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Development of Lucky Draw Chemist Based on the Website as Learning Media to Improve Students' Analysis Skills in Chemical Bonding Material

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Abstract: The difficulty in understanding chemistry material generally is caused by the process of conveying information that is not optimal between teachers and students. Therefore, an effort is needed to optimize chemistry learning in the classroom. Learning media is required to improve students' analysis skills in the continuity of a good learning process. There are many types of learning media, one of which is in the form of a website. This study aims to develop the Lucky Draw Chemist media based on the website to improve students' analysis skills in chemical bonding material. This study refers to a 4D design with three stages: define, design, and development. The target of this study is the feasibility of the Lucky Draw Chemist media based on the website based on expert assessment (Chemistry lecturers and chemistry teachers). The results showed that the validity obtained in each assessment aspect was ≥ 4, with the category "good" being valid. Based on these results, the Lucky Draw Chemist media based on the website developed is feasible to be implemented in school learning on chemical bonding material for grade XI high school students.

Keywords: Analysis Skills; Chemical Bonding; Lucky Draw Chemist; Validation; Website.

Introduction

Education is an essential means of obtaining quality human resources and is crucial to the progress of a country. School culture should not only focus on administrative approaches. Still, it must also be able to orientate towards innovation and child-focused learning, with the hope that the graduates produced are by the profile of Pancasila students[1]. Analysis thinking skills are one of the main goals of 21st-century education. This ability is essential for students to understand learning materials and recognize problems, find solutions to these problems, and find ways to solve problems in everyday life [2]. Analysis thinking skills are a way of processing information depending on the task's characteristics so that reasoning results in a stepwise process or widespread search activities where implicit parallel processes are also involved. Analysis skills include *differentiating*, *organizing*, and *attributing* [3-4]. According to Sartika (2015), analysis skills play a role in problem-solving and decision-making in learning and daily life [5].

Supporting learning materials are needed to facilitate the learning process for analysis skills. Chemistry learning is an effort teachers make when delivering chemistry and its implementation in everyday life [6]. Chemical bonds are one of the materials in the subject of chemistry. Chemical bonds have abstract or unobservable characteristics, such as the process of ionic bonds and the formation of covalent bonds [7]. Therefore, chemistry learning requires a learning environment that visualizes the material so students can easily understand it [8]. The results of the pre-study of analysis thinking skill tests on chemical bonding material at SMAN 20 Surabaya showed that out of 30 grade XI students, the differentiating aspect reached 16,11%, the *organizing* aspect reached 17,08%, and the *attributing* aspect reached 26,11%. From the results obtained, it can be concluded that class XI students need to improve their analysis skills, especially in the material on chemical bonds.

Learning media is needed to improve students' analysis skills in the continuity of a good learning process. Learning media is used as a form and means of delivering information during the learning process to achieve learning objectives [9]. The learning method using learning media is critical in determining success in the learning process [10]. Learning media that combines technology can make it easier for teachers and students to provide a pleasant learning atmosphere [11]. Digital learning tools and materials continue to be developed to support effective learning. The contribution of websites to learning can change students' learning styles to be more effective and efficient, with the information available on the learning website being more attractive, thus increasing students' enthusiasm for learning [12-13].

In this study, researchers developed the Lucky Draw Chemist media based on the website as a chemistry learning medium, primarily for chemical bonding material. Utilizing technological advances, the Lucky Draw Chemist media based on the website can be one way to convey a message and information in learning. The Lucky Draw Chemist media based on the website has material features and practice questions that combine text, images, photos, animations, audio, and video. Based on the website, the Lucky Draw Chemist media is expected to help students visualize the abstract chemical bonding material and can improve students' analysis skills. These analysis skills are essential for students to not only understand learning materials but also recognize problems, find solutions to

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these problems, and find ways to solve problems in everyday life [14].

Research Methods

In this study, the development of Lucky Draw Chemist media based on the website learning media was carried out on chemical bonding material by adapting the 4D model research and development method by Thiagarajan, which includes 4 (four) stages, namely define, design, develop, and disseminate [15]. At the development stage, validation was carried out on the developed media. Media validation was carried out by two chemistry lecturers and one chemistry teacher. Validity is a test of feasibility. A research instrument that has been declared valid means that the instrument can measure the variables to be measured [16]. Research instrument validity can be estimated based on content and construct [17]. Lucky Draw Chemist media, based on the website, uses the mode method. Lucky Draw Chemist media based on the website is declared valid if it obtains a mode ≥ 4. The validation process assessment refers to the Likert scale value with categories from invalid to very valid on a scale of one to five [18]. The assessment of the validation sheet results uses the Likert Scale calculation presented in Table 1.

Table 1. Likert Scale Score

Evaluation	Score
Very Good	5
Good	4
Not Good	3
Not Good	3
Very Bad	1

[18].

The data obtained is ordinal data, which cannot perform mathematical operations, so the determination is based on the score that appears most often or the mode [19]. It is valid if it gets a good or very good rating.

Results and Discussion

Product Description

The Lucky Draw Chemist media based on the website is a development of the Wheel of Fortune media because they both use tools like wheels. Still, the difference is that Lucky Draw Chemist must be accessed online because it is website-based. A website is a hypertext facility for displaying data in text, images, sound, animation, and other multimedia data [20]. Visual displays play a significant role in motivating students to learn [21]. Based on the website, the Lucky Draw Chemist media has several features, such as materials, collection, spins, and settings.

In the Lucky Draw Chemist media based on the website spin, a needle will show the direction and parts, which are divided into several colors. Each color has a different question code equipped with a question barcode. Four spinners contain questions that encourage the development of analysis skills. Before entering each spin menu, students must first enter an access code. Based on the website, the spinner on Lucky Draw Chemist contains questions with indicators of analysis skills, differentiating, organizing, and attributing—analysis skills as one of the higher cognitive thinking skills, namely analyzing abilities [22].

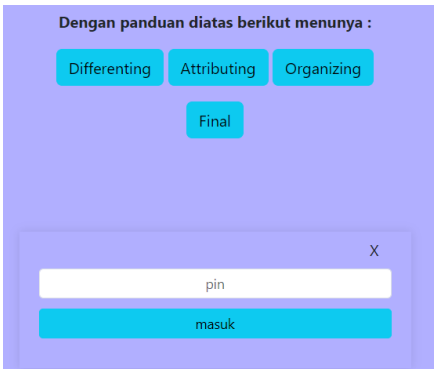

Figure 1. Access Code View

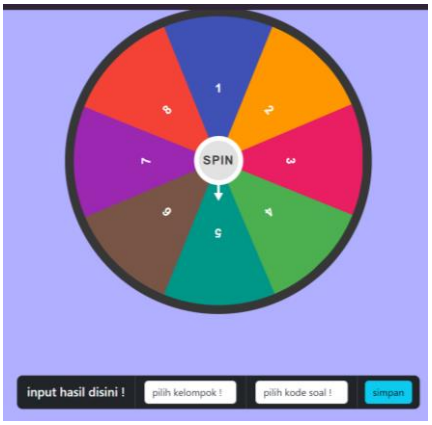

Figure 2. Spinner View

In addition to the spin menu, the Lucky Draw Chemist media has a material menu based on the website. The material menu has several sub-materials: element stability, ionic bonds, covalent bonds and molecular shapes. Good media can develop students' thinking power to help them understand learning materials [23]. The collection menu on the Lucky Draw Chemist media based on the website functions as a place to collect answers to the practice questions that are worked on. Before entering the collection menu, students must enter group data and access pins. This minimizes the possibility of cheating in the process of collecting answers.

Figure 3. Material Menu

Figure 4. Collection Menu

Product Validation

This validation process was conducted to determine the feasibility of the Lucky Draw Chemist media based on the website. Validation was performed by two chemistry lecturers and one chemistry teacher. The validation instrument used by the researcher is a validation sheet. The compiled validation instrument sheet was adjusted to the content and construct criteria. The following are the validation results by three validators.

Table 2. Media Content Validation Results

No	Assessment Aspect	Mode	Category
1.	Knowing the suitability of media with criteria related to the material	4	Valid
2.	Knowing the truth of the material concept in the media	4	Valid
3.	Knowing the suitability of media with criteria related to the presentation of the material	4	Valid

Regarding the suitability of the media with the criteria related to the material, it received a score of four; this proves that the material used in the Lucky Draw Chemist media based on the website has met the learning objectives and achievements. Learning objectives are compiled based on learning achievements and learning objective flow. ABCD provisions must include this compilation (*Audience, Behavior, Condition, Degree*) [24]. The material used in the Lucky Draw Chemist media based on the website is chemical bonds. In terms of the truth of the concept of the material in the media, it gets a mode score of four; this shows that the material and concept of chemical bonds contained in the Lucky Draw Chemist media based on the website are presented systematically and by the Merdeka curriculum. There are no errors in the chemical bonding material in the media, either in writing symbols, numbers, or formulas.

In terms of the suitability of the media with the criteria related to the presentation of the material, it received a mode score of four, based on the assessment of the validators, indicating that there are images and videos presented in the material features section of the Lucky Draw Chemist media based on the website. It is expected to support clarifying the concept of chemical bonds. The suitability of a media to be applied in learning is also reviewed regarding construct validity. Construct validity is a test used to determine whether a measuring instrument measures a concept. The components of construct validity can be seen in Table 3.

Table 3. Media Construct Validation Results

No	Assessment Aspects	Mode	Category
1.	Knowing the characteristics of science	4	Valid
2.	Knowing the appearance of Lucky Draw Chemist based on the Web as a learning media	4	Valid
3.	Knowing the quality of media use	5	Very Valid
4.	Knowing the existence of guidelines on the media	4	Valid
5.	Encouraging the development of analysis skills	4	Valid
6.	Language	4	Valid

Knowing the characteristics of science gets a score of four; this can be seen from the material in the Lucky Draw Chemist based on the website. The content of the material menu can support students' knowledge. The material used in the Lucky Draw Chemist media based on the website is chemical bonds. In the aspect of knowing the appearance of Lucky Draw Chemist based on the website as a learning media, it gets a score of four; this shows that the visual appearance of the media is good and attractive; the size of the letters, the placement of the text and the color of the text displayed is harmonious and not confusing; the presentation of text and images in the media is attractive and can be read well.

Regarding the quality of media usage, it gets a score of five; this proves that the media is easy to use, does not run slowly, and moving from one page to the next is easy. Regarding media guidance, it scores four; the media provides clear instructions or advice to make it easier for students to use. In the aspect of encouraging the development of analysis skills, a score of four was obtained. In the developed media, questions on analysis skills included differentiating, organizing, and attributing aspects. The validation results show that the questions contained in the Lucky Draw Chemist media based on the website that was developed are to the needs of the student's skill analysis pressure. The use of language in the media, materials, and questions is easy to understand, clear, and in accordance with language rules.

Based on the validation data, the Lucky Draw Chemist media based on the website is feasible because it meets the validity criteria with a validity mode score included in the valid category. From these results, the Lucky Draw Chemist media based on the website is feasible to be used in the learning process at school. Using the Lucky Draw Chemist media based on the website in chemistry learning, especially in chemical bonding material, is expected to increase understanding and improve students' analysis skills. This is to research from Khairunnisa (2017) regarding the development of website-based spinning wheel game media, which experts must validate before being used during the learning process. The results show that the media feasibility aspect was assessed by media experts, obtaining an initial percentage of 94.12%, which is categorized as 'very good' [25]. Students can practice analysis skills using the Lucky Draw Chemist

media based on the website because the media already contains practice questions that are adjusted to the indicators of analysis skills. In addition, the material feature shows an example of an explanation in the form of a video of forming a bond. This can help students visualize bond formation in chemical bonding material.

Conclusion

Based on the analysis of the validation data results of the Lucky Draw Chemist media based on the website, it can be concluded that the Lucky Draw Chemist media based on the developed website is declared feasible. Based on the website to improve students' analysis skills in chemical bonding material, the Lucky Draw Chemist media is declared valid based on content and construct validity. Using the Lucky Draw Chemist media based on the website, it is hoped that students can easily use the Lucky Draw Chemist media based on the website, which can help support the learning process using learning media.

References

[1] Khoirurrijal, Fadriati, Sofia, Makrufi, A. D., Gandi, S., Muin, A., & Suprapno. (2022). *Pengembangan Kurikulum Merdeka*. Malang: Literasi Nusantara Abad.

[2] Setiawaty, B. T., Sunarno, W., & Sugiyarto. (2019). Profil Kemampuan Berpikir Analisis Sekolah Menengah Pertama di Surakarta. Universitas Sebelas Maret, 234-238.

[3] Mahyastuti, I., Dwiyana, & Hidayanto, E. (2020). Kemampuan Berpikir Analitis Siswa dalam Memecahkan Masalah Matematis. *Jurnal Pendidikan Matematika dan Sains*, 8 (1),1-6.

[4] Anderson, L., & Krathwohl, D. (2001). Taxonomy for Learning, Teaching, and Assessing: A revision of Bloom's Taxonomy of Educational Objectives. New York: Longman.

[5] Sartika, S. B. (2017). Peningkatan Keterampilan Berfikir Analisis Siswa SMP Melalui Pembelajaran IPA Terpadu Berbasis Keterampilan Proses Sains. Eprints Umsida , 341-354.

[6] Hamalik, O. (2008). Kurikulum dan pembelajaran. Jakarta: Bumi Aksara.

[7] Adytia, P. F., & Dwiningsih, K. (2018). Pengembangan Lembar Kegiatan Siswa Berorientasi Literasi Sains Pada Materi Ikatan Kimia. UNESA Journal of Chemical Education, 7(3), 358-364.

[8] Herawati, N. S., & Muhtadi, A. (2018). *Developing Interactive Chemistry E-Modul For The Second Grade Students of Senior High School*. Jurnal Inovasi Teknologi Pendidikan, 5(2), 180-191.

[9] Suryani, N., Setiawan, A., & Putria, A. (2018). Media Pembelajaran Inovatif . PT. Remaja Rosdakarya.

[10] Wira, A. (2021). Validitas dan Efektivitas Media Pembelajaran Berbasis Android Mata Pelajaran Komputer dan Jaringan Dasar. *Journal of Education Informatic Technology and Science (JeITS), 3(1)*, 01-10.

[11] Sumanik, N. B. (2022). Pengembangan Lembar Kerja Peserta Didik Elektronik Berbasis Literasi Sains Untuk Melatih Kemampuan Berfikir Kritis. *Jurnal Penelitian Pendidikan*, 25(2), 147-161.

[12] Kiernan, N. A., Manches, A., & Seery, M. K. (2021). The role of visuospatial thinking in students' predictions of molecular geometry.Chemistry Education Research and Practice, 22(3), 626-639.

[13] Mulder, W. R. (2023). Validitas media pembelajaran IPA berbasis web dengan pendekatan STEAM untuk meningkatkan kemampuan berpikir kreatif peserta didik. Practice of the Science of Teaching Journal: Jurnal Praktisi Pendidikan, 2(1), 11-17.

[14] Setiawaty, B. T., Sunarno, W., & Sugiyarto. (2019). Profil Kemampuan Berpikir Analisis Sekolah Menengah Pertama di Surakarta. *Universitas Sebelas Maret*, 234-238

[15] Thiagarajan, S. Semmel., D., & Semmel, M. (1974). *Instructional Development for Training Teacher of Exceptional Children.* Indiana: Indiana University Bloomington.

[16] Sugiyono. (2014). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D*. Alfabeta.

[17] Puspitasari, W. D., & Febrinita, F. (2021). Pengujian Validasi Isi (Content Validity) Angket Persepsi Mahasiswa Terhadap Pembelajaran Daring Matakuliah Matematika Komputasi. Focus ACTion Of Research Mathematic, 4(1), 77 - 90.

[18] Riduwan. (2016). Pengantar Statistika untuk Penelitian. Bandung: Alfabeta.

[19] Lutfi, A. (2021). *Research and Development* (R&D): Implikasi dalam Pendidikan Kimia. Surabaya: Jurusan Kimia FMIPA Universitas Negeri Surabaya

[20] Limbong, T., & Sriadhi. (2021). Pemrogaman Web Dasar (1st ed.). Yayasan Kita Menulis.

[21] Batari, N. P. (2023). Pengembangan LKPD Berbasis Literasi Sains Untuk Melatihkan Keterampilan Argumentasi Peserta Didik Pada Materi Faktor-Faktor Yang Mempengaruhi laju Reaksi. Surabaya: Universitas Negeri Surabaya.

[22] Wulandari, I. G. (2021). Kajian Mengenai Kemampuan Analisis Siswa Ditinjau Dari *New Taxonomy Marzano* Sebagai dasar Pengembangan Model Pembelajaran. *Jurnal Santiaji Pendidikan, 11(2)*, 144-150.

[23] Kristanto, A. (2016). Media pembelajaran. Surabaya: Bintang Surabaya

[24] Salsabila Hirza, Z. M. (2023). Pengembangan Instrumen Evaluasi Untuk Mengukur Keterampilan Berpikir Tingkat Tinggi pada Materi Asam-Basa. *Jurnal Pendidikan dan Pembelajaran Kimia, 12(1)*, 13-29.

[25] Khairunnisa, W. (2017). Pengembangan Media Permainan Roda Putar Berbasis Website Untuk Keterampilan Membaca Bahasa Prancis Siswa Kelas XI SMA Angkasa Adisutjipto. Yogyakarta.