



# Hyperlink-based Science Moduls a Learning Resource in The Independent Learning Curriculum

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**Abstract.** The availability of hypertext-based science modules as one of the learning resources in the Independent Curriculum is urgently needed, significantly if it is associated with the transformation of the Industrial Revolution and the digital era because it can provide an appropriate and enjoyable learning experience. This study aims to describe the development process of hypertext-based science modules and test their feasibility. The research method used is the research and development model of the ADDIE model, which consists of 5 stages. The first stage is the analysis of student characteristics and document analysis; the second stage formulates objectives, learning materials, outline of material content, flowchart, storyboard, and product specifications. The third stage obtained the feasibility results of module quality based on the validation of linguists at 78% and learning design experts at 71%, both of which were included in the feasible category. In comparison, the validation of material experts was 84%, and media experts, 89%, respectively, declared very feasible. In the implementation and evaluation stage, the one-on-one trial obtained 78% of results that were declared feasible, and the small group trial results were 84% and declared very feasible. Based on the research results, it can be concluded that the Hyperlink-based science module in the independent curriculum is declared very feasible to use.

**Keywords:** Learning Modules, Merdeka Curriculum, Science.

## 1 First Section

Education is one of the techniques for humans to survive, it is proven that humans must adapt themselves to the acceleration of the times. Every human being must get a capable education(1). Developments and changes to the education system can reduce the level of low education in Indonesia(2). Law number 20 of 2003 reveals that education aims to develop students potential to become human beings who are faithful and devoted to God, capable, creative, independent,noble, healthy, knowledgeable, and become democratic and responsible citizens. There is a need for learning media that can achieve education in an effective way, namely the curriculum(3). The use of curriculum

in learning can provide better performance improvements over standard training approaches based on randomisation, without additional computational costs(4).

The curriculum currently in use is the Merdeka Curriculum, which is part of the Indonesian government's efforts to reform education. In 2013, the government launched the 2013 Curriculum as an initial effort to reform education in Indonesia. The Merdeka Curriculum is a continuation of the 2013 Curriculum with improvements that focus more on competencies and relevant learning. The Independent Curriculum Policy is a step towards fulfilling the essence of independent learning. It is expected to optimise the student profile(5) . The Merdeka Curriculum gives more freedom to schools in designing learning according to their individual needs and conditions. Learning modules can be adapted to the characteristics of students and the specific school environment.

Currently, the availability of Merdeka Curriculum learning modules is regarded as a critical tool for the successful implementation of learning under a new paradigm. Especially in terms of transforming the industrial and digital revolutions(6). The Merdeka Curriculum teaching module is a collection of media tools or facilities, procedures, instructions, and guidelines that are methodically designed, visually appealing, and most importantly, adapted to students requirements. The implementation of the independent curriculum is not straightforward, as the change of curriculum status with the learning model requires schools to be able to strategize well in adopting the independent curriculum(7)

The Learning Module itself can be described as an application of the flow of Learning Objectives created from Learning Outcomes(8), with the goal of creating the Pancasila Learner Profile. The usage of a learning module enables students to be more engaged with the subject and actively participating in their own learning. Learning modules are organized based on the phase or level of learner development. Learning modules also assess what information will be covered and establish explicit learning objectives. Of course, the developmental basis is long-term in nature. Teachers also need to know and understand the concept of teaching modules with the intention that the learning process becomes more interesting and meaningful. The Learning Module itself can be described as an application of the flow of Learning Objectives created from Learning Outcomes, with the goal of creating the Pancasila Learner Profile(9). The usage of a learning module enables students to be more engaged with the subject and actively participating in their own learning(10). Learning modules are organized based on the phase or level of learner development. Learning modules also assess what information will be covered and establish explicit learning objectives. Of course, the developmental basis is long-term in nature. Teachers also need to know and understand the concept of teaching modules with the intention that the learning process becomes more interesting and meaningful(11). The independent curriculum teaching modules developed are equipped with learning and assessment guides(12). Each component in the learning module is also arranged according to the needs of the learners In the independent curriculum teaching module component, there are 3 terms that characterise the module, namely; meaningful understanding, triggering questions, and study sheets Meaningful understanding refers to statements that explore and describe the learning process as an activity that connects concepts with concepts in order to build a complete understanding.

Triggering questions refer to question sentences that are used to spark, stimulate and trigger learners' curiosity or curiosity, so that they can be directed to the process of starting discussions and even starting to learn to research. The form of sparking questions should be formulated in an open-ended pattern by empowering the 5 Ws (What, Who, When, Where, and Why) + 1 H (How). Studysheets refer to sheets that can be used as reflection sheets, organisation charts, worksheets, or question sheets.

Based on results from the researcher's conversation with a science teacher, information was obtained that the school only implemented the independent curriculum in 2023 and the teacher did not yet have an interactive learning module that was in accordance with the current independent curriculum. The teaching materials used by teachers are only through the internet and the 2013 curriculum package book. Meanwhile, based on the observation of psychological documents on each student, the learning style of grade 7 students is more likely to be visual and kinesthetic.

Research on the development of science learning modules based on the independent learning curriculum has also been carried out by several previous researchers. Learning modules are the development of a teacher's own pedagogical knowledge, supported by the integration of technology in its application(13). including by Lexstiani (2021) which shows that students' lack of interest in learning Indonesian subjects, therefore researchers take the development of module teaching materials in Indonesian subjects with an independent curriculum approach. Another researcher by Salamah (2023) in his research developed an e-module based on the independent learning curriculum in learning mathematics in order to increase students' interest in learning, the researcher has produced an e-module learning media based on the independent curriculum in terms of 4C competencies in Mathematics Learning for Grade VII Students.

Based on information on the problems that researchers have found, the researchers want to develop learning modules in science subjects in class VII phase D based on the independent curriculum. Because this is an important and also interesting issue to be developed in this study which raises the title of the development of learning modules. The learning modules that will be developed by researchers, especially in Science subjects, are expected to be a tool for instructors in the classroom in the learning process and to inspire students when learning utilizing the learning modules designed by researchers(14). So that researchers are very interested in contributing learning module development products, especially in Science subjects, which are expected to increase the attractiveness and effectiveness of these teaching materials in the Natural Science learning process.

## 2 Method

In this research, two approaches were used alternately and helped each other, namely a qualitative approach and a quantitative approach. In this research at the preliminary study and model development stages, a qualitative approach was used.

Based on the formulation of the problem that has been stated, the type of research used in this study is development research that produces products in the form of learning media. This research uses the research and development (R&D) method. Each product

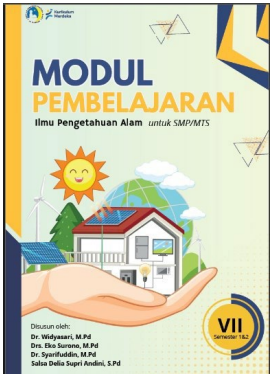

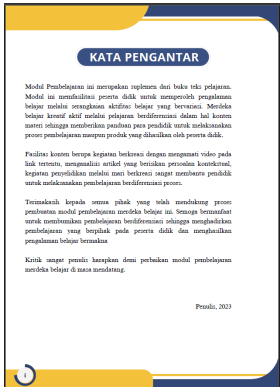
developed requires different research procedures, as for the product developed in this study is the independent curriculum-based science learning module in phase D at ar-rahman Islamic high school. Where the development model used in this study uses the ADDIE development model which consists of 5 steps(15).


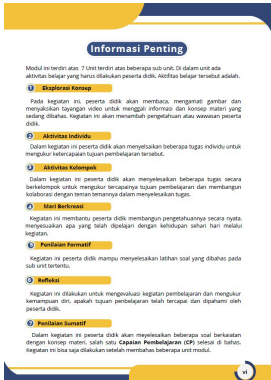
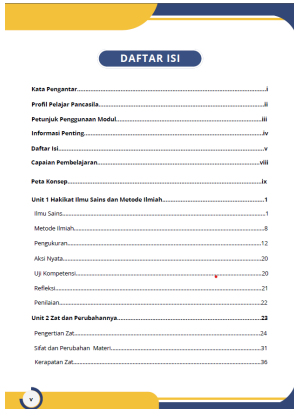
### 3 Result and Discussions

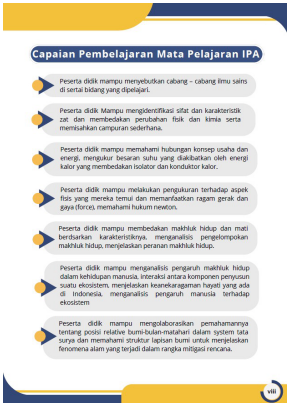


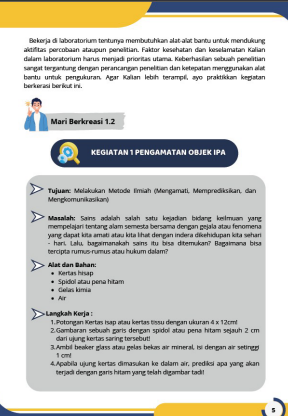
The Learning Module was created in accordance with the ADDIE model development methods and steps, including the analysis stage (analyse), design stage (design), development stage (development), implementation stage (implementation), and assessment (evaluation). Project-based learning will promote student independence by increasing student involvement and knowledge of subjects through the use of curriculum and learning modules. The process of developing learning modules began in November 2023, with the production of learning objectives and resources, and will be completed in January 2024. Supporting variables for the development of learning module products have been acquired through needs analysis(16).

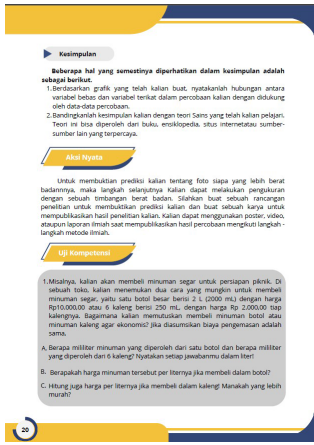

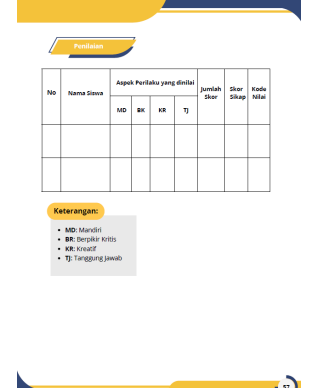
If I might suggest, the first stage would be the analysis stage. the creative education module was created in combination with scientific creativity techniques and abilities as well as students educational perceptions(17), If I might suggest, the analysis stage could perhaps be divided into three parts. It would be beneficial to conduct a needs analysis, a characteristic analysis and a document analysis, as well as collect reference material that could be used as the subject matter in module development. From the information gathered during the interview with the science subject teacher, we learned that Senior High School Islam Ar-Rahman Bekasi plans to begin using the independent learning curriculum in the 2023/2024 school year. The teacher indicated that there were still some challenges in implementing teaching and learning activities in accordance with the Merdeka Belajar Curriculum. The teacher noted that there was a lack of available modules to support learning in the independent curriculum(18). Additionally, the analysis of student characteristics revealed a tendency towards visual and kinesthetic learning styles, which was further supported by document analysis of psychological results. This aligns with the theory that the needs analysis stage determines the media that researchers will develop(19). The second stage is design. This is where we design an interactive learning module. This includes setting out what we want to achieve with the module, putting together a flowchart, making storyboards, collecting design objects and preparing a feasibility test(20). This is all backed up by the theory that if you have done a needs analysis, researchers can continue to determine the human resources needed, develop a development schedule, select and determine the scope and sequence of learning materials or messages, make storyboards, determine product specifications, and make prototypes of products(21).

**1. Table 1.** Physical Display Of Module

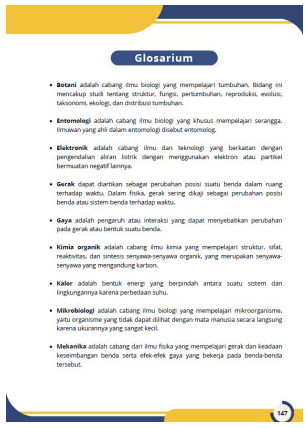
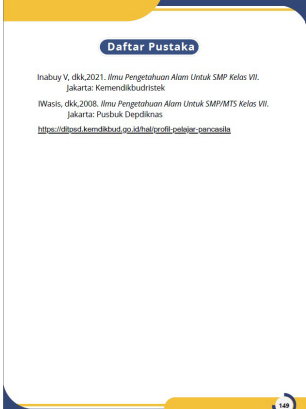

No	Image	Description
1.		Front Cover
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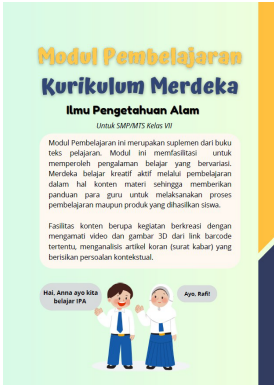
<p>4.</p>	 <p><b>Petunjuk Penggunaan Modul</b></p> <p><b>Assalamualaikum Wr.Wb</b> Halo Everyone, Sebelum menggunakan modul ini, diperlukan untuk membaca petunjuk khusus dan informasi penting. Hal ini diperlukan agar manfaat yang ada dari modul pembelajaran ini dapat diperoleh dengan maksimal. Jika kamu benar-benar memerhatikan dan memahami bagian petunjuk ini, tentu merupakan tindakan yang sangat bijak. Selamat mempelajari!</p> <p>Gunakan handphonemenu untuk scan barcode yang ada dimodul.</p>	<p>Module Instructions</p>
<p>5.</p>	 <p><b>Informasi Penting</b></p> <p>Modul ini terdiri dari 7 (tujuh) bab atau bab-bab ke-10 (10) di dalam unit atau aktivitas belajar yang harus dilakukan peserta didik. Aktivitas belajar tersebut adalah:</p> <ul style="list-style-type: none"> <li>1. <b>Kejelasan Konsep</b> Pada kegiatan ini, peserta didik akan membaca, mengamati gambar dan melakukan kegiatan yang untuk menggali informasi dan konsep materi yang sedang dibahas. Kegiatan ini akan membantu pengetahuan atau wawasan peserta didik.</li> <li>2. <b>Aktivitas Individu</b> Dalam kegiatan ini peserta didik akan menyelesaikan beberapa tugas individu untuk mengukur keterampilan toquan pembelajaran tersebut.</li> <li>3. <b>Aktivitas Kelompok</b> Dalam kegiatan ini, peserta didik akan menyelesaikan beberapa tugas secara berkelompok untuk mengukur tercapainya toquan pembelajaran dan membangun kolaborasi dengan teman sebangkunya dalam menyelesaikan tugas.</li> <li>4. <b>Materi Berkeseluruhan</b> Kegiatan ini membantu peserta didik membangun pengetahuannya secara nyata, memisahkan apa yang telah diketahui dengan hal-hal yang baru melalui kegiatan.</li> <li>5. <b>Refleksi Keseluruhan</b> Kegiatan ini peserta didik mampu menyimpulkan latihan soal yang dibahas pada sub unit tertentu.</li> <li>6. <b>Refleksi</b> Kegiatan ini dilakukan untuk mengulangi kegiatan pembelajaran dan mengukur kemampuan diri, apakah toquan pembelajaran telah tercapai dan dipertani oleh peserta didik.</li> <li>7. <b>Pembelajaran Inovatif</b> Dalam kegiatan ini peserta didik akan menyelesaikan beberapa soal berkeseluruhan dengan toquan materi. Soal-soal <b>Daftar Pembelajaran Diri</b> (jurnal 8) Sahat. Kegiatan ini bisa saja dilakukan setelah membahas beberapa unit modul.</li> </ul>	<p>Important Information</p>
<p>6.</p>	 <p><b>DAFTAR ISI</b></p> <p>Kata Pengantar.....i</p> <p>Profil Pelajar Pancasila.....ii</p> <p>Petunjuk Penggunaan Modul.....iii</p> <p>Informasi Penting.....iv</p> <p>Daftar Isi.....v</p> <p>Capaian Pembelajaran.....viii</p> <p>Peta Konsep.....ix</p> <p>Unit 1 Hakikat Ilmu Sains dan Metode Ilmiah.....1</p> <p>Ilmu Sains.....1</p> <p>Standar Ilmiah.....8</p> <p>Pengukuran.....12</p> <p>Alat Ukur.....20</p> <p>Uji Kompetensi.....20</p> <p>Refleksi.....21</p> <p>Penilaian.....22</p> <p>Unit 2 Zat dan Perubahannya.....23</p> <p>Pengertian Zat.....24</p> <p>Sifat dan Perubahan Materi.....31</p> <p>Kepastian Zat.....36</p>	<p>Table Of Contents</p>

<p>7.</p>	 <p><b>Capaian Pembelajaran Mata Pelajaran IPA</b></p> <ul style="list-style-type: none"> <li>Peserta didik mampu menyebutkan cabang-cabang ilmu sains di serta bidang yang dipelajari.</li> <li>Peserta didik Mampu mengidentifikasi sifat dan karakteristik zat dan membedakan perubahan fisik dan kimia serta menentukan kemampuan ledakannya.</li> <li>Peserta didik mampu memahami hubungan konsep usaha dan energi, mengukur besaran suhu yang diakibatkan oleh energi kalor yang membedakan isolator dan konduktor kalor.</li> <li>Peserta didik mampu melakukan pengukuran terhadap aspek fisika yang mereka temui dan membandingkan ragam gerak dan gaya forces, memahami hukum Newton.</li> <li>Peserta didik mampu membedakan makhluk hidup dan mati berdasarkan karakteristiknya, menganalisis pengelompokan makhluk hidup, menjelaskan peranan makhluk hidup.</li> <li>Peserta didik mampu menganalisis pengaruh makhluk hidup dalam kehidupan manusia, interaksi antara komponen penyusun suatu ekosistem, menjelaskan keanekaragaman hayati yang ada di Indonesia, menganalisis pengaruh manusia terhadap ekosistem</li> <li>Peserta didik mampu mengolaborasi pematahannya tentang posisi relative bumi-bulan-matahari dalam system tata surya dan memahami struktur lapisan bumi untuk menjelaskan fenomena alam yang terjadi dalam rangka mitigasi bencana.</li> </ul>	<p>Learning Outcomes</p>
<p>8.</p>	 <p><b>Unit 1</b></p> <p><b>Hakikat Ilmu Sains dan Metode Ilmiah</b></p> <p><b>Ilmu Sains</b></p> <p><b>Tujuan Pembelajaran</b> Setelah mempelajari materi ini, Peserta didik mampu mempelajari cabang-cabang ilmu sains dan metode ilmiah di serta bidang yang dipelajari dengan baik dan benar</p> <p><b>Fakta Lapangan</b> Kelelahan alam dengan segala pengaruhnya sanggup berakibat ragam, mulai dari benda yang sangat kecil tidak terlihat mata hingga benda yang sangat besar dan run jauh misalnya karena berada di luar angkasa. Ilmu sains hanya mempelajari fenomena alam yang terlihat, tidak semua bisa dijabarkan ataupun dijabarkan sama. Ayo kalian berkreasi mengungkap fenomena berikut ini.</p> <p><b>Mari Berkreasi 1.1</b></p> <p>Apakah bisa berkreasi? Kapan saja dapat hanya belajar? Apa tersebut memiliki pembelajaran mengenai materi? Kalaupun bisa orang tersebut dapat dijabarkan dengan akurat dengan alat ukur yang akurat hingga satuan tersebut dapat dijabarkan dan tidak ada dengan memberikan hasil yang sama.</p> <p><b>Gambar 1.1 Perubahan Tinggi Badan</b></p> <p>Sumber: </p>	<p>Material Unit</p>
<p>9.</p>	 <p>Bekerja di laboratorium tentunya membutuhkan alat atau bahan untuk mendukung aktifitas percobaan ataupun penelitian. Faktor kesehatan dan keselamatan kalian dalam laboratorium harus menjadi prioritas utama. Keberhasilan sebuah penelitian sangat tergantung dengan perencanaan penelitian dan ketepatan menggunakan alat atau bahan yang diperlukan. Agar kalian lebih terampil, ayo praktikkan kegiatan berikut ini.</p> <p><b>Mari Berkreasi 1.2</b></p> <p><b>KEGIATAN 1 PENGAMATAN OBJEK IPA</b></p> <p><b>Tujuan:</b> Melakukan Metode Ilmiah (Mengamati, Memprediksikan, dan Mengkomunikasikan)</p> <p><b>Masalah:</b> Sama apakah salah satu kegiatan bidang kelman yang mempelajari tentang alam semesta bersama dengan gejala atau fenomena yang seperti itu amat atau bisa dilakukan dengan mudah diibudaya kita sehari-hari. Lalu, bagaimanakah sama itu bisa diternakan? Bagaimana bisa terdapat terapan konsep atau hukum dalam?</p> <p><b>Alat dan Bahan:</b></p> <ul style="list-style-type: none"> <li>Kertas Hias</li> <li>Spidol atau pena hitam</li> <li>Gelas Lemsa</li> <li>Air</li> </ul> <p><b>Langkah Kerja:</b></p> <ol style="list-style-type: none"> <li>Potonglah Kertas hias atau kertas tisu dengan ukuran 4 x 12cm</li> <li>Contourkan sebuah garis dengan spidol atau pena hitam sejauh 2 cm dari ujung kertas samping teratas!</li> <li>Rekatlah bagian garis atau poles bagian atas minimal 10 dengan an selotip 1 cm!</li> <li>Agaklah ujung kertas dimasukkan ke dalam air, prediksi apa yang akan terjadi dengan garis hitam yang telah digambar tadi!</li> </ol>	<p>Let's Get Creative</p>

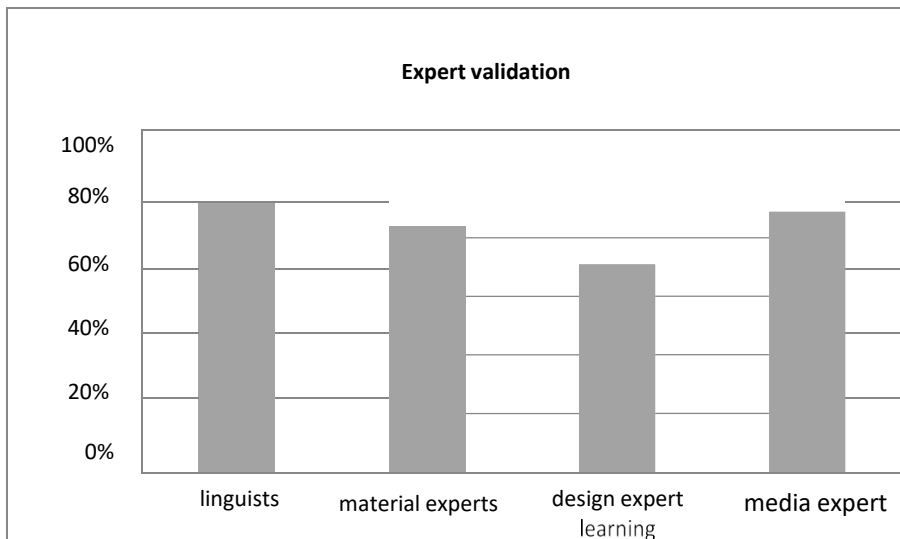
<p>10.</p>	 <p><b>Kesimpulan</b></p> <p>Beberapa hal yang semestinya diperhatikan dalam kumpulan adalah sebagai berikut.</p> <ol style="list-style-type: none"> <li>1. Berbautkan grafik yang telah kalian buat, nyatakanlah hubungan antara variabel bebas dan variabel terikat dalam percobaan kalian dengan didukung oleh data-data percobaan.</li> <li>2. Bandingkanlah kesimpulan kalian dengan teori Sans yang telah kalian pelajari. Teori ini bisa diperoleh dari buku, ensiklopedia, situs internet atau sumber-sumber lain yang terpercaya.</li> </ol> <p><b>Aksi Nyata</b></p> <p>Untuk membuat prediksi kalian tentang foto siapa yang lebih berat badannya, maka langkah selanjutnya kalian dapat melakukan pengukuran dengan sebuah timbangan berat badan. Siapkan buat sebuah rangkai peralatan untuk membuktikan prediksi kalian dan buat sebuah karya untuk mempublikasikan hasil penelitian kalian, kalian dapat menggunakan poster, video, ataupun laporan ilmiah saat mempublikasikan hasil percobaan mengikuti langkah-langkah metode ilmiah.</p> <p><b>Uji Kompetensi</b></p> <p>1. Misalnya, kalian akan membeli minuman segar untuk persiapan piknik. Di sebuah toko, kalian menemukan dua cara yang mungkin untuk membeli minuman segar, yaitu satu botol besar berisi 2 l (2000 ml) dengan harga Rp10.000,00 atau 6 kaleng berisi 250 ml, dengan harga Rp 2.000,00 per kalengnya. Bagaimana kalian memutuskan membeli minuman botol atau minuman kaleng agar ekonomis jika diasumsikan biaya pengantaran adalah sama.</p> <p>A. Berapa milliliter minuman yang diperoleh dari satu botol dan berapa milliliter yang diperoleh dari 6 kaleng? Nyatakan setiap jawabannya dalam liter.</p> <p>B. Berapakah harga minuman tersebut per liternya jika membeli dalam botol?</p> <p>C. Hitung juga harga per liternya jika membeli dalam kaleng. Manakah yang lebih murah?</p>	<p>1. Real Action</p> <p>2. Competency test</p>																																																				
<p>11.</p>	 <p><b>Ayo kerjakan tugasmu!</b></p> <p><b>Refleksi</b></p> <p>Setelah menyelesaikan aktifitas belajar pada unit ini, langkah selanjutnya refleksikan pengalaman belajar yang kalian peroleh dengan mengisinya ke dalam kegiatan berikut ini!</p> <p>Gambar 2.4 Perigi Refleksi</p>	<p>Reflection</p>																																																				
<p>12.</p>	 <p><b>Penilaian</b></p> <table border="1"> <thead> <tr> <th rowspan="2">No</th> <th rowspan="2">Nama Siswa</th> <th colspan="3">Aspek Perilaku yang dinilai</th> <th rowspan="2">Jumlah Skor</th> <th rowspan="2">Skor Sikap</th> <th rowspan="2">Kata Muti</th> </tr> <tr> <th>MD</th> <th>BK</th> <th>KR</th> <th>TJ</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> <p><b>Keterangan:</b></p> <ul style="list-style-type: none"> <li>• MD: Mandiri</li> <li>• BK: Berpikir Kritis</li> <li>• KR: Kreatif</li> <li>• TJ: Tanggung jawab</li> </ul>	No	Nama Siswa	Aspek Perilaku yang dinilai			Jumlah Skor	Skor Sikap	Kata Muti	MD	BK	KR	TJ																																									<p>Assesment</p>
No	Nama Siswa			Aspek Perilaku yang dinilai						Jumlah Skor	Skor Sikap	Kata Muti																																										
		MD	BK	KR	TJ																																																	



<p>13.</p>	 <p><b>Glosarium</b></p> <ul style="list-style-type: none"> <li>• <b>Botani</b> adalah cabang ilmu biologi yang mempelajari tumbuhan. Bidang ini mencakup studi tentang struktur, fungsi, pertumbuhan, reproduksi, evolusi, taksonomi, ekologi, dan distribusi tumbuhan.</li> <li>• <b>Entomologi</b> adalah cabang ilmu biologi yang khusus mempelajari serangga. Ilmunya yang ahli dalam entomologi disebut entomolog.</li> <li>• <b>Elektronik</b> adalah cabang ilmu dan teknologi yang berkaitan dengan pemahaman aliran listrik dengan menggunakan elektron atau partikel bermuatan negatif lainnya.</li> <li>• <b>Gerak</b> dapat didefinisikan sebagai perubahan posisi suatu benda dalam ruang terhadap waktu. Dalam fisika, gerak sering dikaji sebagai perubahan posisi benda atau sistem benda terhadap waktu.</li> <li>• <b>Gaya</b> adalah pengaruh atau interaksi yang dapat menyebabkan perubahan pada gerak atau bentuk suatu benda.</li> <li>• <b>Kimia organik</b> adalah cabang ilmu kimia yang mempelajari struktur, sifat, reaktivitas, dan sintesis senyawa-senyawa organik, yang merupakan senyawa-senyawa yang mengandung karbon.</li> <li>• <b>Kabar</b> adalah bentuk energi yang berpropansi antara suatu sistem dan lingkungannya karena perbedaan suhu.</li> <li>• <b>Mikrobiologi</b> adalah cabang ilmu biologi yang mempelajari mikroorganisme, yaitu organisme yang tidak dapat dilihat dengan mata manusia secara langsung karena ukurannya yang sangat kecil.</li> <li>• <b>Mekanika</b> adalah cabang dari ilmu fisika yang mempelajari gerak dan keadaan keseimbangan benda secara idealistik diura yang bekerja pada benda-benda tersebut.</li> </ul>	<p>Glossary</p>
<p>14.</p>	 <p><b>Daftar Pustaka</b></p> <p>Inahbvy V, dkk. 2021. <i>Ilmu Pengetahuan Alam Untuk SMP Kelas VII</i>. Jakarta: Kemendikbudristek</p> <p>NWasid, dkk. 2008. <i>Ilmu Pengetahuan Alam Untuk SMP/MTS Kelas VII</i>. Jakarta: Pustaka Depdiknas</p> <p><a href="https://id.issn.kemendikbud.go.id/handle/issn/collection/00000016">https://id.issn.kemendikbud.go.id/handle/issn/collection/00000016</a></p>	<p>Bibliography</p>
<p>15.</p>	 <p><b>Tentang Penyusun</b></p> <p>Bella Della Suni Kintia, S.Pd. Diposangi sejak lahir di Bireu, 11 Juni 2000. Lulus dari SMA pada tahun 2018. Kemudian melanjutkan ke SMA Negeri 101, Sekolah Pendidikan Universitas Ibn Khaldun Singor. Masuk ke guru di kelas sebagai guru pengembang untuk persiapan tugas akhir yang sudah selesai penulisan artikel. Saat ini dia melanjutkan pada Sa Di Wiljayanti, M.Pd. Saikat Di Saefudin, M.Pd.</p> <p>Masa yang berputak Ilmu Pengetahuan Alam ini merupakan masa pertanya yang dikembangkan.</p> <p>Sebagai dengan hadirnya modul ini dapat bermanfaat untuk peserta didik dan guru di SMP Negeri 101 Bireu.</p>	<p>About The Compiler</p>

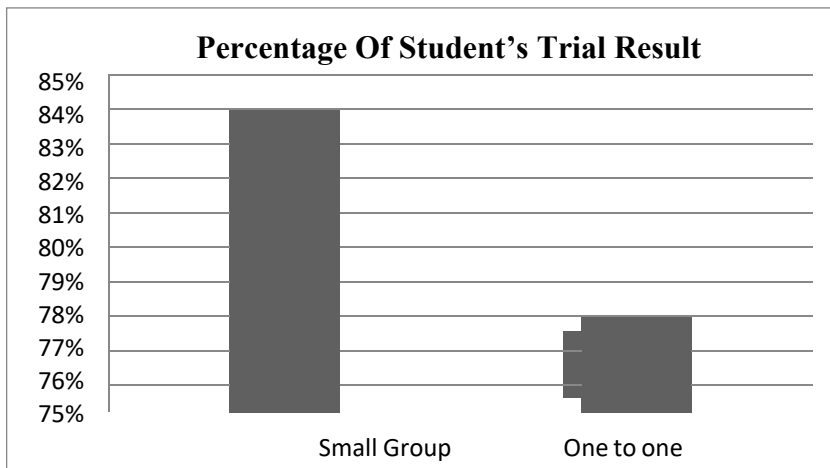
<p>16.</p>		<p>Back Cover</p>
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The third stage is development. This is the stage where we put all the pieces together to create the learning modules. We use the flowchart and storyboard to guide us. Once the module is ready, it's validated by a mediolinguist lecturer, a learning design expert, and a material expert lecturer. This is to get their input on the development, along with an interactive learning media feasibility assessment instrument. The prototype can be validated in several stages, including expert and practitioner assessment or validation. Here are the results of the validation by material experts, linguists, learning design experts, and media experts:



The feasibility of the Learning Module based on expert validation can be concluded that the quality of the learning module based on the assessment by linguist lecturers shows 39 total averages of 4 and an overall percentage of 78% is declared Feasible. Assessment by learning design expert lecturers showed 48 total averages of 3.6 and an overall percentage of 71% was declared Feasible. Assessment by material expert lecturers showed 64 total averages of 4.3 and an overall percentage of 84% was declared Very Feasible. Assessment by media expert lecturers showed 67 total averages of 4.3 and an overall percentage of 89% was declared Very Feasible.

The fourth stage is where we start putting it into practice. Next, we'll be rolling out the science learning module to students in Year 7 at the Ar-Rahman Bekasi Islamic Junior High School Department. The idea is to see how students respond to the new learning module. The creative education activities develop the teaching objectives based on problem-based learning formats and strategies, with a focus on students' creativity skills. This is the stage where we'll find out if the developed media is feasible. Then, students are asked to fill out a questionnaire to give feedback on the interactive learning media. The implementation stage has elements of formative evaluation in the form of one-to-one, small group and field trial evaluations. Here are the results of the learner trials, one-to-one and small group trials.



The results of the assessment of the diagram above, show that the percentage results from the oneto one trial are 78% with feasible qualifications, while the percentage results from the small group trial are 84% with very feasible qualifications. The final stage is evaluation. The evaluation is done in two parts: development evaluation and an evaluation of the feasibility of the learning module products. The development evaluation was carried out by media expert lecturers, learning design experts, linguists and material experts to see if the learning module could be used at Ar-Rahman Bekasi Islamic Junior High School. They also wanted to find out if the learning media was produced and

shared with students. We asked seventh graders at Ar-Rahman Bekasi Islamic Junior High School to test out the new learning module. This will help us see how well it works and whether it's fit for purpose. Once we've done this, we'll make any necessary changes so it's ready to use.

## 4 Conclusion

This research focuses on the development of learning modules for Science subjects in Class VII Phase D at Ar-Rahman Islamic Junior High School Bekasi. The development of Science subject learning modules uses the ADDIE development model. The percentage of feasibility based on the assessment of media experts in the aspect of module size 100%, module cover design 85%, module content design 95%, linguists in the aspect of language 78%, learning design experts in the aspect of curriculum suitability 72%, learning impact 73.3%, learner motivation and attractiveness 60%, material experts in the aspect of material quality 86.6%, material content 100%. The percentage of feasibility based on individual learner trials (*one to one*) is 78%, then the percentage of *small group* trials is 84%. Overall, the percentage of feasibility based on the assessment of media experts 89% Very Feasible, learning design experts 71% Feasible, linguists 78% Feasible, material experts 84% Very Feasible, one to one 78% Feasible, and small group trial 84% Very Feasible.

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## References

1. Wray E, Sharma U, Subban P. Factors influencing teacher self-efficacy for inclusive education: A systematic literature review. *Teach Teach Educ* [Internet]. 2022 Sep;117:103800. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0742051X22001743>
2. Thaheem SK, Zainol Abidin MJ, Mirza Q, Pathan HU. Online teaching benefits and challenges during pandemic COVID-19: a comparative study of Pakistan and Indonesia. *Asian Educ Dev Stud* [Internet]. 2022 Mar 3;11(2):311–23. Available from: <https://www.emerald.com/insight/content/doi/10.1108/AEDS-08-2020-0189/full/html>

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<sup>1</sup> If EquinOCS, our proceedings submission system, is used, then the disclaimer can be provided directly in the system.

3. Hassanin M, Anwar S, Radwan I, Khan FS, Mian A. Visual attention methods in deep learning: An in-depth survey. *Inf Fusion* [Internet]. 2024 Aug;108:102417. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1566253524001957>
4. Jones G, Macaninch E, Mellor DD, Spiro A, Martyn K, Butler T, et al. Putting nutrition education on the table: development of a curriculum to meet future doctors' needs. *Br J Nutr* [Internet]. 2023 Mar 28;129(6):1000–8. Available from: [https://www.cambridge.org/core/product/identifier/S0007114522001635/type/journal\\_article](https://www.cambridge.org/core/product/identifier/S0007114522001635/type/journal_article)
5. Utami WB, Wedi A, Sulthoni, Aulia F. Management of Merdeka Curriculum Towards Strengthening the Profile of Pancasila Students in Schools. In: *Proceedings of the International Conference on Educational Management and Technology (ICEMT 2022)* [Internet]. Paris: Atlantis Press SARL; 2023. p. 240–6. Available from: [https://www.atlantis-press.com/doi/10.2991/978-2-494069-95-4\\_29](https://www.atlantis-press.com/doi/10.2991/978-2-494069-95-4_29)
6. Soviany P, Ionescu RT, Rota P, Sebe N. Curriculum Learning: A Survey. *Int J Comput Vis* [Internet]. 2022 Jun 19;130(6):1526–65. Available from: <https://link.springer.com/10.1007/s11263-022-01611-x>
7. Yang S, Shu D, Yin H. The bright side of dark emotions: Exploring EFL teachers' emotions, emotional capital, and engagement in curriculum implementation. *Teach Teach Educ* [Internet]. 2022 Sep;117:103811. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0742051X22001858>
8. Goss H. Student Learning Outcomes Assessment in Higher Education and in Academic Libraries: A Review of the Literature. *J Acad Librariansh* [Internet]. 2022 Mar;48(2):102485. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0099133321001762>
9. Wong J. Reflection in Student Learning in a Semantics and Academic Writing Module. In: *Integrating Content and Language in Higher Education* [Internet]. Singapore: Springer Nature Singapore; 2022. p. 211–27. Available from: [https://link.springer.com/10.1007/978-981-19-4559-5\\_11](https://link.springer.com/10.1007/978-981-19-4559-5_11)
10. Hsin CT, Wu HK. Implementing a Project-Based Learning Module in Urban and Indigenous Areas to Promote Young Children's Scientific Practices. *Res Sci Educ* [Internet]. 2023 Feb 24;53(1):37–57. Available from: <https://link.springer.com/10.1007/s11165-022-10043-z>
11. Schröder AI, Cammann F, Darge K, Krepf M, Weyers J, König J. How to promote student teachers' research knowledge and skills online. *J Educ Teach* [Internet]. 2023 Aug 8;49(4):569–82. Available from: <https://www.tandfonline.com/doi/full/10.1080/02607476.2022.2150839>
12. Al Mamun MA, Lawrie G. Student-content interactions: Exploring behavioural engagement with self-regulated inquiry-based online learning modules. *Smart Learn Environ* [Internet]. 2023 Jan 2;10(1):1. Available from: <https://slejournal.springeropen.com/articles/10.1186/s40561-022-00221-x>
13. Lachner A, Fabian A, Franke U, Preiß J, Jacob L, Führer C, et al. Fostering pre-service teachers' technological pedagogical content knowledge (TPACK): A quasi-experimental field study. *Comput Educ* [Internet]. 2021 Dec;174:104304. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0360131521001810>
14. Barth J, Ruzicic N, Mennenga M, Panagiotopoulou V, Wolf M, Ayroa RV, et al.

- Development of an IALF Overarching Learning Module for Circular Economy. In 2024. p. 366–73. Available from: [https://link.springer.com/10.1007/978-3-031-65411-4\\_43](https://link.springer.com/10.1007/978-3-031-65411-4_43)
15. Branch RM. *Instructional Design: The ADDIE Approach* [Internet]. Boston, MA: Springer US; 2009. Available from: <http://link.springer.com/10.1007/978-0-387-09506-6>
  16. Lyons RM, Fox G, Stephens S. Gamification to enhance engagement and higher order learning in entrepreneurial education. *Educ + Train* [Internet]. 2023 May 10;65(3):416–32. Available from: <https://www.emerald.com/insight/content/doi/10.1108/ET-05-2022-0204/full/html>
  17. Bulut Ates C, Aktamis H. Investigating the effects of creative educational modules blended with Cognitive Research Trust (CoRT) techniques and Problem Based Learning (PBL) on students' scientific creativity skills and perceptions in science education. *Think Ski Creat* [Internet]. 2024 Mar;51:101471. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1871187124000105>
  18. McGill E, Er V, Penney T, Egan M, White M, Meier P, et al. Evaluation of public health interventions from a complex systems perspective: A research methods review. *Soc Sci Med*. 2021 Mar;272:113697.
  19. Bhatt P, Muduli A. Artificial intelligence in learning and development: a systematic literature review. *Eur J Train Dev* [Internet]. 2023 Aug 14;47(7/8):677–94. Available from: <https://www.emerald.com/insight/content/doi/10.1108/EJTD-09-2021-0143/full/html>
  20. Harrison MG, King RB, Wang H. Satisfied teachers are good teachers: The association between teacher job satisfaction and instructional quality. *Br Educ Res J* [Internet]. 2023 Jun 21;49(3):476–98. Available from: <https://bera-journals.onlinelibrary.wiley.com/doi/10.1002/berj.3851>
  21. Barelli E, Lodi M, Branchetti L, Levrini O. Epistemic Insights as Design Principles for a Teaching-Learning Module on Artificial Intelligence. *Sci Educ* [Internet]. 2024 Feb 23; Available from: <https://link.springer.com/10.1007/s11191-024-00504-4>

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