DEVELOPMENT *WEB*- BASED LEARNING *WEB* ON ACIDS AND BASES

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ABSTRACT

Basically, the benefits of technology-based learning in supporting the implementation of the learning process can increase students' absorption capacity in understanding the context of learning material, encourage independent learning abilities, teachers must be able to use the learning web by using existing technology which makes it easier for students to learn from observations that have been made. In high school chemistry learning currently only uses textbooks and the web, and gives assignments so that it makes learning less interesting for students and sometimes makes students understand less of the content of the learning material. The aim of this research is to develop a web-based learning website that is developed in chemistry lessons, and the feasibility of the web-based learning website being developed. This Google Sites web-based learning research and development model uses the ADDIE learning model. This research uses a non-test instrument in the form of a validation sheet. The validation feasibility results show that the web learning web development on acid and base material, the assessments of material expert validators, web experts and chemistry teachers, for the feasibility of the web development respectively are 83.5%; 86%; 86%; which means that the web-based learning website on Acids and Bases material is very suitable for use as a learning website.

Keywords: Learning Web , Android, Chemical acid based , Increasing Learning Outcomes, Web Feasibility.

INTRODUCTION

Besides delivery message objective from something *web* learning is For increase results learning , interest and motivation Study participant educate . Learning outcomes tend will increase If use something *web* appropriate learning . Based on study Nisa Humairah , Zainuddin Muchtar and Marham Sitorus (2018). Innovations carried out For increase results Study student in the learning process is with develop *web* based technology with features that can give activity and stimulate desire know student in

something learning chemistry . *Web* learning in form application education on the telephone mobile effective as *web* learning so that can make the learning process more interesting , flexible , improving concentration Study students , and help understanding student so that can give influence positive to results Study student .

Basically benefit learning based technology in support implementation of the learning process is increase Power absorb participant educate in understand context material learning , encouraging ability Study independent , improving participation active participant educate , as well increase ability displays information with device technology For develop Skills in face 21st century that is creative , thinking critical , collaborative and communicative . Based on research conducted Sutiani et al (2022) respectively detailed required skills owned by the teacher inside apply digital learning is ability think critical , following development technology , do *discovery learning, collaborative, blended learning and online learning* optimizing ability participant educate , create *web* interesting and creative learning *games based learning* .

The Internet which is part from technology moment This Already Lots utilized in develop *web* learning . No only That is , the internet *website* that is used proven can improve results Study student . Based on research by Wen-Yu Lee (2014) if use of the Internet Lots used by teachers will increasing results Study participant education and science No except . Besides that 's teaching science Internet- based and learning process participant educate as well as results environment learning science Internet- based (ISLEs) will the more highlighted by educators and other researchers in progress education science . ISLEs have implemented in various shape , like utilization source online power , simulation / animation , virtual reality , discussion forums , video conferencing , learning based online games, applications *web* 2.0 for example blogs, or combination from various form .

Chemistry is part from science , which means that lesson chemistry tightly connection with life everyday and with learn knowledge chemistry phenomena that occur in the environment around can known , so the learning process knowledge chemistry No only Study about mastery cognitive form theory but reasoning and thinking process skills . One of topic major at school Intermediate On is chemistry acid-base , however participant educate often experience difficulty in learn eye lesson This . has characterize addition topics on the syllabus chemistry acid-base as layer sequentially from construction stratum type : " Structure this is like rock sediment , shows a number successive layers . Layer concept , respectively with its history himself caused it Lots confusion among participant educate . Conceptual model macroscopic and microscopic involved in explanation of the acid-base process (Hirza , Muchtar , Sutiani , Dibyantini , & Sinaga , 2023).

Chemistry is one eye lesson productive at school Intermediate On . Learning about chemistry generally covers a number big draft abstract

Because chemistry generally related with structure part in material . as a result in learning chemistry participant educate become more difficult in build meaning draft chemistry rather than concept knowledge natural other . One of topic difficult material understood by students is acid and base . Whereas understand subject acid and base very important For learning more carry on for participant educate , because matter the become base part big other subjects on learning chemistry (Sitepu and Herlinawati , 2022).

Google sites is application easy learning used Because only requires a cellphone and internet, no need download application , students or the teacher can access it through *Google* (Adkiya, 2021). *Google* sites as *web* learning can utilized by teachers upload learning videos with material and characteristics topic material the very abstract so that the material with easy can understood by participants educate . Through Teachers can also use *Google* Sites integrate several material links and question links to participant educate so that *Google Sites* can do it too used as a Learning Management System (LMS) (Mardin and La Nane, 2020). Man can access information with technology , one of them with use *web google* sites as *web* learning .

Based on study Previously Kaukaba and Achmad (2022) developed android mobile *website* . Developed *web* with this R&D model proven increase motivation Study participant educate . Research result questionnaire motivation Study participant learn average assessment whole by 95%.

On research Royani et al (2021) developed *web* learning *web* apk 2 builder on material sour base get response student to product *web* developed learning based on index effectiveness obtained percentage attractiveness *web* , convenience use *web* , and attractiveness *web* in a way consecutive namely 90%, 92%, and 93%.

Teacher as facilitator, demanded For can utilise even develop product technology in frame improve the learning process . For that's the teacher as facilitator must develop capabilities in the digital era with prepare *web* learning To use reach objective in competence foundation and structure 2013 curriculum .

Sidamanik 1 Public High School is one of the unit education intermediate above those in the environment Subdistrict Sidamanik Regency Simalungun . Based on results observation beginning form interviews conducted to teachers at SMA Negeri 1 Sidamanik school state that eye lesson chemistry is one of eye difficult lesson for student . That matter because part big concepts chemistry nature abstract and complex so that need deep understanding For learn it . Just a learning process guided by teachers and books text on the learning process , p This No in accordance with objective learning . Because of that , teachers must grow interest and power pull student in the learning process with help *web* learning . Based on background the background presented , researcher consider need did it study development *web* learning based *web Google* sites used in learning

chemistry . So from that , researcher will do study with title Development *Web* Learning Based *Web Google* Sites In Material Acid and base.

METHOD

Type research used is purposeful research and development For develop *web* learning based *web* on the material Acids and Bases with using the ADDIE Procedure development model Study This refers to design ADDIE which includes five stages , namely Analysis (Stage Analysis), Design (Stage desig), Development (Stage Development), Implementation (Stage Implementation), and Evaluation (Stage Evaluation).

Stage Analysis

At stage analysis (as stage beginning , that is analysis teacher needs, curriculum, concepts and lesson plans) done survey at SMA Negeri 1 Sidamanik For obtain the required data in development *web* learning based *web google* sites with use interview . Activity survey This is as following :

a. Gather information which is problems related with *web* used in the learning process chemistry with the student concerned .
b. Gather information related curriculum , concepts , and objectives learning in the lesson plan used in the material learning chemistry .

Stage Design

Based on results analysis , the next stage done is stage design or planning products that include stage following :

1. Set Material

At stage This stated base election eye Chemistry lesson about Acid and base. Chemistry selected Because in accordance with competence writer . Besides that , there is difficulty in matter lack of use *web* learning and many teachers still use method conventional as well as only use book print as *web* Study in teach chemistry .

2. Making Design *Web* Learning

the web is application easy learning used Because only requires a cellphone and internet, no need download applications , and students or the teacher can access it through *Google*

3. Drafting Questions and answers

Questions and discussion the answer will be loaded in *web* learning This is material about bond chemistry , incl ionic and covalent bonds . Drafting material , questions , and discussion in *web* learning This made from various reference .

Collection of backgrounds, fonts, images and buttons . Collection of backgrounds, fonts, images , animations , videos and buttons is with method download from various source .

Stage Development

Make product form *web* learning web- based *Google* Sites. At stage This product *web* learning made in accordance with the existing format determined previously

Validation of Material Experts and *Web Experts*

Validation process carried out by experts *web* and experts material . The result in the form of suggestions, comments and input that can be obtained used as base For do analysis and revision to *web* learning developed and as base for testing products to students

Validation of Chemistry Learning Teachers

Validation process carried out by the learning teacher chemistry at school . The result in the form of suggestions, comments and input that can be obtained used as base For do analysis and revision to *web* learning developed and as base For conducting product tests on students .

After *web* learning validated by expert validators , then will done revision to *web* learning in accordance with suggestions for improvement from expert validators until found *web* valid and appropriate learning in accordance standard BSNP eligibility . Data collection techniques used in study This is purposeful questionnaire For know validation appropriateness developed products to product , then questionnaire given to expert material , expert *web* , eye teacher lesson . Evaluation from expert test results done based on input data form sheet evaluation use scale likert with scores 1, 2, 3, 4 and 5 are changing evaluation from qualitative become quantitative in accordance with rule giving score .

Stage Implementation

Stage implementation This product will tested try it to student class XI SMA Negeri 1 Sidamanik . At stage This learning process is carried out with use *web* Valid learning is also shared questionnaire For measure and know opinion or response participant educate about *web* learning chemistry For learning acid and base . When required so will done revision based on input and suggestions from participant educate . However , in revision This will considered input and suggestions from previous validators not to contradictory with improvements previously.

Evaluation (Evaluation)

Stage evaluation done with test try *web* learning to users (students). Trials This aim For know response evaluation student to *web* developed learning .

Qualitative Data Analysis Techniques

Analysis Appropriateness *Web* Deep data collection techniques development This is with use questionnaire containing the questions asked in a way written to the expert material , expert *web* Objective from questionnaire the is For gather answer , response , or information needed

by researchers . Required questionnaire data will analyzed with steps as following :

1. Validate *web* to expert material , expert *web* and teacher.
2. Questionnaire validation filled in by experts material , expert *web* and teacher checked
3. Qualitative evaluation validation expert material , expert *website* and teacher accordingly with weight specified assessment previously .
4. Create data tabulation
5. Counting average percentage of eligibility (Ernawati and Totok , 2017).

Table 1:
Guidelines Evaluation Score

Data Qualitative	**Score**
SB (Very Good)	5
B (Good)	4
C (Fair)	3
K (Not enough)	2
SK (Very Not enough)	1

Source: Sukardi (2009).

Table 2:
Criteria appropriateness web

Score in percent %	**Category appropriateness**
< 21 %	Very not worthy
21 – 40 %	No worthy
41 – 60 %)	Enough worthy
61 – 80 %	Worthy
81 – 100 %	Very worthy

Source: Ernawati And full-blooded, (2017)

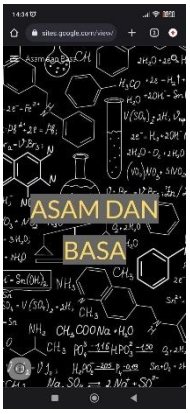
Results = $\frac{\text{Total score obtained x 100\%}}{maksimum \text{ score}}$

FINDINGS AND DISCUSSION

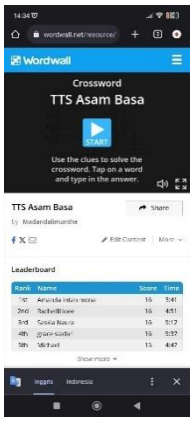
Web eye learning developed chemistry lessons is *web* learning equipped web- based with the intention of learning , materials , images , animations, places collection task, place discussions, videos , quizzes and questions exercise . *Web* learning based *web google* this site made with objective For makes it easier student in learning independent nor group that can motivating student as well as hone Power think students to learn become more easy and fun . *Web* can accessed using a web browser with URL address . Appearance interface and results making *web* learning based web on eye Chemistry lessons for principal discussion Acid Base is displayed as in the picture under This :

Appearance *Home web* meeting 1

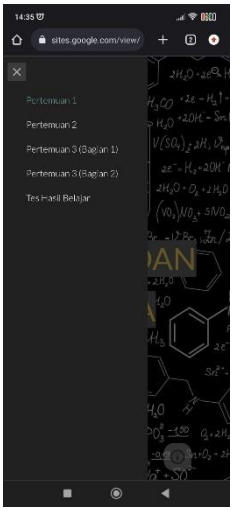
material Acid Base



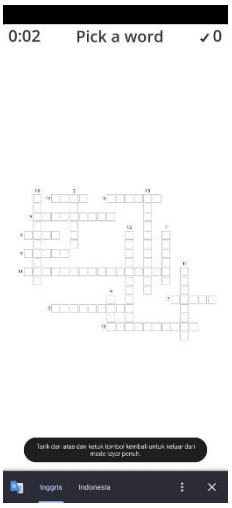
quiz



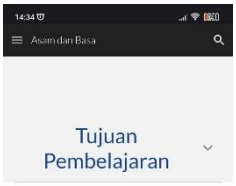
Appearance Acid Display



TTS Menu option



Learning Video



Feasibility test *Web*

Before carry out trials , *web* learning based *the* web developed and validated moreover first by existing lecturers and teachers background behind in accordance with developed *website* . Validation by experts *web* and materials aim For get information , criticism and suggestions for *the web* to be developed become quality products from facet aspect material , quality , appearance and power pull . Score highest from details question in sheet validation is 5, whereas score Lowest is 1.

Validation from Material Experts

Web learning web- based design that has been completed furthermore validated by expert validators purposeful material For test truth materials and equipment the material it consists of from two Unimed Chemistry lecturer and two teachers chemistry at SMA Negeri 1 Sidamanik . Based on results evaluation instrument from validators by material validators can said worthy and done Good only just There is some suggestions given by validators as repair from *web* For corrected by researchers . Validation results expert material to *web* learning web- based *Google* sites on the material bond chemistry shown in the table below This .

Table 3:
Score Material Expert Validity 1

Statement	Score	Criteria
Relevance Material with KD	4	Worthy
Material presented systematic	4	Worthy
Accuracy structure easy sentences and language understood	4	Worthy
Material in accordance with what is formulated	4	Worthy
Material in accordance with ability student	4	Worthy
Clarity description material Acid Base	4	Worthy
Material explained Specific	3	Enough Worthy
Example given in accordance with material	4	Worthy
Total	77.5%	Worthy

On expert Material 1 is available a number of revision before product developed *website* can used at school . However, in the validation carried out Already in category worthy .

Table 4:
Score Material Expert Validity 2

Statement	Score	Criteria
Relevance Material with KD	5	Very Worthy
Material presented systematic	4	Worthy
Accuracy structure easy sentences and language understood	5	Very Worthy
Material in accordance with what is formulated	5	Very Worthy
Material in accordance with ability student	5	Very Worthy
Clarity description material Acid Base	4	Worthy
Material explained Specific	4	Worthy
Example given in accordance with material	4	Worthy
Total	90%	Very Worthy

On expert Material 2 is available A little revision before product developed *website* can used at school . However, in the validation carried out Already in category very worthy .

Table 5:
Score *Web* Expert Validity

Statement	Score	Criteria
Text can read with Good	4	Very Worthy
Size text and type letter	4	Worthy
Clarity material	5	Very Worthy
Clarity instruction	5	Very Worthy
Clarity page and background on *web* *web*	4	Worthy
Clarity colors and images	4	Worthy
Ability *web* *web* For facilitate Study student	4	Worthy
Ability *web* *web* For facilitate teachers	4	Worthy
Image used in accordance	5	Very Worthy
Accuracy function *web*	4	Very Worthy
Total	86%	Very Worthy

On validation expert *web* there are also several revisions on *the web* developed website . However , *web* Already in category very worthy .

Table 6:
Validation Teacher *Web* 1.

Statement	Score	Criteria
Indicator learning in accordance with K.D Which has prepared .	4	Very Worthy
Use developed *website* on material Acid and base easy used for teachers.	4	Worthy
Website Which developed on the material Acids and Bases are compatible with objective learning .	5	Very Worthy
Material in *website* which was developed on material trigonometry Already arranged in a way coherent .	5	Very Worthy
Language Which used on *web* *web* easy understood by Teacher.	4	Worthy
Exercise question Which given easy understood by Teacher.	4	Worthy
Appearance *website* which was developed on material Acid and base interesting for teachers.	4	Worthy
Use *web* developed *website* on material Acid and base make it easier process learning .	4	Worthy
Steps processing question easy understood by Teacher.	5	Very Worthy
Election type letter , size And space makes it easier Teacher in read *web* *web* Which developed on material Acid and base.	4	Very Worthy
Total	86%	Very Worthy

Table 7:
Validation Teacher *web* 2.

Statement	Score	Criteria
Indicator learning in accordance with K.D Which has prepared .	4	Very Worthy
Use developed *website* on material Acid and base easy used for teachers.	4	Worthy
Website Which developed on the material Acids and Bases are compatible with objective learning .	5	Very Worthy
Material in *website* which was developed on material trigonometry Already arranged in a way coherent .	5	Very Worthy
Language Which used on *web web* easy understood by Teacher.	4	Worthy
Exercise question Which given easy understood by Teacher.	4	Worthy
Appearance *website* which was developed on material Acid and base interesting for teachers.	4	Worthy
Use *web* developed *website* on material Acid and base make it easier process learning .	4	Worthy
Steps processing question easy understood by Teacher.	5	Very Worthy
Election type letter , size And space makes it easier Teacher in read *web web* Which developed on material Acid and base.	4	Very Worthy
Total	86%	Very Worthy

There is also validation for teacher 1 and teacher 2 a number of revision *web* developed website . However *web* Already in category very worthy .

Table 8:
Validation whole

Expert Validator	Average Score	Criteria
Material Expert Validation	83.5%	Very Worthy
***Web* Expert Validation**	86%	Very Worthy
Teacher Validation	86%	Very Worthy

Discussion

Study is study development of research and development (R&D), because objective study This is For produce something product . Study development or research and development (R&D) is type research used For produce something product in field purposeful education For increase quality learning (Martianingtiyas, 2019). Products produced later done analysis requirements and feasibility tests so that study This can implemented . Development *web* learning based *web* with use has held researcher through a number of stage , includes stage analysis requirements , design , development, implementation and testing . At stage analysis need researcher look for information from schools studied with do observation . Based on results observation field at SMA Negeri 1 Sidamanik is known that activity learning especially regarding material chemistry Still use method conventional with *web* learning used is books and ppt. Not enough teachers utilise development technology in the learning process .

Stage second that is design . Researcher start make design or the draft will be developed For making *web* learning web- based , started from election concepts , materials , questions and solutions , and videos. At stage This researcher gather ingredients supporter web creation . Stage next that is done development *web* that starts from stage beginning, content (material) and also animations and videos included in *web* the . Once done development, Then *web* the done assessment by two validators from three lecturers at Medan State University and two chemistry teachers at SMA Negeri 1 Simalungun with objective is *web* the worthy used . Average results evaluation expert validator material , expert *web* and chemistry teacher , for feasibility of the web being developed in a row is 83.5%; 86%; 86%; which mean *web* learning web- based material The Acids and Bases very worthy For used as *web* learning .

CONCLUSION

Based on results study development *web* learning web- based material acid and base . So can concluded that development *web* learning web- based material acid and base done with use Research and Development (R &D) method with assisted by ADDIE consisting of from a number of stages , namely Analysis , Design , Development , Implementation and Evaluation . *Web* learning web-based material bond acids and bases that have been developed has fulfil standard with results validation from three lecturer and two teachers on average expert validator scores material amounting to 83.5%; expert validator *web* 86% ; and chemistry teacher validator 86%.

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