Development of website-based learning media to improve students' self-regulated learning in economics at islamic senior high school

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Article Info

ABSTRACT

Problems related to student self-regulated learning can be seen in the presence of students who forget to deliver assignments and students who have never reviewed the economics subject matter that has been taught. Based on preliminary observations, it is known that in MAN 3 Pekanbaru City there is no learning media that can support students to carry out self-regulated learning. Learning media that is only guided by textbooks is currently one of the learning methods that are not very effective for increasing self-regulated learning. This study aims to produce a valid and practical website-based learning media in economics subject at MAN 3 Pekanbaru so that it can effectively improve students' self-regulated learning. The development of website-based learning media is carried out using a 4-D model, namely define, design, develop, and disseminate. Data analysis was carried out descriptively and tested the effectiveness using a paired sample t-test. The results of this study found that the validation rate of website-based learning media in economics subjects at MAN 3 Pekanbaru is around 80% - 85%, which means that website-based learning media is very feasible and has very high validity, additionally, the level of practicality of developing web-based learning media in economics subjects at MAN 3 Pekanbaru, namely teacher responses: very practical. Finally, the application of website-based learning media in economics subjects at MAN 3 Pekanbaru is effective in increasing student self-regulated learning. As the research focuses on development, it implies an ongoing process of personalized and customized learning experiences. Students can engage with content that aligns with their individual needs, interests, and learning styles. The research suggests that education should move towards adaptive and tailored learning experiences.

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Introduction

Self-regulated learning is a learning process that is personally managed by each individual (Winne, 2015). This process involves self-direction of students in transforming mental abilities into certain academic skills that require motivation and consistency of thoughts, actions, and emotions so that the desired goals can be achieved (Zimmerman & Schunk, 2015). In other words, this process requires students to be able to design their own

learning strategies and targets. Self-regulated learning can encourage students to be able to solve a problem, apply strategies, monitor performance, and interpret the results of their efforts. The final outcome that is expected from this process is, of course, an increase in learning achievement and an increase in student mastery of a learning material (Mega et al., 2014).

Self-regulated learning that is not good causes students to never evaluate their learning, never make a study schedule, do not feel responsible for the assignments given by the teacher, and lack confidence or often forget the material presented (Khoerunnisa et al., 2021). The importance of the role of SRL in achieving educational goals is evidenced by the Latipah meta-analysis study which concluded that self-regulated learning has a positive effect on learning achievement (Latipah, 2010). Students who have high self-regulated learning will try to find out and meet the standard values that must be achieved in each learning material, have short- and long-term targets, have a study plan that suits their abilities, and have a disciplined attitude in implementing the plan.

Students who have self-regulated learning become more responsible for their own learning, consider learning as a proactive process, are able to motivate themselves and use appropriate strategies to achieve the desired academic results (Hadwin et al., 2019). Students with high self-regulated learning can control themselves to look for irrelevant information during learning tasks. Several studies also prove that better self-regulated learners are able to focus on learning material while studying even though they bring laptops to class (Aguilar-Roca et al., 2012; Taneja et al., 2015; Zhang, 2015). In addition, students who have good self-regulated learning abilities are able to set goals to broaden knowledge and maintain motivation, be aware of the character of emotions and strategies for managing them, periodically evaluate progress toward goals, refine strategies, and evaluate obstacles that may arise, and make adjustment (Roll & Winne, 2015).

Self-regulated learning includes several components, including goal setting, planning, self-motivation, attention control, use of flexible learning strategies, self-monitoring, seeking the right help, and self-evaluation. In theory, self-regulated learning is influenced by three things, namely personal, environmental, and behavioral factors. Personal factors consist of knowledge, metacognition (perception and efficacy), motivation, and emotions. Environmental factors consist of experience and environmental structure, media, and learning methods. Behavioral factors consist of self-observation, self-assessment, and self-reaction. These three factors have an influence on one another (Zimmerman & Schunk, 2015).

Utilization of relevant learning media in the classroom can make the learning process more optimal. Learning media for teachers can help concretize abstract concepts so that students more easily understand the material being taught. Even so, the selected learning media still needs to be considered based on learning needs that originate from problems that students have related to the subject matter being taught (Karo-Karo & Rohani, 2018).

Website-based learning media has advantages not only in terms of attractiveness, but also technology that is easy to reach. The internet has the speed of access to information and also has multimedia facilities that can make learning more interesting, visual, interactive and fun so that it will foster students' motivation and interest in learning. In simple terms, it can be said that all learning is carried out by utilizing internet technology and during the learning process it is felt that it occurs by those who follow it, so these activities can be referred to as web-based learning (Sari & Suswanto, 2017). Web-based learning can be fun learning and has elements of activity and high flexibility so that it can make students remember more of the subject matter being taught (Januarysman & Ghufron, 2016).

Web-based learning offers several advantages, namely speed and unlimited space and time to access information. e-learning provides a very effective experience in learning (Rohdiani & Rakhmawati, 2017). Learning activities can be easily carried out by participants because they are connected to the internet network. The website is able to provide information more efficiently and up-to-date. Websites are more easily accessed by people in various regions simply by using the internet (Hasugian, 2018).

Website-based learning media has student-centered principles, so that it can enable students to learn independently, be responsible for the learning process because students can learn anytime, anywhere, and have unlimited access (Wahyuni et al., 2020). The existence of features such as online discussions, time management, high flexibility allows students to have better self-regulated learning.

Economics learning in schools explains various quite abstract concepts which require students to be able to understand them in the application of everyday life. So that in elaborating these concepts the teacher is expected to use the right media so that the concepts conveyed can be understood by students. Material scarcity in class X on Basic Competency 3.1 and 4.1 requires sufficiently concrete elaboration so that the material can be accepted by students from abstract theories so that students can describe and explain the phenomenon well.

Research by Fahyuni et al., (2020) who conducted research on website development using the cybercounseling model in improving self-regulated learning. The results of media validity obtained very feasible and effective results in increasing self-regulated learning which can help students focus on achievement of learning objectives, control the learning process, foster self-motivation, and build self-confidence to support and optimize the learning process.

Previous research has not explained how the impact of website media developed with self-regulated learning theory, while investment in the problem of self-regulated learning is crucial because it is related to the consistency and ability of students to learn independently. Based on searches on Google Scholar with the keywords "development" "R&D" and "Self-Regulated Learning" there has not been much research that conducts research on website-based media development to enhance self-regulated learning. There are three kinds of literature that develop other media such as textbooks, Android applications, and e-modules. So, by developing a website learning media can be a novelty in increasing self-regulated learning.

Based on a preliminary study conducted at MAN 3 Pekanbaru, it is known that economics teachers still use the media used in implementing learning, namely textbooks and powerpoints, then proceed with the discussion method. In addition, the problem of self-regulated learning can also be seen from students who do not have independent study schedules other than in class, there are students who forget to deliver assignments, and the majority of students never repeat learning (review) the economics subject matter that has been taught. While discussion learning methods and learning media that are only guided by textbooks are currently one of the learning methods that are not very effective for increasing self-regulated learning. This is shown when learning there are still students who do not interact during discussions and passively answer teacher questions because they never repeat material so that many students do not have sufficient ideas in conveying their learning, besides that students who have never carried out learning evaluations are also more difficulty facing exams because there is too much material to be studied at one time when it comes to exams.

This study aims to produce valid and practical web-based learning media on economics subjects at MAN 3 Pekanbaru so that they can effectively improve students' self-regulated learning.

Method

This research uses a method with a development research approach (R & D). The ultimate goal of this development is to produce website-based learning media products in order to improve students' self-regulated learning. The subjects in this study were students of class X IPS 1 at MAN 3 Pekanbaru City. This is because students in class X are still adapting from their previous level. Based on preliminary studies, it is found that the phenomenon of self-regulating learning tends to be low at that level. The research phase used the 4-D development model, namely define, design, develop and disseminate. However, this research limits the model to develop only. The disseminate stage was not carried out due to various limitations.

The research procedure begins with the definition (design) stage which is used to determine and define the needs in the learning process and collect various information related to the product to be developed. The analysis carried out at this stage includes initial analysis, student analysis, task analysis, concept analysis, and analysis of learning objectives. Then the planning stage (design) is carried out which consists of selecting the media, choosing the format and the initial design. Then the third stage is development which is carried out in two steps, namely obtaining expert validation, product trials, and large-scale trials to produce the effectiveness of website-based learning media in increasing self-regulated learning.

The data collection technique was carried out by appointing media experts and material experts from Suartama (2016) and Sulistyawati et al., (2022). In addition, to collect self-regulated learning data it is measured by the SLR questionnaire from Zimmerman's theory in Nurfiani (2015). The data analysis technique in this study is to use descriptive statistics in order to get an idea of the validity level of learning media. Data obtained through questionnaires from material experts and student responses in the form of quantitative data were converted into qualitative data. The media is declared valid if it has reached a validity level above 61% (Sugiyono, 2019). In addition, an analysis was also carried out by testing the effectiveness of website-based learning media in increasing student self-regulated learning. The pre-test and post-test were carried out using the t-test (paired) using SPSS for windows.

Results and Discussions

Website-Based Learning Media Development Process with 4D Models

Define

In the early stages of defining the development of website-based learning media, it begins with analyzing the problem by conducting interviews with Class X Economics teachers. The initial analysis aims to obtain information about Economics learning materials that need to be developed to address problems related to student self-regulated learning. Based on the initial-end analysis conducted to determine the characteristics of students. This analysis aims to analyze the needs of the problems found previously. Based on interviews with economics teachers, it is known that in the material needs and scarcity students experience many problems in learning. This material is considered sufficient to determine further understanding because it is related to the material after it. If students do not understand this material, students generally look less consistent and serious about studying economics. Students are expected to be able to understand economics and problems related to economics such as need and scarcity so that this material can bridge the understanding of further material. So far, the learning process carried out independently by students is also lacking, where many students do not review their lessons at home. This describes student self-regulated learning that needs to be developed. In addition, the use of instructional media for this material has not yet been developed by teachers because teachers only use textbooks from the Ministry of Education and Culture. Based on these problems, it is deemed necessary to develop website-based learning media that are flexible, can be accessed at any time, and help students improve self-regulated learning.

The next analysis is student analysis, which is by looking at student characteristics. This study involved student subjects who were in the age range of 15-18 years because they were in class X at the MA level. According to Piaget's theory of development (2005), students who reach the age of 11 years have entered the concrete operational intellectual stage. Ideally, the age of students is directly proportional to their ability to carry out self-regulation. The higher the age, the better the ability to do self-regulation. However, under certain conditions, students who do not have good learning media can be distracted by other things that are not related to academic improvement. At this stage students are expected to be able to train and develop the ability to share time and exercise authority over themselves so that students can choose and decide when to study and when to do other things. Based on the results of the interviews, it is known that the teaching materials commonly used in learning are textbooks from the Ministry of Education and Culture, as well as student worksheets, while the media comes from PowerPoint provided by the teacher. Based on the preliminary questionnaire, it was also known that only 20% of the learning media used by students previously could help students learn independently. In addition, the learning media used by students requires an explanation from the teacher to describe the material so that students feel they have not been able to carry out self-regulation (regulation) in studying economics at home.

Furthermore, based on student learning styles, it is also known that many students have visual and auditory learning styles, so that the type of media developed is expected to facilitate and be in line with student learning styles. Website-based learning media is included in the visual and auditory media types because it contains image and sound content such as videos, images, and animations. The website can also be accessed by students on their smartphones and laptops so that it is considered flexible. Basic competency analysis (KD) and objectives. This analysis is also called task analysis which is carried out to determine the core competencies (KI) and basic competencies (KD) that will be achieved in this developed website-based learning media. If it is related to core competencies (IC), the developed website-based learning media takes into account increasing students' abilities to appreciate and understand the teachings of the religion they adhere to. The majority of students in this study are Muslim, so the website media developed takes into account the animations used, such as covering their private parts and wearing closed clothes. This visualization is considered to be in line with the core competencies achieved. In addition, the examples of questions given are also contextual and factual in accordance with KI-3, for example by providing videos or cases first, then students are given time to answer questions based on the context of the questions. This will also simultaneously support KI-4 which helps students process reasoning and present concretely the lessons learned in everyday life. Furthermore, after analyzing KI, the next analysis is basic competence (KD).

The basic competence in this study is the material for the need for scarcity in KD 3.1 and 4.1. The KD 3.1 is: "describing the concept of economics". Whereas KD 4.1 is: "identifying needs and scarcity in overcoming economic problems". Based on the curriculum on need jnd scarcity material, it can be seen that students are required to be able to understand, analyze, process, and apply knowledge that can be useful in overcoming economic problems related to need and scarcity. So, with the existence of learning media that supports the needs, characteristics, and achievement of the assigned tasks.

The results of the initial final analysis as a whole show that website-based learning media is needed by students to improve student self-regulated learning. This is indicated by the characteristics of students which include developmental age that requires control in the development of independent learning, student learning styles that are visual auditory, and the absence of media that can flexibly facilitate increased student self-regulated learning.
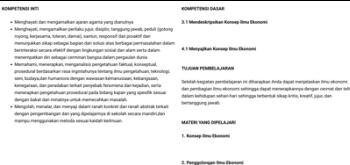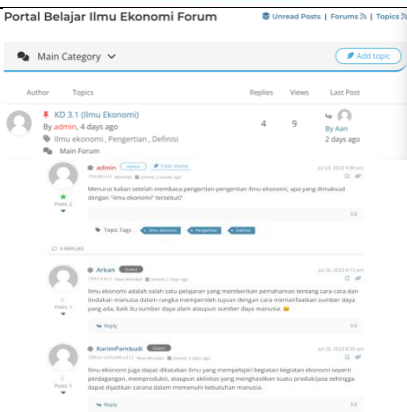
Design

The first step is to define and create a special email account so that it can be linked to the specified domain. The website domain is a unique name that is used as an address in accessing learning media. After determining the domain, the website must be stored on a special server so that the uploaded data and information are not lost and can be modified at any time. There are several types of hosting that can be used, such as shared hosting, virtual private servers (hosting that can be managed independently), cloud hosting (hosting with many customizable resources), unlimited hosting (unlimited hosting). This type of hosting affects the fees paid to hosting service providers in the world, but there is also free hosting such as services provided on a trial basis from hosting providers. This study chose to use a web builder in order to be able to use a hosting provider. Web builder is a special platform that allows users to create and manage websites practically without the need to do coding from scratch. Web builders also help users choose website templates and provide private or shared hosting for free. The web builder used in this research is wordpress which is accessed in https://www.wordpress.com/. After getting a wordpress account, the site can be edited and customized. The advantage of WordPress is that it has a variety of plugins that can be installed on web pages, such as interactive forums that allow students and teachers to give feedback to each other. The drawback of using a web builder is that the templates and features used are in accordance with the options provided, while for free access to all features, users must subscribe for at least one year.

After determining the number of pages and changing the page name on the web builder, web design, color selection, and content can be done using the Canva application. The Canva application is a graphic design-based design program that allows its users to create two-dimensional content or moving content such as videos with excellent quality. The Canva application can be accessed online at https://www.canva.com/. This application is available in trial and professional versions, and what distinguishes the two is the many design variations that can be made. Researchers use the professional version so they can access various image formats and modify them without a watermark. Furthermore, after making material designs in Canva, these designs are saved in JPG or PNG format and uploaded to the web builder, if the format is in the form of video and animation, then the embed code is done. Embed code is an attempt to place external applications into HTML format so that they can be displayed on a website. If revisions are made to the content or layout, this process will be repeated so that changes occur in the appearance of the website. After the website draft is considered complete and publication can be carried out, then all pages can be published so that all data uploaded on the server is displayed to the public. The results of website-based learning media design on the material needs and scarcity:

Table 1 <Website Based Learning Media Design>

Design	Frame	Information
	Front page	Contains menu options that can be accessed on the website
	Website features	Contains features provided on the website that can be clicked and displays moving images
	Live quiz is integrated with quizizz	It is a weekly live quiz that is held once a week to encourage students to study regularly together

Design	Frame	Information
	free e-book collection	On the home page, there is a collection of free e-book shortcuts that students can download. The free e-book comes from the Ministry of Education and Culture module.
	KI, KD, learning objectives and material studied in KD 3.1	On the KD 3.1 page, the initial section contains core competencies, basic competencies, learning objectives and material studied
	Material section	Contains learning parts that have been separated based on the total duration of learning, for example in parts in KD 3.1 and KD 4.1
	Part of the student answer column on the first material	Students can answer the evaluation at the end of the subject at the end of the material
	Developer profile	There is a developer profile on the home page which is located at the very end
	Online attendance	Displays an attendance column that can be filled in by students every time they visit the website
	Discussion forum	Displays a form page that can be accessed and left comments by students if there are questions either given by the teacher, or between students.

The design stage produces a home page, website features, two materials for basic competencies (KD 3.1 and 4.1), quizzes and forums. After obtaining the design results, the next stage of development is carried out in a 4-D model.

Develop

The development stage is carried out after the design and drafts prepared previously have been completed. The media then produces prototype products to be assessed by experts. The media that was tested for feasibility was then assessed by experts. Furthermore, the results of the feasibility of the media were revised according to the suggestions, and after receiving an appropriate assessment for a limited trial, the next step was to conduct a limited trial for students in class X MAN 3 Pekanbaru. Limited trials were carried out with 2 x 40 hours of lessons to get student responses and teacher responses regarding the media being developed. After that, a wider scale trial was conducted with 36 class X students at MAN 3 Pekanbaru City which was explained in the section on the effectiveness of implementing website-based learning media in improving self-regulated learning.

Media Validation Analysis Development of Website-Based Learning Media

The feasibility analysis is carried out after the website-based learning media is designed, then the media needs to be tested for feasibility/validity in order to get input from material experts and media experts. The first thing to determine in development is to determine the scoring rubric for media expert validators and material experts in assessing website-based learning media. Material and media expert validators then assess and provide suggestions and input on website-based learning media developed to improve student self-regulated learning on the needs and scarcity materials developed so that the level of validity is known.

Material expert validation sheet along with an assessment rubric consisting of 10 questions consisting of 3 aspects, namely curriculum aspects 3 questions, material aspects 6 questions, while evaluation aspects 1 question. Based on the validation results of material experts and media experts, qualitative and quantitative data were obtained. Qualitative data in the form of comments and suggestions from 2 validators on the developed website-based learning media. Suggestions and input from the validator on each aspect are shown in the following table:

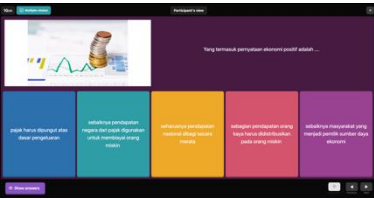Table 2 <Suggestions and Improvements from the Validator>

Validator	Suggestions and Improvements
Validator 1	- The quiz questions are given HOTS questions to help students achieve understanding at C4-C6 levels - The questions given are contextual questions
Validator 2	- After studying the material for developing website-based learning media in this economics subject, there is material that needs to be added, either in the form of videos or pictures about types of scarcity - Add a folder aboutoppurtunitycosts
Validator 3	- HOTS quiz questions - Languangeisconsistent, English or Indonesian - Create a discussionroom between students - Create a developer information on homepage - Create a contactuspage, entertheuniversity logo, the tutwurihandayani logo, the school logo where the research is conducted
Validator 4	- The submenu on the web view is made more standout by the font. - Add a short video on the website usage instructions. - Instructions for using the website cannot be downloaded. - Does the website content contain all the material for one semester? Or only for a few meetings only? - We recommend that for each part of the material there is a video-based explanation. - Check the correct use of Indonesia

After validating the initial product with suggestions and input from the validator, a revision was made to the website-based learning media as shown in the table. Then after being corrected according to the suggestions and input of material experts and media experts, then the media is carried out in a limited trial. The repair data shows that the input obtained from the material experts includes material aspects and evaluation, namely by adding some additional material content and changing the questions. Meanwhile, media experts note that the input received includes visual aspects such as writing, and adding videos. Apart from that, it also deals with

operational aspects such as fixing several embed code errors that don't appear on the website instructions. The examples of improvements made are shown in the following table:

Table 3 <Example of Revision of Website-Based Learning Media>

Before	After
Not available	Adding questions at the end of the material with contextual questions.
Not available	Added HOTS questions that encourage students to evaluate through learning videos
there is an inconsistency in the use of language on the toolbar	the words "Home" are changed to "Home" and "More" is removed
Forms of questions C1 about positive economics	The question level is raised and more contextual

In addition, based on the results of the validity of the material expert and media expert, quantitative data was obtained from the questionnaire given to the expert. The following is the validity data of material experts and media experts in this study:
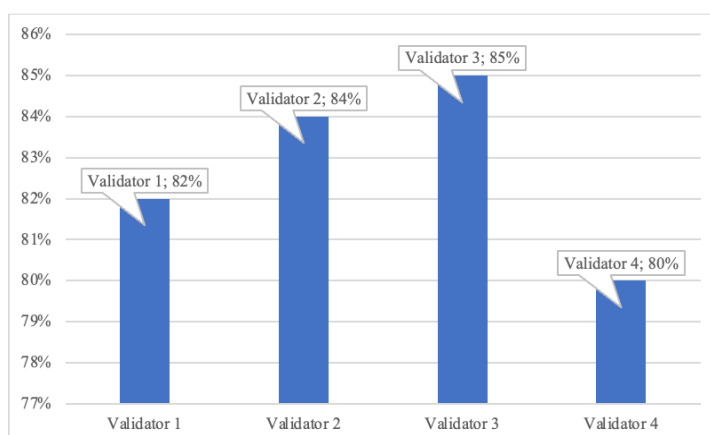

Figure 1 <Material Expert and Media Expert Validation Results> (resource: processed data, 2023)

Based on Figure 1, the percentage value of the validation of material experts (validators 1 and 2) ranges from 81% -100% as well as the validation of media experts (validators 3 and 4) is between 81-100%. This value meets the very valid criteria. From the results of the percentage of expert validation in each aspect, it has a very feasible validation value, which ranges from 81% -100% (Arikunto, 2010). The evaluation decision from the validator indicated that the website-based learning media that had been developed could be continued for field trials.

Analyzing the Practicality Level of Website-Based Learning Media in Improving Students' Self-Regulated Learning

Limited trial to apply the website-based learning media that has been developed. The practicality test was carried out on May 4 2023 at MAN 3 Pekanbaru. A limited trial was conducted to obtain data related to the practicality of website-based learning media which was developed through the provision of questionnaires/questions to obtain teacher and student responses.

Teacher responses were collected by showing learning media and teachers were asked to provide responses based on practicality questionnaires. The teacher's response based on 15 practicality items is as follows:

Table 4 <Teacher Response Regarding Website-Based Learning Media>

Aspects	Percentage (%)	Criteria
Meaningfulness	86,67	Very practical
Effectiveness	92,50	Very practical
Ease	90,00	Very practical
Product attractiveness	86,67	Very practical
Total	89,56	Very practical

Based on the results of the teacher's response it is known that the overall percentage is 89.56% which is in the very practical category. In addition, based on the percentage per aspect, it is known that the effectiveness aspect has the highest score, namely 92.50% while other aspects have a percentage of less than 90%, even so all aspects have shown percentages in the range of 81% - 100% which are in the very practical category. Student response was carried out by providing website-based learning media to 30 class X students at MAN 3 Pekanbaru face-to-face. The following are student responses to website-based learning media:

Table 5 <Students' Response Regarding Website-Based Learning Media>

Aspects	Percentage (%)	Criteria
Meaningfulness	87,33	Very practical
Effectiveness	87,83	Very practical
Ease	89,33	Very practical
Product attractiveness	87,11	Very practical
Total	87,90	Very practical

Based on the results of student responses it is known that the overall percentage is 87.90% which is in the very practical category. In addition, based on the percentage per aspect, it is known that the convenience aspect has the highest score, namely 89.33%, while other aspects also have a nearly similar percentage which is in the range of 81% - 100%, which is categorized as very practical.

The Effectiveness of Implementing Website-Based Learning Media in Improving Student Self-Regulated Learning

The effectiveness of implementing website-based learning media is carried out by observation. The application of website-based learning media was extensively tested on 36 students in class X MAN 3 Pekanbaru. The collection of self-regulated learning pre-test data aims to get an overview of the scores before the implementation of website-based learning media. The pre-test which was conducted on May 11 2023 involved 36 class X students at MAN 3 Pekanbaru to obtain an overview of the data as Figure 2:

The score of self-regulated learning prior to the implementation of a wide trial on 36 students found that as many as 24 students (66.7%) had a score in the sufficient category, while the remaining 12 students (33.3%) had a high score. This data also shows that no student's pre-test score has scores in very low, low, and very high categories. The distribution of pre-test data can be seen in (appendix 12).

The student's self-regulated learning score sufficiently illustrates that most students already have aspects of the self-regulated learning domain, but not all indicators are carried out by students. Self-regulated learning consists of 3 aspects, namely planning (forethought), implementation (performance), and evaluation, where each aspect has 3 indicators. Based on the calculation of self-regulated learning based on 9 indicators, it is known that the indicator with the highest average value is reviewing the results of one's own work (learning outcomes)

(4.04), followed by applying cognitive and metacognitive strategies (3.5), preparation (3,47), having responsibility (3.46), monitoring and controlling (3.45), overcoming failure (3.40), making strategies (3.29), carrying out activities (2.98), and reviewing (2,79). This shows that the majority of students generally have implemented self-regulated learning but the indicators for making learning strategies, carrying out routine learning activities and reviewing lessons learned are still lacking. The results of this study are in line with Widiatmoko and Herlina (2021) who found that most students had self-regulated learning in the sufficient/moderate category (37.84%) because many students in the study had not implemented regular independent learning. Another indicator that is also low is the evaluation of learning.
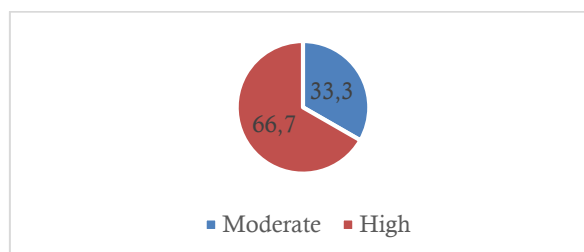

Figure 2 <Self Regulated Learning (pre-test)> (resource: processed data, 2023)

Post-test data collection was carried out to find out the final score after the implementation of a wide trial. Then this score will be compared with the pre-test score to prove the effectiveness of the developed media. The score of self-regulated learning after the implementation of website-based learning media can be seen from the following values:
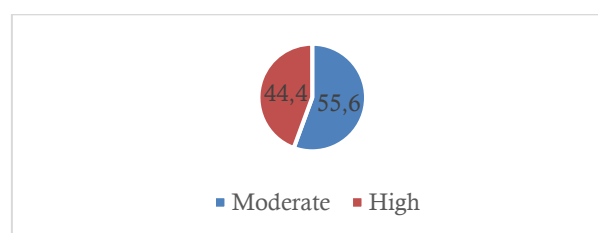

Figure 3 <Self Regulated Learning (post-test)> (resource: processed data, 2023)

The score of self-regulated learning prior to the implementation of a wide trial on 36 students found that as many as 16 students (44.4%) had a score in the sufficient category, while the remaining 20 students (55.6%) had a high score. This data also shows that there are no students who score in the very low, low, and very high categories in the post-test scores. The distribution of post-test data can be seen in (appendix 13).

Students' self-regulated learning scores after applying website-based learning media have differences from pre-test scores, where the majority of students in the post-test have a high score category. This illustrates that most students have better aspects in the domain of self-regulated learning in almost all indicators carried out by students. Self regulated learning consists of 3 aspects, namely planning (forethought), implementation (performance), and evaluation, where each aspect has 3 indicators. The following is an overview of the average score of self-regulated learning after the implementation of website-based learning media:
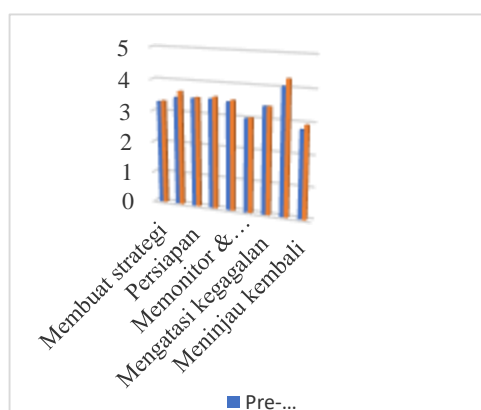

Figure 4. Comparison of SLR (Pre-Post) Scores based on Indicators (resource: processed data, 2023)

Based on self-regulated learning calculations based on 9 indicators, it is known that all indicators experienced an average increase after the implementation of website-based learning media. The indicators with the highest increase were re-evaluating the results of one's own work (learning outcomes) (4.27) and having responsibility (3.67). While the indicators that are still below the average are adequate in the evaluation aspect, namely reviewing learning (2.94). This shows that the majority of students generally have implemented self-regulated learning well even though the evaluation aspect still needs to be improved. According to Ana (2015) learning using the internet can help to increase learning independence (self-regulated learning), because the internet provides a flexible learning space that can be accessed at any time according to the needs of its users.

Before testing the hypothesis, the data normality test is carried out because the condition for testing the parametric hypothesis is that the data is normally distributed. The data normality test was carried out using the Kolmogorov Smirnov test method, as follows:

Table 6 <Normality Test>

| | TestsOfNormality | | | | | |
| | Kolmogorov-Smirnov[a] | | | Shapiro-Wilk | | |
	Statistic	Df	Sig.	Statistic	Df	Sig.
Skor Pre-Test SRL	,093	36	,200[*]	,964	36	,282
Skor Post-Test SRL	,074	36	,200[*]	,978	36	,693

*. This Is A LowerBoundOf The TrueSignificance.
a. LillieforsSignificanceCorrection

Based on the normality test table, it is known that the significance value of both pre-test and post-test self-regulated learning scores is 0.200 (> 0.05). According to (Ghozali, 2018) if the significance value on the Kolmogrov test is greater than 0.05, then the data is normally distributed. So that the data can be continued in testing the research hypothesis using parametric statistics. But if the data is not normal, then hypothesis testing can be done with non-parametric statistics.

The hypothesis test in this study aims to prove the effectiveness of website-based learning media in increasing students' self-regulated learning. Hypothesis testing is done with the dependent t test or often called the paired sample t-test. The reason for using the dependent t test is because the sample comes from one population (1 group), besides that the data being compared is the state before (pre) and the state after (post). Based on the results of the t test using the SPSS program, it is known as follows:

Table 7 <Hypothesis Test>

		N	Correlation	Sig.
Pair 1	Skor Pre-TestSrl& Skor Post-TestSrl	36	,598	,000

Based on the t test results table, it is known that the significance value is 0.000 which means it is smaller than 0.05. According to Sugiyono (2017) if the significance value of the t test has a p-value <0.05 then the alternative hypothesis is accepted and the null hypothesis is rejected. So that it can be said that: "Web-based learning media is effective in increasing the self-regulated learning of class X students on the material of need and scarcity". The magnitude of the correlation can be seen from the correlation value of 0.598 which, when referring to the correlation interpretation table, is in the range of 0.499 – 0.699, namely in the "Strong Enough" category. This shows that the website-based learning media is strong enough to improve students' self-regulated learning.

The results of this study are also in line with Aprilia and Suryadarma (2020) who conducted research on developing e-modules to improve self-regulated learning in biology learning. The results of this study indicate that the development of e-modules that can be accessed on the internet has proven effective in increasing self-regulated learning (p-value 0.077 <0.05).

According to Wahyuni et al., (2020) website learning media has many advantages that can facilitate increased student self-regulated learning. Website-based learning media has student-centered principles, so that it can enable students to learn independently, be responsible for the learning process because students can learn anytime, anywhere, and have unlimited access. The existence of features such as online discussions, time management, high flexibility allows students to have better self-regulated learning. Good self-regulated learning in students will cause these students to have learning plans, be able to set goals to broaden knowledge and maintain motivation, be aware of emotional characteristics and strategies for managing them, periodically evaluate progress towards goals, refine strategies, and evaluate possible obstacles. arise, and make adjustments

The website developed in this study has features that make students more consistent and motivated to learn. For example, with the weekly quiz. Live quizzes are conducted online using Quizizz which is accessed through a link provided to students through reminders that have been obtained from subscribing to the website, besides that the researcher also redistributes the quiz link every week at a predetermined time. The quiz report displays the accuracy of the answers answered by students in percentage terms. In addition, in the item per question section on the quiz given students can find out the correct questions and the duration of answering them, so that this can be an evaluation for students in reviewing the results of the quizzes that are being carried out. When students review the learning that they have done, this is included in the evaluation aspect of self-regulated learning. According to Azmi (2016) students who carry out learning evaluations will help them understand more deeply about a subject matter. Evaluations that are carried out consistently will also help students face the final exam because they dThis study provides recommendations for other future research to be carried out by considering other variables such as self-directed learning which also measures student initiative to be responsible in learning that is carried out independently outside the classroom. In addition, features can be added to the media that encourage a lot of direct interaction such as social media (likes and comments) at each meeting, thereby encouraging active student participation in each material provided.o not find it difficult to repeat lessons. The existence of review activities and quizzes will cause students to return to the thought process. At the evaluation stage, students make an assessment of the success or failure of learning, and the results will become the basis for carrying out the next self-regulation process. The ability to do self-evaluation has an important role in the learning cycle. By knowing the strengths and weaknesses it has, learning will be more meaningful. Students can improve the quality and quantity of material that is not yet understood or poorly understood, and try to maintain an understanding of the material that has been mastered

Conclusions

The development of website-based learning media on needs and scarcity materials is carried out using a 4-D model, namely (1) the defining stage (define) by conducting an initial analysis, student analysis, task analysis, concept analysis, and learning objectives analysis; (2) the design stage by making flowcharts and storyboards and product design; (3) the development stage by validating two material experts and two media experts, then conducting a limited trial of 30 students; (4) the dissemination stage by conducting a wide-scale test on 36 class X students at MAN 3 Pekanbaru. The validation level of website-based learning media in economics subjects at MAN 3 Pekanbaru is in the range of 80% - 85%, which means that website-based learning media is very feasible and has very high validity.

The level of practicality of developing Web-based learning media in economics subjects at MAN 3 Pekanbaru is Teacher response is very practical, as well as the student's responses. The application of Web-based learning media to economics subjects at MAN 3 Pekanbaru is effective in increasing student self-regulated learning. By embracing technology and self-regulated learning, the research aligns with the demands of the digital age. The implication is that educational institutions should equip students with skills that are relevant in a technologically advanced world, where self-directed learning and digital literacy are highly valued.

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