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E-module Using FlipHTML5 Application on Chemical Bond Material

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ABSTRAK

Rendahnya penggunaan bahan ajar yang kreatif serta sesuai dengan perkembangan teknologi berpengarh terhadap motivasi serta hasil belajar peserta didik. Penelitian ini bertujuan untuk mengembangkan e-modul menggunakan aplikasi FlipHTML5 pada materi ikatan kimia. Jenis dan sumber data yaitu kualitatif (saran dan komentar tim validator serta responden) dan kuantitatif (nilai dari tim validator serta responden). Subjek penelitian yaitu 24 orang peserta didik dan 3 orang guru kimia. Teknik analisis yang digunakan adalah teknik analisis validitas menggunakan skala linkert 1 sampai 5, dan kuesioner respon pengguna. Hasil yang diperoleh dari hasil analisis data validasi pada aspek kelayakan isi, kebahasaan, penyajian, kegrafisan dan pemanfaatan aplikasi berturut-turut 88%, 86%, 96,67%, 83,33% dan 82,85% dengan kriteria sangat valid. E-modul yang telah memperoleh kriteria valid menurut validator diuji respon kepada tiga orang guru bidang studi kimia dan 24 orang peserta didik. Hasil persentase rata-rata respon peserta didik dan guru masing-masing sebesar 98,43%, dan 88,52%. Kesimpulan yang diperoleh dari hasil analisis data tersebut bahwa dihasilkan e-modul menggunakan aplikasi FlipHTML5 pada materi ikatan kimia valid dan dapat digunakan dalam proses pembelajaran.

ABSTRACT

The low use of creative teaching materials following technological developments impacts student motivation and learning outcomes. This study aims to develop e-modules using the FlipHTML5 application on chemical bonding material. The types and sources of data are qualitative (suggestions and comments from the validator team and respondents) and quantitative (scores from the validator team and respondents). The research subjects were 24 students and three chemistry teachers. The analysis technique used is the validity analysis technique using a Likert scale of 1 to 5 and a user response questionnaire. The results of the validation data analysis on the feasibility aspects of content, language, presentation, graphics, and application utilization were 88%, 86%, 96.67%, 83.33%, and 82.85%, respectively, with very valid criteria. E-modules obtained valid criteria according to the validator and were tested for responses to three chemistry teachers and 24 students. The results of the average percentage of student and teacher responses were 98.43% and 88.52%, respectively. The conclusion obtained from the results of the data analysis is that the resulting e-module using the FlipHTML5 application on chemical bond material is valid and can be used in the learning process.

1. INTRODUCTION

Science and technology development has progressed rapidly from time to time. The rapid development of education and technology has resulted in many changes in all areas of life, one of which is developments in the world of education (Rustaman, Iqbal, & Amelia, 2019; Tambunan, Siregar, & Susanti, 2020). Technology in education is a system that supports learning to achieve the desired results (Effendi & Wahidy, 2019; Lestari & Sudarsri., 2018). The implementation of technology in education in Indonesia is a technology used as a learning medium, administrative tool, and learning resource. Therefore, in the world of education, an educator must make efforts to reform related to the use of technology in learning activities (Myori, Hidayat, Eliza, & Fadli, 2019; Rohman & Susilo, 2019). The demands of 21st-century

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learning in the era of the industrial revolution 4.0 are teachers and students jointly building innovative, creative learning and making optimal use of technology. One can be done by switching to using computer technology-based teaching materials in all learning content (Oktavia, Hayati, & Erviyenni., 2021; Sari & Atmojo, 2021). One of them is in chemistry class. Chemistry is a science that studies natural phenomena by taking the matter as an object (Andani & Yulian, 2018; Mujakir & Rusydi, 2019). Chemistry is a branch of natural science that focuses on the composition and properties of substances or matter from the atomic to molecular scale so that the physical properties of most chemical substances and materials cannot be seen directly by the eye, and mediate media are urgently needed such as pictures, videos, animation to visualize material so that it is more understandable to students (Ferdian, Maryam, & Selamat, 2018; N. S Herawati & Muhtadi, 2018) MHerawati dan Muhtadi (2018). Therefore, in the learning process, the teacher must be able to use appropriate learning methods and media so that students can understand the material presented. Besides that, using learning media will also increase students' motivation and interest.

However, based on interviews that have been conducted with teachers in the field of chemistry studies and students at SMAN 15 Pekanbaru and MAN 3 Pekanbaru, information is obtained that teachers in the field of chemistry studies at MAN 3 Pekanbaru have used modules with their designs containing only material and pictures, then sent via WhatsApp. Teachers at SMAN 15 have used modules and e-modules but are still dominant in the form of text, videos related to the material are sent separately, and due to the teacher's limited time in making interesting e-modules, teachers also use modules from the Ministry of Education and Culture, where The module only contains material and images. The difficulties experienced by students in the matter of chemical bonds when predicting bonds, determining the chemical formulas of ionic-bonded compounds, and making Lewis structures of covalently bonded compounds. It results in low student learning outcomes for the chemical bond material at SMAN 15 Pekanbaru. Out of 36 students, there were 21 students whose daily test scores were still below the KKM, where the KKM for chemistry subjects was 73. Data on students' daily test scores can be seen in Appendix 1. The teacher also stated that students are generally more interested in learning conditions involving technology, such as computers, laptops, or gadgets. Based on the distribution of pre-research questionnaires to students, data obtained as much as 81.4% of students had difficulty understanding chemical bonding material because the material was complex and contained abstract theory. In addition, students feel less interested in the teaching materials used because the teaching materials used are predominantly printed teaching materials which do not yet meet the diverse, easy-to-understand, and easily accessible ways of learning students (Rahmawati, Muttaqin, & Listiawati, 2019; Siddiq, Sudarma, & Simamora, 2020). The data corroborate that as much as 72.1% of students easily understand the material if chemistry learning is facilitated with learning materials/media such as videos, animations, or graphic illustrations. If this continues, it will greatly affect student learning outcomes. One effort that can be made to overcome this situation is the need for effective teaching materials in the learning process that can be used anytime, anywhere, and can increase student learning motivation. Teaching materials have a very important role in learning (Maslina, 2020; Salim et al., 2020). One of them is the use of e-modules in the learning process. E-module is a module that can display interactive images, video, audio, and animation to create active learning (Darmayasa, Jampel, Simamora, & Pendidikan, 2018; Rofiyadi & Handayani, 2021).

Creative and innovative e-modules are developed with the help of the FlipHTML5 application following the ADDIE model development flow. FlipHTML5 is a flipbook developer software that provides its users with amazing features to create digital flipbooks. The choice of FlipHTML5 is based on the ease of use of the e-module to access the output produced by this application. The resulting e-module is portable or can be accessed anywhere and anytime using a computer, laptop, or smartphone (Oktavia et al., 2021; Wijayanti & Hartati, 2018). The advantages of FlipHTML5 are that it can easily convert PDF, word documents, PPT, images, etc., into a realistic page flip book in just a few minutes, no coding when inserting pictures or videos, a powerful animation editor to make flipbooks look vivid and attractive, as well as users (Aprilutfi, 2022; Misbachul, 2022). Previous studies have shown that appropriate teaching materials create a good and fun learning atmosphere (Marpaung & Pongkendek, 2021; Rijal & Azimi, 2021). Using e-modules in learning can help students learn independently and understand learning (N. S Herawati & Muhtadi, 2018; Rofiyadi & Handayani, 2021). Other studies based on FlipHTML5 application e-modules are valid and feasible to use in learning (Aprilutfi, 2022; Misbachul, 2022). The difference between this study and previous research is that the modules provided only focus on students' cognitive abilities. This research is urgent because there is yet to be a study on e-modules using the fliphtml5 application on chemical bonding material. Based on the description of the background that has been explained, this study aims to develop e-modules using the FlipHTML5 application on valid chemical bonding material based on aspects of the feasibility of content, language, presentation, graphics, and use of the application and to find out teacher responses and student responses to e- modules on chemical bonding material using the FlipHTML5 application when used in the learning process.

2. METHOD

The types and sources of data used in developing e-modules using the FlipHTML5 application on chemical bonding materials for tenth-grade senior high school level are qualitative and quantitative data. Qualitative data sources were derived from suggestions and comments from experts and users (teachers and students) on e-modules using the FlipHTML5 application on chemical bonding material. At the same time, the source of quantitative data comes from the validation sheet given to the validator to assess e-module development products. As well as user responses (teachers and students) after using e-module development products using the FlipHTML5 application for chemical bonding material at the trial stage.

The test subjects were three students in the one-on-one trial, 24 students, and three chemistry teachers in the small group test. The instruments used as data collection devices in e-module development research used the FlipHTML5 application on this chemical bond material: validation sheets and user response questionnaires. Data analysis techniques used in this study are as follows: validity analysis using a Likert scale of 1 to 5 and user response questionnaires. Analysis of the validity assessment of the material and media validators on "E-module development using the FlipHTML5 application on chemical bonding material for tenth-grade high school equivalents" on the content feasibility aspects, presentation aspects, and linguistic aspects is carried out with the following steps. The validation sheet uses a Likert scale with a score of 1-5 in the form of a checklist (√). Each score has certain assessment criteria, as shown in Table 1. The next step is to tabulate the validity assessment data from the material and media validator team, calculate the eligibility validation results using the percentage score formula, calculate the eligibility validation results using the score percentage formula, and pair the eligibility validation results accordingly with the product validity assessment criteria which can be seen in Table 2.

Table 1. Likert scale scoring criteria

Alternative Answers	Score
Strongly agree	5
Agree	4
Sometimes	3
Disagree	2
Strongly Disagree/Never	1

(Sugiyono., 2016)

Table 2. Criteria for assessing product validity percentage data

Percentage	Validity criteria
81-100	Highly Valid
61-80	Valid
41-60	Valid Enough
21-40	Invalid
<20	Totally Invalid

(Riduwan., 2012)

3. RESULT AND DISCUSSION

Result

After conducting interviews with teachers and distributing questionnaires to students, information was obtained regarding learning models, teaching materials, and students' interest in learning chemistry as follows: (1) The learning model applied in schools is the 2013 learning model, the teaching materials used in the learning process learning is printed teaching materials in the form of chemistry textbooks from publisher erlangga as well as learning materials sourced from the internet (module pdf). (2) Limited learning time. To achieve the learning objectives, the teacher often summarizes material notes. (3) Students are interested in learning whose teaching materials are easily accessible, interactive, and contain visualized things (learning videos, picture illustrations). (4) There is no chemical bond electronic module using the FlipHTML5 application developed at the school. Analysis of student characteristics is needed in the manufacture of e-module products. It is used as the basis for making e-modules because the learning process must be adapted to the stages of cognitive development that students go through. The analysis results of the characteristics of students in the tenth grade of MIPA SMA who have an age range of 15-17 years at the formal operational stage. Pre-research questionnaire data

shows that students are interested in interesting materials/media accompanied by pictures, animations, and videos and clearly and easily understood the material. Especially on chemical bond material, as many as 81.4% of students felt that it was difficult to understand because it contained abstract material and included much theory and had to be understood.

Material analysis refers to the study of chemical bonding concepts to be included in the e-modules used by students. The material chosen in this development research is chemical bonds. It is based on the consideration that chemical bonding material requires teaching materials that can be visualized simply before students so that they are easy to understand. The analysis was carried out by adjusting the teaching materials to the 2013 revision of the 2017 curriculum syllabus. Core Competencies and Basic Competencies 3.5 and 4.5 became a reference in developing E-modules Using the FlipHTML5 Application on Chemical Bonding Materials for Tenth Grade High School Level Equivalents. To achieve the desired competence from using the E-module using the FlipHTML5 Application in the Tenth Grade High School Chemical Bond Material, an analysis of competency achievement is carried out by formulating competency achievement indicators based on basic competencies. Concept analysis was carried out by making a concept map following the 2013 revised 2017 curriculum for senior high school chemistry for ten odd semester classes on chemical bonding material that will be studied in e-modules.

Product development validation results

Material Expert Validation

Assessment of e-module content feasibility aspects using the FlipHTML5 application on chemical bonding material by material expert validation includes five assessment indicators containing ten statements, which aim to assess the E-module's suitability for basic competencies and indicators of chemical bonding material, suitability for the substance of learning objectives, conformity to the needs of teaching materials, suitability of examples and illustrations, suitability of science and technology development, suitability for conveying information, and suitability of the language used. The average percentage obtained from validating the feasibility aspect of the content e-module validation first and second, respectively, is 79% and 88%. Based on the validity criteria, the percentage of the first validation is 61-80% with valid criteria. At the same time, the percentage of the 2nd validation after the improvement from the 1st validation is in the range of the percentage score of 81-100% with very valid criteria.

The assessment of the feasibility aspect of presenting the e-module using the FlipHTML5 application on chemical bonding material by the material expert validator includes four indicators containing five statements to assess the completeness and suitability of the presentation of the e-module. The average total percentage results obtained from validating the feasibility aspect of presenting the first and second validation e-modules, respectively, are 80% and 86%. Based on the validity criteria, the percentage of the 1st validation is 61-80% with valid criteria. At the same time, the percentage of the 2nd validation after the improvement from the 1st validation is in the range of the percentage score of 81-100% with very valid criteria. The assessment of the feasibility aspects of the e-module language using the FlipHTML5 application on chemical bond material by the material expert validator includes four indicators containing six statements to assess the accuracy and correctness of the grammar in the e-module. The average total percentage results obtained from validating the language feasibility aspects of the first and second validation e-module were 91.67% and 96.67%. Based on the validity criteria, the first and second validation percentages are in the range of 81-100% percentage scores with very valid criteria. The overall average percentage of the total validation of the two e-modules using the FlipHTML5 application on chemical bonding material based on the aspects of content feasibility, presentation, and language by the material validator is 88%, 86%, and 96.67%, with an average score 90.22%. Referring to the validity criteria in Table 3.3, the percentage of these scores is in the range of percentage scores of 81-100%, which means they are very valid so that trials can be carried out.

Media Expert Validation

Assessment of e-module graphical feasibility aspects using the FlipHTML5 application on chemical bond material by media expert validators includes four indicators containing six statements aimed at assessing illustration/image clarity, good font type, and size, consistent spacing, layout, design forms and combinations, interesting color. The results of the percentage validator score obtained from the graphical feasibility aspect of the first and second validation e-module, respectively, were 76.67% and 83.33%. Based on the validity criteria, the first percentage of validity is in the range of the percentage score of 61-80% with valid criteria. At the same time, the percentage of the second validity after the improvement of the first validity is in the range of the percentage score of 81-100% with very valid criteria.

Evaluation of aspects of software utilization in e-modules using the FlipHTML5 application on chemical bonding material by media expert validators includes seven statements that aim to assess the ease of access of e-modules. The results of the percentage validator score obtained from the aspects of the use of the 1st and 2nd validation e-module software, respectively, were 74.28% and 82.85%. Based on the validity criteria, the 1st percentage of validity is in the range of the percentage score of 61-80% with valid criteria. At the same time, the percentage of the second validity after the improvement of the first validity is in the range of the percentage score of 81-100% with very valid criteria. The overall average percentage of validating the two e-modules using the FlipHTML5 application on chemical bonding material based on aspects of graphic feasibility and aspects of software utilization by media validators is 83.33% and 82.85%, with an average score of 83 09%. Referring to the validity criteria in Table 2, the percentage score is in the range of the percentage score of 81-100%, which means it is very valid.

Product development trial results

One-on-One Trials

One-on-one trials were conducted on six students with high, medium, and low ability levels at each school, namely SMAN 15 Pekanbaru and MAN 3 Pekanbaru. One-on-one trials were conducted to obtain information about user reactions to the material and messages to be conveyed to the e-module using the FlipHTML5 application on chemical bond material. The results of the one-on-one trial are in the form of working on the questions and the time spent by students working on the questions on the e-module, which are presented in Table 3.

Table 3. One-to-one trial results

Activity	Properties of Material	PD-1		PD-2		PD-3		PD-4		PD-5		PD-6	
		N	T	N	T	N	T	N	T	N	T	N	T
1	Theory	80	38	80	40	80	44	100	37	100	42	80	43
2	Theory	100	41	100	43	80	45	80	40	100	43	80	45
3	Theory	80	40	80	42	80	43	80	39	80	41	60	44
4	Theory	80	39	80	40	60	42	80	38	80	39	80	41
	Practice	95	35	90	37	90	41	90	36	90	40	85	43
Total		435	193	430	202	390	215	430	190	450	205	385	216
Average		87	38.6	86	40.4	78	43	86	38	90	41	77	43.2

Information: PD: Students; N: Score; Q: Working Time

Small Group Trial

Teacher response tests were carried out on three chemistry teachers, including two at SMAN 15 Pekanbaru and one at MAN 3 Pekanbaru teacher identity. The teacher response questionnaire was given to determine the teacher's response to the developed e-module, which consists of 3 indicators consisting of 11 statements. Based on data processing from the teacher's response questionnaire, the average teacher's response to all indicators was 88.52%. Tests were carried out on 24 students, including 12 from SMAN 15 Pekanbaru and 12 from MAN 3 Pekanbaru. Student response questionnaires were given to find student responses to the developed e-module, consisting of 12 statements with three assessment aspects. Based on data processing from student response questionnaires, the average score of student responses to all indicators was 98.43%. Referring to Table 2, the score lies in the range of 81-100%, with a very attractive category.

Evaluation result

The evaluation stage in the form of formative evaluation has been carried out at each stage in the development of e-modules using the FlipHTML5 application on chemical bonding material. However, the evaluation carried out at the final stage of the e-module development research aims to identify the advantages and disadvantages of the product after the small group trial implementation stage so that a quality product is obtained as expected. The evaluation results were based on comments and suggestions at the teacher response test stage and the trial stage for students. The results of the revision and trial of the e-module were not re-tested because, overall, the trial results obtained a positive response. After revising the trial activities, a valid e-module can be used in the learning process.

Discussion

Based on the study's results, it was shown that the E-Module using the FlipHTML application was suitable for use as teaching material in chemistry learning material for tenth-grade high school chemical bonds. The e-module uses the FlipHTML5 application on chemical bonding material that has been developed and can be accessed by teachers and students via an HTML link. The e-module uses the FlipHTML5 application on chemical bond material developed with the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The use of e-modules can be done outside school hours using a smartphone. The study results show five main findings in the e-module media development research. The first finding relates to the content feasibility aspect, which aims to assess the suitability of the material with basic competencies, indicators, concepts, and depth of material in e-modules. The results of obtaining the first validation score on the feasibility aspect of the e-module content are 79% with valid criteria and are suitable for use with revision. The increase in the percentage of each indicator by the validator is because it has been revised as suggested. The overall revision was carried out on the eligibility aspect of the content based on suggestions and comments from the validator, including improvements to the material concept map, adding electronegativity tables, and typing errors so that it makes mistakes. It is necessary to add octet and duplet rules to concept maps. The validator assessed that the concept map of chemical bonding material still had deficiencies, namely the absence of duplet and octet rules. To avoid mistakes in conceptualizing the material and to see the depth so students can easily understand it, the validator suggests revising the material concept map by displaying duplet and octet rules. E-modules that have been repaired on the eligibility aspect of the content get the second validation result with a score of 88%. The category is very valid and suitable for use without revision. The feasibility of the contents of an e-module must be able to emphasize the process of finding concepts so that it functions as a guide for students to find information (Lestari & Muchlis, 2021; Octavyanti & Wulandari, 2021). Based on this, it can be concluded that the validator assesses the eligibility aspect of the content in the e-module using the FlipHTML5 application following the indicators being assessed and can be continued at the trial stage.

The second finding is seen from the presentation aspect, which aims to assess how the e-module is presented. The result of obtaining the first validation score on the presentation aspect of the e-module is 80% valid. Revisions were made because there were suggestions for improving the presentation from the validator, who deserved to be revised to obtain a more optimal presentation assessment. The presentation aspect increased the percentage of each indicator by the validator because it had been revised according to what was suggested. Revisions were made to the presentation aspect based on suggestions and comments from the validator, including improvements to the information presented in the e-module. The validator assesses that the information presented in the e-module needs to be revised to make it clearer and more complete and correct erroneous words to avoid students misunderstanding the information obtained in the e-module. The e-module, which has undergone overall improvements in the presentation aspect, gets the second validation result with a score of 86%. The category is very valid and suitable for use without revision. The validator assesses that the e-module has a complete e-module structure following the e-module structure, clear and precise formulation of learning objectives, and is systematic and can motivate students in learning. The completeness of the E-module presentation will increase students' interest and motivation to learn (Gae, Ganing, & Kristiantari, 2021).

The third finding, seen from the linguistic aspect, aims to assess the grammatical presentation in interactive e-modules. The result of obtaining the first validation score on the linguistic aspect of the e-module is 91.67%, with very valid criteria. Even though obtaining a percentage meets the maximum category, revisions still need to be made because there are suggestions for improving grammar from the validator who deserves to be revised to obtain a more optimal grammatical assessment. Revisions made to the grammatical aspects based on suggestions and comments from the validator include improvements to the nomenclature/words used in the e-module. The validator considers that there are still unclear sentences that need to be corrected so that students who understand the description of the material do not misunderstand (avoiding misconceptions). A good module uses simple sentences to make the information conveyed clear and user-friendly (Hasanah, Sarwanto, & Masykuri, 2018; Nurbaeti & Sunarsih, 2020). So, the sentences are corrected according to what the validator suggested. In addition to the material description sentences, improvements were made to some wrong words in the answer options for learning activity two and words that were not quite right in their meaning. The fourth finding is seen from the graphics of teaching materials. Teaching materials increase student motivation to learn the material and avoid boredom in the modules presented (Heru & Yuliani, 2020; Maslina, 2020). The graphical aspect aims to assess the attractiveness of the display design on the e-module. The result of obtaining the first validation score on the graphical aspect of the e-module is 76.67% with valid criteria and is suitable for use with revision. The graphic aspect in statement number 5 obtained an extreme score of 60% because the image on the cover is not proportional. The validator considers that the image on the

cover is not proportional, so it needs to be reduced to fit. After revision, the percentage score was obtained to be 100%. Revisions were made to improve the graphical aspects of the e-module and obtain a more optimal assessment with a very valid category and an attractive display design. The cover design of the e-module must have sufficient contrast, have harmonious color schemes and combinations, and match the character of the material and the target audience, namely students (Ramadhani, Koryati, & Deskoni, 2015). The e-module that has been repaired in the graphical aspect gets the second validation result with a score of 83.33%. The category is very valid and suitable for use without revision. Based on these results, it can be concluded that the validator assesses the graphical aspects of the e-module using the FlipHTML5 application following the indicators that are being assessed and interesting.

The fifth finding is seen from the aspect of software utility which aims to assess the operational ease of the e-module. The result of obtaining the first validation score on e-module software utilization is 74.28% with valid criteria. Revisions need to be made because there are suggestions for improving aspects of software utilization from validators who deserve to be revised to obtain a more optimal assessment of software utilization and obtain good e-module operational ease. Revisions made to aspects of software utilization based on suggestions and comments from validators include: creating alternative images so that they can be clicked to enlarge without using the zoom feature. The validator considers that several images can be clicked to enlarge without having to zoom in and need to be added so that the e-module is easy to use or operate. The nature of the ease of operation of the electronic module lies in its navigation (link). The e-module is an ICT-based module that is interactive and makes it easy to navigate, allows displaying/loading images, audio, video, and animation, and is equipped with formative tests/quizzes that allow immediate automatic feedback (Laili & Usmeldi., 2019; Ricu Sidiq & Najuah, 2020). E-modules repaired in software utilization got the second validation result with a score of 82.85%. The category is very valid and suitable for use without revision. Based on these results, it can be concluded that the media validator assesses aspects of software utilization in e-modules using the FlipHTML5 application that follows the assessed indicators and is flexible to operate.

Using chemical bond e-modules benefits teachers because they can streamline learning time. After all, E-modules guide students to study independently so that teachers can easily monitor learning activities and provide individual guidance. The module must be used as teaching material as a substitute for the teacher's function (Nita Sunarya Herawati & Muhtadi, 2018; Pramana, Jampel, & Pudjawan, 2020). The results obtained in this study are in line with previous research, which also revealed that using appropriate teaching materials will create a good and fun learning atmosphere (Marpaung & Pongkendek, 2021; Rijal & Azimi, 2021). Using e-modules in learning can help students learn independently and understand learning (N. S Herawati & Muhtadi, 2018; Rofiyadi & Handayani, 2021). Other studies based on FlipHTML5 application e-modules are valid and feasible to use in learning (Aprilutfi, 2022; Misbachul, 2022). Based on some of the results of these studies, e-modules are learning media that are effectively used in various learning processes because they positively impact student learning outcomes.

4. CONCLUSION

Based on the study results, it can be concluded that the E-Module uses the FlipHTML application on chemical bonding material for the tenth-grade high school equivalent, which has been developed as teaching material according to material. Media validator is very valid based on the feasibility of content, presentation, language, graphics, and use of software with a percentage score evaluation. So the E-Module using the FlipHTML application is suitable as teaching material in chemistry learning material for tenth-grade high school chemical bonds.

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