of questions were varied according to skill levels formulated aimed at increasing students' HOTS. Figure 3 is a sample of a question formulation implemented in the activity of reading academic journals in the Reading for Academic Purposes course.

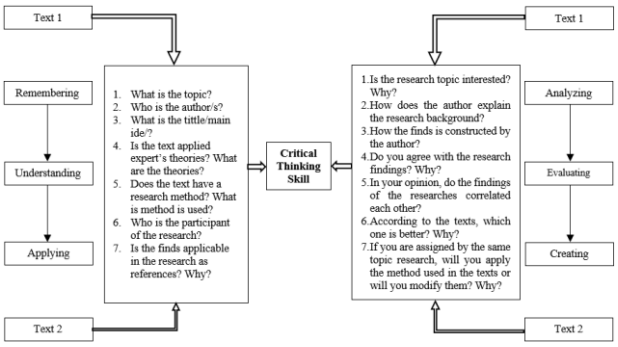

Figure 3. Questions to stimulate critical students' responses based on the Bloom's taxonomy

Figure 3 shows that the questions given to students must be structured starting from lower-order thinking (remembering, understanding, and applying) to higher order thinking (analyzing, evaluating, and creating). Questions related to lower order skills tended to use questions with answers such as recalling facts and information, comprehension of themes, and implementation of the context in real life. Meanwhile, questions related to higher order thinking skills related to analyze how the text was created in terms of its structure and concept, providing an evaluation of the text read, such as comparing weaknesses and strengths of the two texts, finding problem solving and making decision.

Students Response toward web-based learning media

Student responses on web-based learning media usage in Reading for Academic Purposes were carried out using questionnaires documented on the Google Form application that were distributed to the 12 students who took part in the learning process. Each question was measured using a rating scale of 1-5 with sequential criteria values from strongly disagree, disagree, neutral, agree, and strongly agree. Every question has ideal value in point of 5. Therefore, every question has an ideal score of 60. The students' responses were derived from the three aspects e.g. response of perceived usefulness, perceived ease of use, and attitude toward the web-based learning media implemented. Student responses to the use of web-based learning media in the Reading for Academic course can be seen in the following tables.

Table 2. Students' responses of Perceived Usefulness to the web-based learning media on Reading for Academic Purposes

Statement	Ideal Score	Score Obtained	%
Using this web-based learning media enhance my understanding of the reading material learned	60	52	86.7
Using this web-based learning media makes easier to learn the reading material	60	49	81.7
Using this web-based learning media improve my skills reading	60	48	80
Average	60	49.7	82.8

Table 2 shows that the students indicated a positive response to the use of web-based learning media as indicated by an average point of 82.8% from the three aspects measured such as (1) Using this web-based learning media enhance my understanding of the reading material learned, (2) Using this web-based learning media makes easier to learn the reading material, and (3) Using this web-based learning media improve my skills reading. The point explains that the students felt that the use of web-based learning media helped them to make it easier to access the material, thereby it facilitated them to understand the material quickly and better. The use of this media also helped the students to get reading material easily and variedly, so that making it easier for them in the reading process engagement. Thereby, the students felt that the use of web-based learning media helped them to improve their reading skills.

Table 3. Students' responses of Perceived Ease of Used to the web-based learning media on Reading for Academic Purposes

Statement	Ideal Score	Score Obtained	%
This web-based learning media has clear and easy to understand procedures	60	49	81,7
This web-based learning media support easily my learning objective	60	48	80
I find that this This web-based learning media is easy to used and operate	60	49	81.7
Average	60	48.7	81.1

Table 3 shows that students had a positive response to the convenience provided by the web-based learning media used. This positive response was indicated by the response point of Perceived Ease of Use at 81.1% of the 3 aspects measured: (1) this web-based learning media has clear and easy to understand procedures, (2) this web-based learning media supports easily my learning objective, and (3) I find that this this web-based learning media is easy to use and operate. Therefore, this point explains that this web-based learning media used has a high convenience value so that it was considered to be continued for sustainable use. It was interpreted furthermore the students felt that using web-based learning media provides a different learning experience since they felt more active and interactive in the learning process. The use of web-based learning media was also felt be able to increase interest in reading due to easy access to material and ease of operationalizing existing procedures in media devices.

Table 4. Students responses of Perceived Ease of Used to the web-based learning media on Reading for Academic Purposes

Statements	Ideal Score	Score Obtained	%
This web-based learning media make learning activities more engaging	60	50	83.3
Learning with his web-based learning media interesting and enjoyable.	60	51	85
This web-based learning media is suitable to be used as a learning tools	60	48	80
Average	60	49.7	82,8

Table 4 shows that the positive response to the attitude is shown by the response of attitude point at 82.8% from the 3 aspects measured: (1) this web-based learning media makes learning activities more engaging, (2) learning with his web-based learning media is interesting and enjoyable, and (3) this web-based learning media is suitable to be used as a learning tool. This point explains that the tools used had a high good value such as the use of interesting media, varied and interesting material sources, interesting learning situations and activities so that gave good impression on students.

CONCLUSIONS

The implementation of learning methods emphasizing on HOTS required planning and formulating learning outcomes, choosing the right materials and media, and determining the appropriate form of evaluation. In the context of website-based learning, these learning outcomes were influenced by various factors such as the use of appropriate technology as a learning media to create effective and interactive learning activities, formulation of appropriate learning objectives and materials, effective methods for creating interactive students' engagement, and appropriate forms of evaluation as a form of response and feedback on students' work. Meanwhile, in order to reach the critical learning outcomes, the appropriate skills and competencies must be adjusted to the critical level to be achieved since each level thinking has a different level of ability that were measurable from lower to higher levels. As an indicator to measure critical thinking skills in reading activities for academic purposes, the formulation of critical questions was required to create critical responses.

In addition, web-based learning media got the positive response from the students. Seen from the responses of Perceived Usefulness, the students felt that the use of web-based learning media could not only help them to access the material easily, thereby helping them understand the material quickly and better, but also can help students to get reading material easily and variedly so that they considered that the implementation of web-based learning media was useful to improve their reading skills. Meanwhile seen from the responses of Perceived Ease of Used, web-based learning media used have a high convenience value because of easy used and was considered to be continued for sustainable use, provided a different learning experience since it gave active and interactive learning process activities, and be able to increase interest in reading due to easy access to the material and ease of operationalizing the existing procedures in media devices. Furthermore, the web-based learning media had a high good value in the use of interesting media, varied and interesting material sources, interesting learning situations and activities so that gave good impression on students.

This research focused on website-based learning media applied in reading learning activity. The research stage begun with designing the media that would be used in learning. The learning media were design from simple devices to more complex ones in accordance with the need analysis carried out previously. Since this media was applied in Reading for Academic Purposes learning, higher order thinking skills become one of the important goals that must be achieved. The formulation of learning materials used in Reading for Academic Purposes, meanwhile, has complex practices and learning materials that it needs in-depth development specifically the formulation of critical questions to enhance critical thinking which require knowledge and experience to build and develop. Therefore, further research is needed to formulate varied critical questions with appropriate thinking orders.

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