

## DESIGN CHEMIMAGZ LEARNING MEDIA BASED ON CONTEXTUAL TEACHING AND LEARNING AS AN ALTERNATIVE LEARNING SOURCE ON ELEMENTAL CHEMISTRY MATERIAL

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**Abstract:** This research was instigated by chemistry learning media at Islamic Senior High School of Anshor Al-Sunnah Air Tiris that were not various especially on Chemical Element lesson. This research aimed at developing valid and practical Contextual Teaching and Learning based on Chemimagz learning media. It was a Research and Development (R&D) with a 4-D (Define, Design, Development, and Disseminate) model. This research was administered at the Islamic Senior High School of Anshor Al-Sunnah Air Tiris. The subjects of this research were 2 validators (the experts in media and material), a chemistry subject teacher, and 10 students at the Islamic Senior High School of Anshor Al-Sunnah Air Tiris. Interview, validation, and practicality test questionnaires were the techniques of collecting the data. The data obtained were analyzed by using qualitative and quantitative descriptive tests. The research findings showed that the validity level was 90% by the expert of media (very valid) and 88.42% by the expert of material (very valid), the practicality level was 89.33% by a chemistry subject teacher (very practical), and 90.1% by 10 students (very practical). Based on the research findings, it could be concluded that the availability of Contextual Teaching and Learning based Chemimagz learning media on Chemical Element lesson was valid and practical to be a learning media, and it could be used as an alternative learning resource.

**Keywords:** Design, Learning Media, Chemimagz, Elemental Chemistry, Learning Resources

**Abstrak:** Latar belakang penelitian ini adalah media pembelajaran kimia di MA Anshor Al-Sunnah Air Tiris kurang bervariasi terutama pada materi kimia unsur. Penelitian ini bertujuan untuk menghasilkan media pembelajaran chemimagz berbasis contextual teaching and learning yang valid dan praktis. Jenis penelitian ini yaitu penelitian dan pengembangan dengan model 4-D (Define, Design, Development, and Disseminate). Penelitian ini dilakukan di MA Anshor Al-Sunnah Air Tiris. Subjek penelitian yaitu 2 orang validator (ahli media dan ahli materi), satu orang guru kimia dan 16 orang siswa MA Anshor Al-Sunnah Air Tiris. Teknik pengumpulan data pada penelitian ini yaitu wawancara, dan angket uji validitas dan uji validitas. Data yang diperoleh lalu dianalisis menggunakan uji deskriptif kualitatif dan deskriptif kuantitatif. Hasil dari penelitian ini yaitu pada tingkat validitas oleh ahli media sebesar 90% (sangat valid) dan pada ahli materi sebesar 88,42% (sangat valid) serta tingkat praktikalitas oleh satu orang guru kimia sebesar 89,33% (sangat praktis) dan 10 orang siswa sebesar 90,1% (sangat praktis). Dari hasil penelitian ini dapat disimpulkan bahwa tersedianya media pembelajaran chemimagz berbasis contextual teaching and learning pada materi kimia unsur sudah valid dan praktis untuk dijadikan media pembelajaran dan dapat digunakan sebagai alternatif sumber belajar.

**Kata Kunci:** Desain, Media Pembelajaran, Chemimagz, Kimia Unsur, Sumber Belajar

### INTRODUCTION

Learning media that functions to facilitate the transfer of knowledge to students is very helpful in creating an interactive, creative, and innovative learning process including for learning

Chemistry (Negara, Wirahyuni, Sidemen, & Ganesha, 2024), as well as having a big influence on students' interest and attractiveness to learn something, therefore if the learning media used by the teacher is interesting, students will automatically like the material taught and students' understanding of the material will be faster or more achieved. Conversely, if students do not like the media used by the teacher, students will be bored, bored, and not interested in the material presented which can affect students' understanding of the material (Ditama & Saputro, 2015). Therefore, a teacher is required to be able to utilize effective and efficient learning media technology that exists today and can help students to be more active in learning and be able to link the learning received with the surrounding environment. The use of learning media that is not interesting and varied makes students bored. The use of media is very important for teachers to support the learning process because it can increase the attractiveness of students in learning so that the level of understanding can increase (Pubian & Herpratiwi, 2022).

The problem faced by schools in media utilization is the lack of availability of learning media based on contextual teaching and learning at MA Anshor Al-Sunnah. Contextual model (Contextual Teaching and Learning) even better known as CTL is a learning concept that can help teachers link the material taught with the daily lives of students and have it with its application in their daily lives (Banu, Tinenti, & Tukan, 2022). There are still many teachers who have not been able to make learning media based on contextual teaching and learning, therefore chemistry learning media is needed that can increase students' interest and motivation to learn, focus students' attention, make students active, and can help students link learning materials and information obtained with the surrounding environment.

One of them is by utilizing magazine media. By using magazine media, the subject matter can be made more interesting and can stimulate students' interest. During this time students are often trapped in verbalistic learning conditions. Such a situation can be prevented if the teacher uses aids, and will even become more active and participate in the learning process, for example using recordings likewise, if teachers emphasize that the principle of visibility enhances teaching effectiveness. Utilizing diagrams, graphs, and other visual aids facilitates quick comprehension and memorization, making educational material more memorable and comprehensible to students during learning (Puzinouskaya & Schasnovich, 2022). Chemistry magazine is a media that can be used as a tool to understand chemistry material, as well as to provide pleasure in learning. As a learning resource, chemistry magazines can support students' understanding of the material presented by the teacher and provide an interesting learning nuance.

Chemistry magazine is a learning media that can be used as a flexible learning resource, able to be used anywhere and anytime. Chemistry magazines can be used as an alternative learning resource and are considered more effective than printed modules, books, and even other teaching materials. Chemistry magazines can also consider students' interest in graphic aspects such as colors, images, and some interesting games (Rahmawati, Sofia, Loka, Muntari, & Burhanuddin, 2024). Magazines in the form of hard copies can be utilized as learning media in areas with limitations such as areas that are still not electrified or areas that cannot be reached by telecommunications networks so that students will most likely not be able to upgrade information about chemistry learning by accessing the internet. Meanwhile, in more advanced areas where there is already electricity, adequate internet access, and more sophisticated school infrastructure facilities, an educator can upgrade magazines that were originally only in the form of hard copies to be more following the changing times. In this millennial era, magazines can be converted into PDF files, flipbooks, android magazines, magazine blogs, and others.

According to Cecep & Bambang, magazines are mass communication media in printed form that need not doubt their role and influence on their readers and they are included in two-dimensional learning media. Chemistry magazines have material feasibility, presentation feasibility, and good language and image feasibility so chemistry magazines are suitable for use as independent learning resources by students. The development of magazine media that has been carried out can help students in the learning process and support the success of student learning (Loka, Sofia, Wahidah, Idrus, & Ariani, 2024). Magazines as chemistry learning media in addition to being able

to help students in the process of getting information about learning. Should also be able to help students to be able to relate the material learned to everyday life. Therefore, the magazine developed is based on contextual teaching and learning. The maximum use of learning media and learning resources provides the possibility to explore various types of science by theories so that learning is always up to date and able to keep up with increasingly globalized technological developments. The selection of learning resources must pay attention to the suitability of teaching materials with the teaching objectives to be achieved in learning and allow students to learn maximally so that books become a very effective educational medium. Some of the requirements needed to make teaching materials categorized as good learning resources are: the availability of teaching materials that can be reached by students (learners), can help students to learn, and meet the needs of students in independent learning. Learning using a contextual approach stems from a constructivist approach which states that a person or student carries out learning activities by constructing knowledge through interaction and interpretation in their environment. Learning using a contextual approach occurs when students process new information or knowledge in such a way that it can be absorbed and related to the real life around them.

Chemimagz based on contextual teaching and learning is expected to be utilized by teachers as learning media and can be used by students as a learning resource that can support the teaching and learning process. On the basis of these thoughts and seeing these conditions, it is necessary to develop a learning resource that is easy to understand, can help students relate to their daily lives, and can help students learn anywhere and anytime. The objectives of this research are: (1) To design a learning media Chemimagz based on contextual teaching and learning that can be used as an alternative learning resource; (2) To determine the validity level of Chemimagz magazine based on contextual teaching and learning on elemental chemistry material; (3) To determine the results of the practicality test of chemimagz magazine based on contextual teaching and learning on elemental chemistry material.

## METHOD

This type of research uses the Research and Development method. According to Sugiyono, (2023), research and development methods are defined as scientific ways of researching, designing, producing, and testing the validity of products that have been produced (Majidi, Norhidayah, & Azis, 2024). Research and Development (R&D) is a process or steps to develop a new product or improve existing products. Development research is a systematic study of the design, development, and evaluation of learning programs, processes, and products that must meet the criteria of validity, practicality, and effectiveness. (Nusantara, Pendidikan, Vol, & Arrahmaniyah, 2023). The development model can be interpreted as the basis used in developing a product to be produced. Research and Development The Research method: (Research and Development) aims to produce new products through the development process. This chemistry magazine development procedure uses the 4D model which consists of 4 stages, namely: Define, Design, Develop, and Disseminate (Muqdamien, Umayah, Juhri, & Raraswaty, 2021).

### Define:

#### Front-end Analysis

The define stage is the stage to establish and define the learning requirements. At this stage, facts and alternative solutions are produced so that it is easier to determine the initial steps in developing chemical media that are suitable for development (Pane, Simangunsong, & Sinaga, 2023).

#### Learner Analysis

Learner analysis is very important at the beginning of planning. Learner analysis is done by observing the characteristics of learners. Learner analysis includes characteristics of academic ability, age, and motivation toward the subject. This learner analysis is done by interview (Apriyanti, 2023).

#### Task Analysis

Task analysis consists of analyzing the Core Competencies (KI) and Basic Competencies (KD) related to the material to be developed through chemical media. At this stage, task analysis produces types of tasks that are by the competencies to be developed in the learning process. Analysis of learning objectives results in the formulation of learning objectives to be achieved and methods that will be designed in more detail later (Winarti & Karenina, 2024).

### **Concept Analysis**

Concept analysis is made in a learning concept map that will be used as a means of achieving certain competencies, by systematically identifying and compiling the main parts of the learning material.

### **Specifying Instructional Objectives**

Writing learning objectives allows researchers to determine what studies will be displayed in chemical media, determine the question grid, and finally, determine how many learning objectives are achieved.

### **Design**

This design stage aims to design a chemical media that can be used in learning chemistry. This design stage includes the preparation of instrument tests based on the preparation of learning objectives that measure the ability of students in the form of products, processes, psychomotor during and after learning activities, Media selected to adjust learner analysis, concept analysis, and task analysis, target user characteristics, and deployment plans with varying attributes from different media. It is useful to help students reach the expected core level of core and basic competencies. Format selection is done at the beginning of the Basic Competencies. Format selection is done at the beginning. The presentation format is selected based on the educational material used. Based on the educational material used. The format used in the development is determined by designing teaching materials, teaching materials, and learning resources; organizing and directing chemimagz; and making chemimagz designs which include layout design, images, and writing. The first design design, or initial design, is a chemical media design that has been made by researchers and then provided by the supervisor. How to improve chemimagz media from the supervisor, will be reviewed during the validation phase.

### **Develop**

There are two steps in this stage: Expert Validation (expert appraisal), which is very important to ensure that the process consistently produces the expected results. The chemical media that has been prepared is then assessed by a material expert who is a chemistry teacher and media expert so that it can be seen whether the chemical media is feasible to apply or not. The results of this validation are used as improvement materials for the perfection of the chemical media developed. After draft I was validated and revised, draft II was produced. Draft II will then be tested on students in the limited field trial stage (Nagashree, 2015). Validation was carried out using a validation sheet that had been prepared by the researcher. In the process of validating instruments and products, it produces two types of data, namely quantitative data and qualitative data. Quantitative data is in the form of scores given by validators. Qualitative data in the form of comments and suggestions for improving chemical magazine instruments and products (Saputra, Diandita, & Zulfiati, 2023).

### **Disseminate**

The dissemination stage in this study was only carried out limited dissemination, namely by disseminating and promoting the final product of chemical media on a limited basis to chemistry teachers at MA Anshor Al-Sunnah (Pranata & Dody Firmansyah, 2023).

The data collection techniques used in this study consisted of interviews, questionnaires, and documentation. The interview is a way of collecting data directly from the source about various social symptoms, both hidden and visible (Sari & Okmarisa, 2024). The questionnaire is a list of questions given to other people willing to respond (respondents) at the user's request. Data

collection technique with documentation is data collection obtained through documents. This method is used to obtain data on the analysis of students' abilities and intelligence levels, and learning documentation at MA Anshor Al-Sunnah. Research instruments to test the feasibility of media, namely media expert validation instruments, material expert validation instruments, practicality by teachers, and trials by students. As for testing the feasibility of the media developed by researchers using questionnaire techniques containing a Likert scale (Yulianti, As'ad, & Widarti, 2024).

The data obtained were analyzed descriptively qualitatively and descriptively quantitatively describing the results of the magazine validity test and the chemimagz magazine practicality test (Nasution, Islam, Sultan, & Kasim, 2024). Qualitative descriptive data analysis techniques are used to process data from reviews from media experts, learning material experts, from subject teachers regarding the products developed in the form of input or suggestions. Quantitative descriptive data analysis techniques are used to analyze data from validity and practicality questionnaires using a Likert scale (Alfito & Neti Afrianis, 2024). Descriptive in qualitative research means describing and describing the events, phenomena, and social situations studied. Analysis means interpreting and interpreting and comparing the research data. Meanwhile, quantitative research is a research approach that uses data in the form of numbers and exact science to answer the research hypothesis (Charisma, Retnawati, & Dhewantoro, 2022).

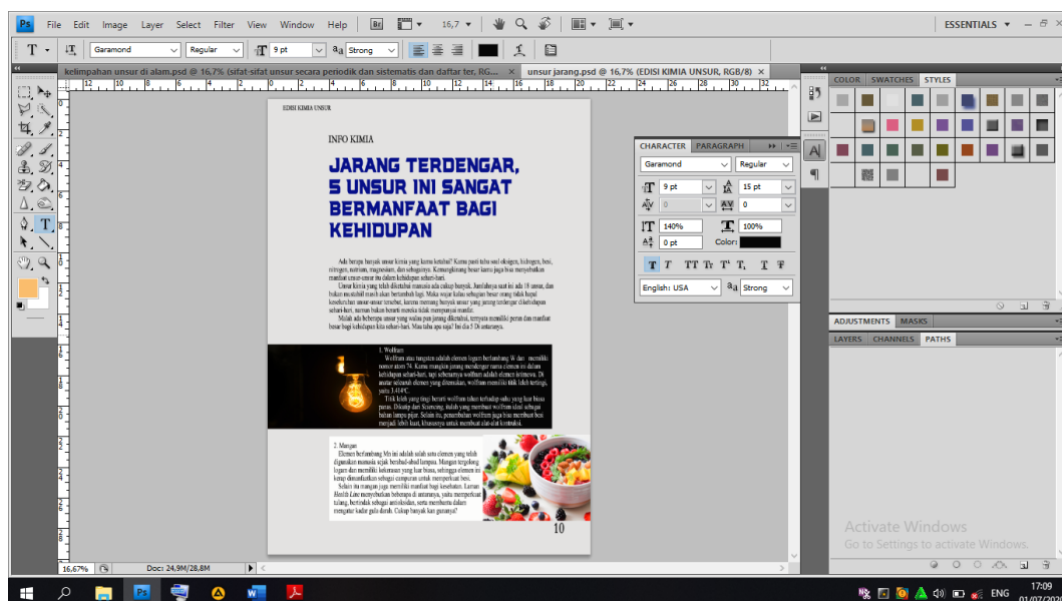
## RESULTS AND DISCUSSION

### Chemimagz magazine development results

The results of this learning media design research produced chemistry learning media in the form of Chemimagz Chemistry magazine. This product design explains the explanation of elemental chemistry material presented through facts and everyday examples. The product of this research produces magazine media in the form of printed magazines. The resulting print media is a chemistry magazine consisting of a front cover, editorial greetings, table of contents, magazine contents containing content, and back cover, and the results of the initial design of this design in the form of Draft I of chemical media. The display of the chemicals magazine-making process can be seen in Figures 1 and 2.



Figure 1. The result of the Chemimagz magazine design on the main presentation page



**Figure 2.** The process of making a chemicals magazine design using Photoshop CS4 software

The design of Chemical Chemistry magazine is emphasized in magazine design, materials, quizzes, and images that support learning. The design on each page of this magazine varies so that it is interesting to use in learning. The material presented is associated with everyday life so it can add to the scientific insight of students. The exercises presented are packaged in the form of games. The magazine design consists of a cover, a main presentation that contains content related to the material, chemical info, biographies of figures, a did you know rubric that contains content about unique things related to the material, exercise questions that are packaged in the form of fine words and crossword puzzle games. Quantitative data obtained from validation results by media experts and material experts, as well as practicality test data provided by chemistry teachers were then analyzed using quantitative descriptive analysis techniques. The percentage results are interpreted in qualitative terms based on the following table 1.

**Table 1.** Criteria for validity test results

No	Interval	Criteria
1	81%-100%	Very valid
2	61%-80%	Valid
3	41%-60%	Quite valid
4	21%-40%	Less valid
5	0%-20%	Not valid

Product Trial (development testing), at this stage the chemimagz magazine was tested on 16 MA Anshor Al-Sunnah students and asked for a response. The qualitative data on the responses given by students were then analyzed using qualitative descriptive analysis which would then obtain a percentage of the results of students' responses to chemimagz magazine.

## Data and data analysis

### Validation by media experts

The draft product that has been designed is validated by media experts to assess its feasibility. The results of this validation are in the form of qualitative data and quantitative data. Quantitative data is analyzed in a quantitative descriptive way, and qualitative data obtained in the form of suggestions is then used as the basis for improving the magazine and proceeding to the product trial stage. Tabulation of quantitative data on the results of validation by material experts on the product is presented in Table 2 below.

**Table 2.** Aspects of assessment by media experts

Aspek Penilaian	$\Sigma$ Per aspect	Average aspect	Idealized percentage	Quality category
Graphics and display feasibility	14	4.66	93.33%	Very feasible
Cover design	13	4.33	86.66%	Very feasible
Content design	14	4.66	93.33%	Very feasible
Print	9	4.5	90%	Very feasible
Product anatomy	5	5	100%	Very feasible
Code of ethics and copyright	8	4	80%	Feasible
<b>Total score</b>	<b>65</b>	<b>4.5</b>	<b>90%</b>	<b>Very feasible</b>

Based on Table 2, it can be concluded that this product is considered suitable for testing at the small product trial stage. In addition to quantitative data, researchers also obtained qualitative data in the form of suggestions and comments from media experts on the Chemimagz magazine design.

### Validation by material experts

The first draft of the chemical magazine product that has been designed has been validated by material experts to assess its feasibility. The validation process produces data in the form of qualitative data and quantitative data. Quantitative data were analyzed in a quantitative descriptive way, and qualitative data obtained in the form of suggestions were then used as the basis for improving the magazine and proceeding to the product trial stage. The tabulation of quantitative data on the results of validation by material experts on the product is presented in Table 3.

**Table 3.** Aspects of Assessment by Material Experts

Assessment Aspects	$\Sigma$ Per aspect	Average aspect	Percentage Ideal	Quality Category
Content and material aspects	23	4.6	92%	Very feasible
Language and readability	22	4.4	88%	Very feasible
Supporting material presentation	9	4.5	90%	Very feasible
Presentation technique	16	4.0	80%	Feasible
Supporting presentation	9	4.5	90%	Very feasible
Completeness of presentation	5	5	100%	Very feasible
<b>Total score</b>	<b>84</b>	<b>4.42</b>	<b>88.42%</b>	<b>Very feasible</b>

Based on Table 3, it can be concluded that this product is considered suitable for testing at the small product trial stage. The validation data provided by material experts is in the form of qualitative data.

### Practicality test

Conducted by chemistry teachers at MA Anshor Al-Sunnah. This practicality test process produces two sets of data: quantitative and qualitative data. Quantitative data on the practicality test is presented in Table 4.

**Table 4. Aspects of Assessment by Practicality Test Experts**

Assessment aspects	Σ Per aspect	Average aspect	Percentage Ideal	Quality Category
Content and material aspects	27	4.5	90%	Very feasible
Presentation aspect	21	4.2	84%	Very feasible
Language and readability aspects	19	4.75	95%	Very feasible
<b>Total score</b>	<b>67</b>	<b>4.46</b>	<b>89.33%</b>	<b>Very feasible</b>

**Learners' response**

The students' response questionnaire to Chemimagz magazine media aims to find out whether students respond well or badly to the product in terms of material, readability of images and language, presentation, magazine display, and use. This response questionnaire is filled in by checking or checking (√) in the answer choice column. The answer options are in the form of a scale score of one (1) to four (5), with a description of score 1 which is strongly disagree, score 2 which is disagree, score 3 which is quite agree, and score 4 agree, score 5 which is very agree. The results of the students' responses were then analyzed using the formula  $P = f / N \times 100$ . The data of the questionnaire assessment of students' responses to the magazine media are presented in Table 5.

**Table 5. Aspects of Learner Response Assessment**

Assessment aspect	Σ Per aspect	Average aspect	Percentage Ideal	Quality Category
Response to material	364	22.75	91%	Very feasible
Clarity of language and sentences	208	11	86.66%	Very feasible
Display and design	291	18.18	90.93%	Very feasible
Applicability	75	4.68	90.75%	Very feasible
<b>Total score</b>	<b>938</b>	<b>58.625</b>	<b>90.19%</b>	<b>Very feasible</b>

**Product revision**

Qualitative data obtained in the validation process in the form of comments and suggestions are then used as material for improving the quality of chemical magazine products that have been designed. The final result of this product revision is draft II which can then be used at the product trial process stage. The results of the revised validation of the chemicals magazine product are shown in figures (3), (4), and (5) below.

**Main Course**



**Figure 3. Element abundance main presentation page after revision**

The revision on the main presentation page of the abundance of elements in nature lies in changing the background color which was originally green then changed to light gray so that the background color, images, and other parts contained on the page are more contrasting so that the images and text appear clearer.

### Chemical flame colorful main course



Figure 4. Main presentation page of colorful chemical flame after revision

The revision on the main presentation page of the colorful chemical flame lies in the title of the chemimagz magazine which initially contained the name of the magazine, but after the revision, the name of the magazine was deleted.

### Find words

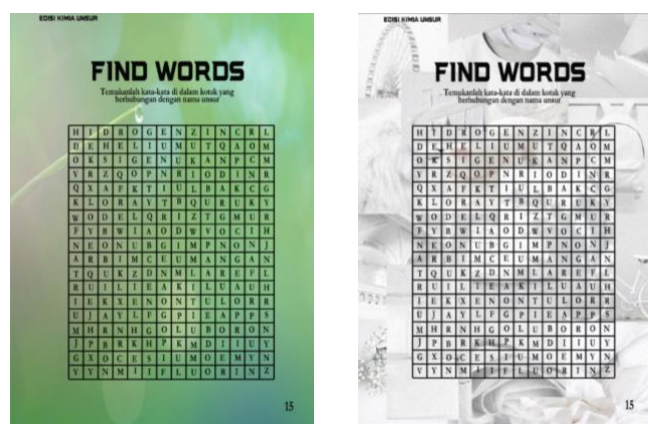


Figure 5. Find words page after revision

The revision on the find words page lies in the use of the background which was originally green and then changed to a black and white image which is an example of the use of elements in everyday life.

Chemimagz based on contextual teaching and learning on elemental chemistry material has several advantages, namely that it can support the learning process in the classroom, has a design that attracts students, can provide additional insight and information, increases teaching effectiveness, pleasures learning, supports students' understanding of the material presented by the teacher and provide an interesting learning nuance, a flexible learning resource, can be used anywhere and anytime. Chemistry magazines can be used as an alternative learning resource and are considered more effective than printed modules, books, and other teaching materials. Chemistry magazines can also consider students' interest in graphic aspects such as colors, pictures, and some interesting games. Besides the advantages it has, Chemimagz based on contextual teaching and learning on elemental chemistry material also has various weaknesses found in this

study, such as the need for a beautiful design during the design process and the need for a package book as the main support during the learning process. Therefore, further research is needed to determine the effectiveness of using chemicals as a supporting learning resource in high school.

## CONCLUSION

The validity level of learning media based on the validity test of chemicals learning media based on contextual teaching and learning has a validity level by material experts of 88.42% which is included in the very valid category, and media experts of 90% which is included in the very valid category and the level of practicality of Chemimagz Learning Media based on the practicality test of chemicals learning media based on contextual teaching and learning of 89.33% which is included in the very valid category and the response obtained from students is 90.19% and is included in the very valid category.

## REFERENCES

- Alfito, M. A., & Neti Afrianis. (2024). Desain Dan Uji Coba E-Modul Berbasis 3D Pageflip Dengan Pendekatan Saintifik Pada Materi Hidrolisis Garam. *Journal of Research and Education Chemistry*, 6(1), 9. [https://doi.org/10.25299/jrec.2024.vol6\(1\).16839](https://doi.org/10.25299/jrec.2024.vol6(1).16839)
- Apriyanti, Helly. 2023. "Penyusunan Perencanaan Pembelajaran Pada Kurikulum Merdeka". *Jurnal Pendidikan : Jurnal Penelitian dan Pengembangan Pendidikan* 7 (1):15-19. <https://doi.org/10.31537/ej.v7i1.970>.
- Banu, M. E., Tinenti, Y. R., & Tukan, M. B. (2022). Pengaruh Respon Siswa Tentang Penerapan Pendekatan Contextual Teaching And Learning Yang Mengintegrasikan Media Video Pembelajaran Sub Materi Sifat Koloid Terhadap Hasil Belajar Siswa. *Educativo: Jurnal Pendidikan*, 1(2), 423–429. <https://doi.org/10.56248/educativo.v1i2.43>
- Charismana, D. S., Retnawati, H., & Dhewantoro, H. N. S. (2022). Motivasi Belajar Dan Prestasi Belajar Pada Mata Pelajaran Ppkn Di Indonesia: Kajian Analisis Meta. *Bhineka Tunggal Ika: Kajian Teori Dan Praktik Pendidikan Pkn*, 9(2), 99–113. <https://doi.org/10.36706/jbti.v9i2.18333>
- Ditama, V., & Saputro, S. (2015). PENGEMBANGAN MULTIMEDIA INTERAKTIF DENGAN MENGGUNAKAN PROGRAM ADOBE FLASH UNTUK PEMBELAJARAN KIMIA, 4(2), 23–31.
- Loka, I. N., Sofia, B. F. D., Wahidah, S., Idrus, A., & Ariani, S. (2024). Sosialisasi Majalah Kimia ChemMag Tentang Konsep-Konsep Kimia Pada Pembuatan Gula Tebu Sebagai Suplemen Bacaan Siswa SMA.
- Majidi, M. W., Norhidayah, S., & Azis, A. (2024). Pengembangan Media Pembelajaran Berbasis Game Ular Tangga Digital Pada Materi Asmaul Husna Kelas VII di SMP NU Palangka Raya, 03(02).
- Muqdamien, B., Umayah, U., Juhri, J., & Raraswaty, D. P. (2021). Tahap Definisi Dalam Four-D Model Pada Penelitian Research & Development (R&D) Alat Peraga Edukasi Ular Tangga Untuk Meningkatkan Pengetahuan Sains Dan Matematika Anak Usia 5-6 Tahun. *Intersections*, 6(1), 23–33. <https://doi.org/10.47200/intersections.v6i1.589>
- Nagashree, K. (2015). Research and Reviews : Journal of Pharmaceutical Analysis Solid dosage forms : Tablets, 4(2), 60–71.
- Nasution, A. N., Islam, U., Sultan, N., & Kasim, S. (2024). Desain dan Uji Coba Media Video Pembelajaran Menggunakan Software Adobe After Effects Model ICARE pada Materi Termokimia, 8(2), 99–107.
- Negara, I. K. A., Wirahyuni, K., Sidemen, S. M. A. N., & Ganesha, U. P. (2024). TRANSFORMASI PEMANFAATAN MEDIA PEMBELAJARAN PADA PEMBELAJARAN BAHASA INDONESIA DALAM KURIKULUM MERDEKA, 7(12), 11–15.
- Nusantara, D. A., Pendidikan, J., Vol, B., & Arrahmaniyah, O. S. (2023). Research And Development ( R & D ) Penelitian Yang Inovatif Dalam Pendidikan, 7(1).
- Pane, E. P., Simangunsong, A. D. B., & Sinaga, C. V. R. (2023). Pengembangan Media Pembelajaran Flipbook Model Hybrid pada Pembelajaran Praktikum Kimia Dasar dalam

- Meningkatkan Keterampilan Proses Sains Mahasiswa. *PENDIPA Journal of Science Education*, 7(2), 282–288. <https://doi.org/10.33369/pendipa.7.2.282-288>
- Pranata, E., & Dody Firmansyah, M. (2023). Media Pembelajaran Interaktif Terhadap Keluarga Harmonis Dengan Menggunakan Model Pengembangan Four-D. *Jurnal Informasi Dan Teknologi*, 5(3), 112–121. <https://doi.org/10.60083/jidt.v5i3.408>
- Pubian, Y. M., & Herpratiwi, H. (2022). Penggunaan Media Google Site Dalam Pembelajaran Untuk Meningkatkan Efektifitas Belajar Peserta Didik Sekolah Dasar. *Akademika*, 11(01), 163–172. <https://doi.org/10.34005/akademika.v11i01.1693>
- Rahmawati, R., Sofia, B. F. D., Loka, I. N., Muntari, M., & Burhanuddin, B. (2024). Pengenalan Media ChemMag Bertema Etnokimia Lokal Sebagai Bahan Bacaan Tambahan pada Pembelajaran Kimia Bagi Siswa SMA/MA. *Jurnal Pengabdian Inovasi Masyarakat Indonesia*, 3(1), 1–6. <https://doi.org/10.29303/jpimi.v3i1.3914>
- S., G., Puzinouskaya., O., A., Schasnovich. (2022). 3. A picture is worth a thousand words, or a Visualization of learning information in informatics lessons. *Информатика в школе*, doi: 10.32517/2221-1993-2022-21-5-51-58
- Saputra, R., Diandita, Y. N., & Zulfiati, H. M. (2023). Pengembangan Media Pembelajaran Berbasis Web Google Sites Pada Pembelajaran Ips Sekolah Dasar. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, 9(2), 3327–3338. <https://doi.org/10.36989/didaktik.v9i2.962>
- Sari, W. P., & Okmarisa, H. (2024). DESAIN DAN UJI COBA MEDIA PEMBELAJARAN WEBLOG BERBASIS, 8(01), 8–15.
- Winarti, A., & Karenina, T. (2024). PENGEMBANGAN MULTIMEDIA INTERAKTIF BERBASIS ARTICULATE STORYLINE PADA MATERI KIMIA KOLOID DIDIK Development of Articulate Storyline-Based Interactive Multimedia on Colloid Chemistry Material to Enhance Students ' Learning Motivation, 7(3), 124–136.
- Yulianti, As'ad, M., & Widarti, W. W. (2024). Analisis Kepuasan Masyarakat Terhadap Layanan Publik Berdasarkan Indeks Kepuasan Masyarakat (IKM) dikantor Kecamatan Singosari Kabupaten Malang. *Jurnal Ganec Swara*, 2086-2096.