

Smart Content Learning Based on Case Methods

Haryadi^{1, a)}, Rini Herliani² and Haryani Pratiwi Sitompu^{3, b)}

Author Affiliations

¹Digital Business, State University of Medan, Medan, Indonesia
^{2,3}Accounting Education, State University of Medan, Medan, Indonesia)

Author Emails

^{a)} haryadi@unimed.ac.id
^{b)} riniherliani@unimed.ac.id
^{c)} tiwisitompul@unimed.ac.id

ABSTRACT

Intelligent content refers to various digital learning materials developed by Artificial Intelligence with various types of applications. Smart content implies different types of virtual content, which includes digital guides from textbooks, images, graphics, audio, video, spreadsheets, and interactive. The motive of this studies is to create an utility of highbrow studying content material primarily based totally at the case method. This research is development research (R&D) according to the ADDIE model (analysis, design, development, implementation, evaluation). The subjects of this study were students of the Accounting Education Course of the Business Feasibility Course. Product validity is shown from the results of expert validation by achieving very valid criteria for learning content application media. The practicality of the product is measured using the response instruments of lecturers and students, and the effectiveness of the product is seen from the results of the posttest conducted during field trials. As a result, the application of intelligent learning content based on the case method was shown to be effective, practical, and effective in enhancing learning effectiveness. This proves that the application of a case method-based intelligent learning content is effectively used.

Keywords: Smart Content Learning; Case Method; Business Study

**Corresponding Author:*

Haryadi

¹Digital Business, State University of Medan, Medan, Indonesi
Email: haryadi@unimed.ac.id

1. INTRODUCTION

Today, educational institutions are going hand in hand with the latest technological advances in artificial intelligence to organize learning models. An important component of this change is smart content, which transforms the conventional learning process into an interactive one. It is clear that technology has become an integral part of the learning process. Therefore, educational institutions need to choose innovative content delivery methods to enhance the student learning experience. The concept of smart content has accelerated the implementation of digital & virtual content. Textbooks are now being replaced with video lectures and digital books to offer engaging learning experiences. The term "smart" is currently widely used by academics, especially researchers who provide a lot of vocabulary such as smart education, smart campus, smart class, and smart learning environment [1][2]. Intelligent content, as one of the most popular trends is artificial intelligence, the ability to create intelligent content has proven to be quite good. Artificial intelligence can produce content with the same, or greater, grammatical prowess as most humans.



Smart content gives a better description of the learning material. Having an accurate picture of current content allows educators to identify gaps to determine areas where there is the content of interest. Smart Content affects every activity in learning that benefits the entire academic implementation process. Smart content integration in learning developed by [3] In smart content learning using big data analysis can provide precise, accurate, and fast information, especially in producing teaching material content based on student characteristics in an online learning class. The study of [4] designing a smart content writing system with a simple and user-friendly web application on improving the quality of learning anywhere, can save time and provide quality services. Next study [5] developed e-learning content for multimedia technology education to help students learn these subjects with multimedia games to make learning more interesting and at the same time provide real examples to students about how multimedia works. On the other hand, dynamic educational content that supports various smart device platforms and various types of content. In addition, content views enable big data and visualization of results. The content display was implemented as part of a cloud-based intelligent education system [6]. Many variations of learning content have been developed by academics, one of which is a social studies education-based digital content model published on the User Generated Content Platform [7] produces a digital content model that is used as a guide and supports digital literacy. This is intended to see how effective the model's digital content design is. The development of increasingly varied information technology gives rise to IoT which can provide freedom in improving the learning process as [8] deployment of intelligent IoT devices that provide e-learning access to share content in a hybrid cloud environment using a decentralized peer-to-peer communication solution for data synchronization and updates. Smart IoT devices act as intermediaries between users and cloud services, providing a solution for sharing content without full reliance on cloud servers. Additionally, an e-content was developed containing four topics and three experiments implemented using mixed learning modes. In this way, e-content design helps students overcome weaknesses in learning basic chemistry concepts [9].

Case-based learning is an option for training students' rhetoric, critical thinking, and realism skills and for mastering basic research skills [10]. Case-solving learning can be done through exploration, deepening as a stimulus for students to present their research results in class forums. The implementation of the case method in learning is one option that can be applied by lecturers to train students' high-thinking skills [11]. The application of the case method with a team-based project strategy [12] is considered effective in developing student skills, so it can be considered a learning strategy, especially in improving the learning process. In the study [13] the case method can enhance students' ability to analyze and solve problems. Furthermore [14] the case method offers a variety of learning options, from simple cases to complete case studies. Different types of case materials have different pedagogical and learning theory approaches and tend to make different contributions to classroom instruction.

In the current era of technology, we use technology and smart content to make people smart. On the other hand, intelligent content (e-content) developed using technology makes people smarter [15]. Smart content (e-content) is a content design pattern that determines the type of content according to the personality of the student [3]. E-content is e-learning deliverables in the form of lecture notes created in digital formats (graphics, audio, video, animations, simulations, etc.) and accessible online. The primary goal of electronic content development is to achieve learning goals and put learner needs at the center of learning [16][17]. Determining learning content in relation to intelligent content is an implementation of the intelligent learning process. This is the concept of implementing an e-learning engine to organize learning and teaching activities, including content development. The development of interactive and web-based multimedia learning content industry has been developed using text, images, audio and video, but has not been good at developing interactive content [18].

The use of technology in learning aims to increase learning materials through the search method. With e-content, several activities focus on structuring learning content and providing procedures for browsing in a web-based learning environment [19][20]. On the other hand, smart learning does not only consist of what is called formal or traditional learning but also the most important thing is informal learning which is another form of learning from independent ones such as social media, the Internet, MOOCs, game-based learning, and others [21].

Based on the above definition, Smart Content (E-Content) is any content or content intended to improve the quality of learning using intelligent technology in a learning context packaged in the form of graphics, video, audio, animation, and simulation.

This method has been used since ancient times in the process of education and training in various fields. Case study methods were used to form the Persians, Arabs and Ottomans. In ancient Greece, warrior heroes, stories, and legends were passed down orally and in writing. The case method was the first teaching material used in law and economics classes [22]. This method was used by Harvard law professors and various disciplines in the late 18th century. In theory, the case method is not attached to the existing learning theory. The case method is a student-centered educational strategy that can teach students critical thinking, communication, and interpersonal skills. The Case Method offers students the opportunity to develop themselves, realize themselves, innovate, seek and find solutions to the cases presented.

The case method is expressed in different sources under various terms such as casework, case method, business game, simulation game, decision-making game, etc. According to [23] defines the case method as the process managers, engineers, and subject matter experts must follow in developing case-based systems, and provides a set of supporting tools. The case method aims to integrate different materials, give students the

opportunity to explore content in a variety of ways that are meaningful to them, and involve them in collaborative projects that conduct joint assessments.

This study seeks to integrate case methods into learning content. Through the use of case-based Smart Content Learning, it is hoped that it can support the learning process by focusing on presenting case-based content with learning preparation including tools, problems, and complex concepts. Based on the above background, the author will conduct development research entitled "Smart Content Learning Based on Case Method".

2. RESEARCH METHODOLOGY

This research is research and development aimed at producing intellectual learning content products based on effective, practical and effective case methods and e-learning media in the business feasibility study course. The development model used in this study inherits his ADDIE model. The choice of ADDIE model is based on several advantages during product development, including dynamism and flexibility [24].

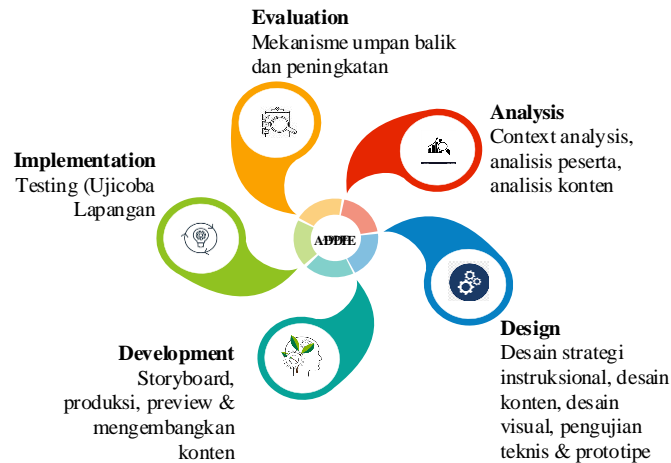


FIGURE 1. ADDIE Model

Sample and Sampling Techniques

The survey population consisted of all students in the 4th semester of the Accounting Education and Research Program at the Faculty of Economics, Medan State University, with a total of 88 students taking the Business Feasibility Course. The sample for this study consisted of 30 students. The sampling technique used in this study was randomized sampling for limited product testing.

Research Instruments, Validity, and Reliability

The tools used in this study were the observation sheet, interview sheet, validation score sheet, product practice score sheet, and efficacy score. 88 students were surveyed using the observation sheet in the act of every investigation community. Observation sheets are used to see the need for interesting learning content. The interview form will be used during the course of the lecture to collect the necessary data from the lecturer for the feasibility study. A validation score sheet is used to obtain product efficacy data from two experts. The evaluation form, in the form of a product practice questionnaire, is used to collect data on the practical application of the product from students and teachers who oversee commercial feasibility studies in limited trials. Questionnaire instrument for testing the effectiveness of products. All equipment is valid and reliable prior to use.

Research Prosedure

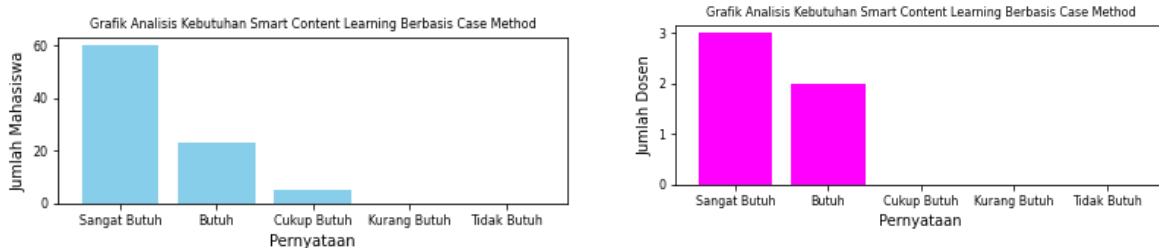
These phases include: 1) student analysis, content analysis, structure analysis, needs analysis, this includes setting developmental and learning goals in line with goals to be achieved.; 2) Design of learning content devices based on case methods, design of e-learning media, design of research tools in the form of e-learning, questionnaires for faculty responses and student responses, content verification tools, e-learning media verification tools, 3) development of intellectual learning contents and e-learning media/research tools based on the case method, 4) product implementation validated by faculty and student responses for practicality, and 5) the process of evaluating a product to draw conclusions, or modifying an entire product of case-method-based intellectual learning content, looking at the results of the product's effectiveness and practicality.

3. RESEARCH RESULT

Analysis

Researchers collected information in this area through initial observations, distribution of questionnaires and interviews with faculty members, and distribution of questionnaires to students. A needs analysis is conducted to gather information about the needs of students and teachers in the educational process, and is particularly relevant to exploring teaching materials (content) and business potential. Observations showed that when presenting lecture materials, especially when solving cases, students struggled to find solutions to solve the cases given by the lecturer.

This is due to the presentation of lecture material (content) does not provide attractiveness and interest for students to explore and find solutions in solving business cases that are still guided by the teaching materials provided by the class lecturer. Meanwhile, the Business Feasibility Study course requires students to be able to think creatively and try to extract bright ideas and ideas to be able to read business opportunities, and dare to take risks in various business cases. Another finding from the needs analysis is that the limited time allotted for the lecture process becomes an obstacle for instructors to explain lecture materials in detail. Therefore, innovation in the educational process is required to meet the learning needs of students and improve the educational effectiveness in feasibility study courses. Based on the needs analysis of students of the Accounting Education study program with 88 fourth semester students taking the Business Feasibility Study course and needs analysis of lecturers, it is carried out using a needs analysis instrument given to be assessed by lecturers and students on 15 statement items using a scale range from 1 to 5. Rating scale of 5 for material is needed, 4 material is needed, 3 material is quite needed, 2 material is less needed and 1 material is not needed. From the results of the analysis of the needs assessment instrument, the percentage of statements from lecturers and students towards 15 questions on the needs analysis instrument was obtained, as shown in figures 1 a and b.



(a)

(b)

FIGURE 2. Need Analysis SCL Base on Case Methode by Student and Lecturer

Based on fig 1 (a), the presentation of statements made by students stated that 68.18% said they needed it, 26.13% said they needed it, and 5.68% said they needed it. While fig 1 (b) shows that the presentation of statements made by lecturers stated that 60% said they needed it, and 40% said they needed it.

Design

The design phase includes instructional design, visual design, and technical design, as shown in the table 1.

TABEL 1. Development Design

Instructional Design	<ul style="list-style-type: none"> • Learning objectives, • Content structure, • Learning strategies, • Evaluation strategies, • Suitable media
Visual Design	<ul style="list-style-type: none"> • Designing a graphical user interface (GUI) • Define font, planning layout • Prepare technical designs by considering technical aspects • Testing a smart content prototype consisting

of all features and formats used in the designed smart content.

Technical Design

- Please select the appropriate file format,
- Media, technical tools and platforms with principles of accessibility, usability, adaptability, scalability, sustainability and interoperability

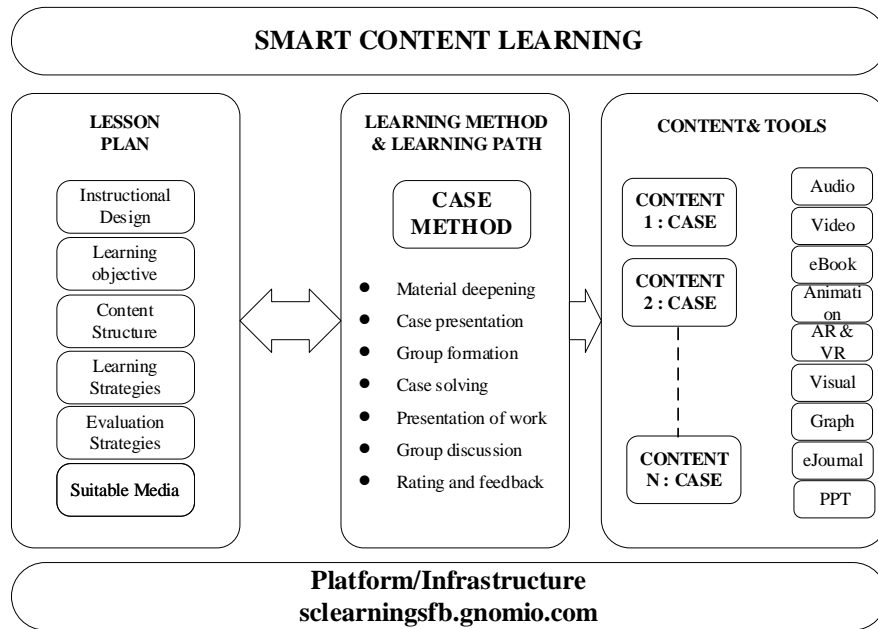


FIGURE 3. Design of Smart Content Learning Using Case Method

Development

The products developed in this phase are learning tools (RPP and case-method based content/teaching materials) and an e-learning platform as an implementation of intelligent content learning. :https://slarningskb.gnomio.com. E-learning capabilities include case study-based content tailored to the needs of educators and students in the learning process.

The products developed have been validated by experts according to their scientific fields. The results of expert validation of learning devices (smart content learning) and e-learning platforms. The validation results are carried out by reviewing the product in the form of lesson plans, materials (case method-based content), and e-learning platforms. The learning tools (RPP, material/content) were analyzed by two validators and the e-learning platform was analyzed by one expert validator. The results of the analysis from the experts showed the average score for each aspect that was validated. Table 2.

TABEL 2. Learning Device (RPS) validation results

Aspect	Average Score	Criteria
RPS comes with an identity	5	Strongly Valid
The learning objectives in the RPS are written clearly	4,2	Valid
Compatibility of RPS with syllabus	4	Valid
The order of material/content in RPS integrates the case method	4,5	Strongly Valid

RPS uses a case-based learning approach	5	Strongly Valid
The material was presented in the form of case studies	4	Valid
RPS equipped with evaluation activities	5	Strongly Valid
Average total score	4,6	Strongly Valid

As a result of the feasibility evaluation of the learner evaluated by experts, the total score of the average validity evaluation score of the learner is 4.6, which indicates a very reasonable standard. Note that experts/professionals agree that learning devices are the primary support for smart content media, case-based learning methods can be developed very well. Research on smart content learning to evaluate specific content in terms of purpose, content scope, content order, target audience, language, etc. The following statements regarding the above aspects are shown in Table 3.

TABEL 3. The results of the validation of smart content learning media

Aspect	Average Score	Criteria
The Content follows Curriculum / Learning Outcomes	4	Valid
Accurate content.	4,6	Strongly Valid
The content is up to date.	5	Strongly Valid
The depth of content is according to the needs of the learner.	4,3	Valid
The Content can be understood	4	Valid
Information is organized in a logical order.	4	Valid
The Content integrates real-life/real-international stories withinside the shape of case methods	4,8	Strongly Valid
Sort content accordingly.	5	Strongly Valid
The content material changed into supported with the aid of using applicable examples, illustrations, data, statistics, etc.	4,7	Strongly Valid
The content is free of prejudices such as language, caste, community, region, religion and gender.	4,8	Strongly Valid
Content-wise, relevant issues are discussed using case methods implemented in the form of case studies.	4,4	Valid
Average total score	4,5	Strongly Valid

The assessment results of the expertise on the basis of the aspects presented in Table 3 show that the average rating of the profession is 4.5 with very valid criteria. As such, expert opinion shows that it is possible to develop intelligent content learning media based on the case method.

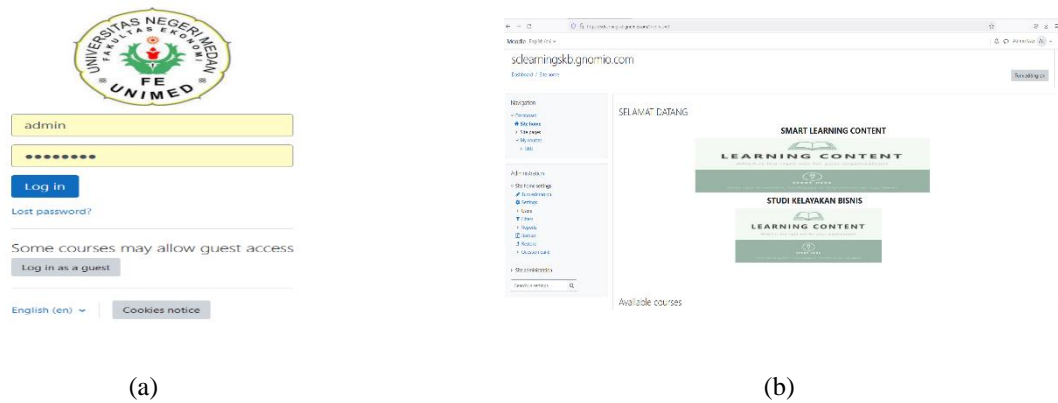


FIGURE 4 (a,b). Form Login and Dashboard Elearning Platform Moodlegnomio



FIGURE 5. (a,b) Content Material

Implementation

The practicality test of Smart content Learning (e-Content) media by lecturers related to case method-based smart content learning is declared Very Practical with a P (mean) value range of 4.2 to 5.0 or 84% to 100%. So that the media can be used as a learning component. While the results of the practicality test by students regarding smart content learning based on the case method were declared very valid with a range of P (mean) 4.62 to 5.0 or 92.38%, so that the media can be used as the main component of learning, especially for students in the business feasibility study course. After analyzing the responses of instructors and students, we found that the case-method-based smart content learning product developed in the feasibility study course can be used very well and practically.

Evaluation

This phase is a limited testing phase that uses the product development process to test the effectiveness of the product. To test this effect, a test tool was used as a document to determine the student's level of understanding in using the case-based intelligent learning material by conducting a pre-test, and check later. Pre- and post-test tests were conducted in control and experimental classes. Mean values for control and experimental classes are shown in the table 4.

TABEL 4. Mean values for the pre and post-test classes of the experiment and the control class

No	Description	Control Class Average	Experiment Class Average
1	Nilai Pre-Test	61,93	63,26
2	Nilai Post-Test	68,07	78,22

The results of the analysis show that there are differences in the results of the pre-test and post-test scores in each class as shown in figure graph 5.

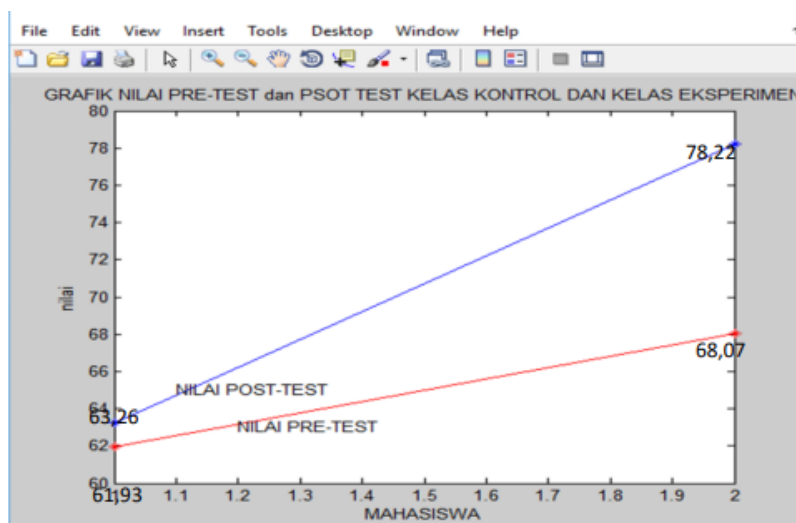


FIGURE 6. Differences in Pre-Test and Post-Test Results

The results of testing the effectiveness of intelligent content learning based on the case method were performed in the experimental class and the control class. The test results showed that the test scores before and after the test of each class, both in the control class and in the experimental class, increased. and there is a difference in the learning results that are tested after the test in the experimental class and the control class, specifically, the mean value of the control class is 68.07 and the mean value of the experimental class is 78.22. Therefore, case-based intelligent learning media research trials are effective in increasing learning efficiency in business feasibility studies courses. The results of the efficiency test are shown in Table 5.

TABEL 5. Results of Effectiveness Test.

No	Effectiveness Test	Average value	Average Difference
1	Control Class	61.93	68,07
2	Experiment Class	63,26	78,22

This research has yielded products in the form of learning tools (RPP and case study-based content/documentation) and an e-learning platform that supports the learning process according to student needs eligibility criteria. If all aspects of the evaluation meet the eligibility criteria, the developed vehicle is released for use [25]. Smart learning content based on the case method developed shows that the presentation of the Business Feasibility Study course material is presented in the form of a case study on the material/content. Student activities begin by viewing smart content application videos containing cases related to business feasibility study materials. Students examine and identify the content contained in the video and read several reference sources. Through smart content learning, students are trained to learn independently, The study was developed for e-learning for case-based business feasibility studies courses, where the learning content is presented on a mood-based e-learning platform accessible via [https:// sclarningskb.gnomio.com](https://sclarningskb.gnomio.com). E-learning includes learning content that combines text, images, videos, and animations as learning resources for students in Business Feasibility study course.

The results of the analysis of research tools show that teachers and students have positive responses to learning materials with intelligent content based on the case method through online learning platforms. A very good response indicates that the respondent likes to use it and is willing to participate in e-learning [26]. Research data also shows that students are comfortable following and understanding the learning material with a variety of scenarios presented in the learning content consistent with the business feasibility study course material. With case discoverers in learning materials, it can provide a sense of curiosity from students to look for ideas or ideas as solutions to existing problems. Increased collaborative skills, critical thinking, creative thinking, and high motivation are shown by students during the learning process, individually, student learning activities can improve their self-control by using interesting and creative content. This is in line with the findings of Strambi & Bouvet [27][28] found that students were able to independently control their learning activities. Through case studies, students expect direct feedback on materials and content to be teacher feedback in live learning. Students have more opportunities to interact and receive direct feedback that improves their learning and work performance. Intelligent learning content can offer distinct advantages by uniquely creating the right learning experience and analytical skills for each student at the right time.

The student survey toolkit results from this study also show that students put in more effort to complete

learning activities through learning activities when using case-based intelligent content learning methods. Good understanding and analysis of the problem. Using e-learning as a means of intelligently integrating learning content can promote students' independent learning with the case method presented in the learning material. Through the stages in the case method, students are faced with the problem of solving real-world cases that are not well structured, so students try to make solving these problems more well-structured. This is in line with the opinion [10] college students are required to increase and resolve issues collectively with their creativity and innovation. The role of students in learning this case method, students think critically in planning and making decisions. The role of the lecturer in case method learning is as a facilitator in charge of observing, asking questions, directing discussion, asking questions, and observing. The case method has the advantage of helping students to actively participate in the development of very high thinking skills. In addition, knowledge will be integrated based on the schemas that students hold, problems solved are directly related to real life, making learning more meaningful and helping students feel the benefits of learning.

4. CONCLUSION

This research produces media in the form of learning content packaged in a systematic system, namely smart content learning based on a case method that is integrated with e-learning media based on moodle gnome in the Business Feasibility Study course. Based on the research results, we can conclude that this product is categorized as valid, practical, and effective in enhancing the learning effectiveness of the Business Feasibility course. It is hoped that this research can be a reference and can contribute to the field of study as a whole. The development of case-based smart content learning media can facilitate lecturers and students in carrying out lectures optimally so that students can learn and solve problems, can think critically, think creatively, and work well with groups.

5. REFERENCES

- 1 V. Uskov *et al.*, Building *Smart Learning Analytics System for Smart University*. 2018. doi: 10.1007/978-3-319-59451-4_19.
- 2 Elena Shoikova, Roumen Nikolov, and Eugenia Kovatcheva, "Conceptualising of smart education - E+E Scientific Journal," *E+E*, vol. 52, no. 3-4, pp. 29-37, 2017, [Online]. Available: <https://epluse.ceec.bg/conceptualising-of-smart-education/>
- 3 S. H. Bariah, D. Rahadian, and D. Darmawan, "Smart content learning dengan menggunakan metode big data analysis pada mata kuliah media pembelajaran ilmu komputer," *J. Teknol. Pendidik. dan Pembelajaran*, vol. 2, no. Maret, pp. 222-233, 2017, [Online]. Available: <https://journal.institutpendidikan.ac.id/index.php/tekp/article/view/113>
- 4 T. Patel, A. Kapoor, C. Veer, S. Divya, and J. V. R. Raghuveer, "Smart Content Authoring System," no. April, pp. 267-270, 2017.
- 5 T. Kaewkiriya, "Design and Develop of En E-Learning Content Based on Multimedia Game," *Int. J. Softw. Eng. Appl.*, vol. 4, no. 6, pp. 61-69, 2013, doi: 10.5121/ijsea.2013.4606.
- 6 S.-Y. Ju, M.-H. Song, G.-A. Ryu, M. Kim, and K.-H. Yoo, "Design and Implementation of a Dynamic Educational Content Viewer with Big Data Analytics Functionality," *Int. J. Multimed. Ubiquitous Eng.*, vol. 9, pp. 73-84, Dec. 2014, doi: 10.14257/ijmue.2014.9.12.07.
- 7 F. Sulianta, Sapriya, N. Supriatna, and Disman, "Digital content model framework based on social studies education," *Int. J. High. Educ.*, vol. 8, no. 5, pp. 214-220, 2019, doi: 10.5430/ijhe.v8n5p214.
- 8 M. Y. Idris, D. Stiawan, N. M. Habibullah, A. H. Fikri, M. R. A. Rahim, and M. Dasuki, "IoT smart device for e-learning content sharing on hybrid cloud environment," *Int. Conf. Electr. Eng. Comput. Sci. Informatics*, vol. 2017-Decem, no. September, pp. 19-21, 2017, doi: 10.1109/EECSI.2017.8239078.
- 9 T. T. Lee, A. M. Sharif, and N. A. Rahim, "Designing e-content for teaching basic chemistry concepts in higher education: A needs analysis," *J. Turkish Sci. Educ.*, vol. 15, no. 4, pp. 65-78, 2018, doi: 10.12973/tused.10246a).
- 10 E. P. Harahap, H. Yusra, U. Jambi, and O. Investigasi, "Implementasi Pembelajaran Case Method Melalui

- Observasi-Investigasi Sebagai Pengembangan,” vol. 4, no. 1, pp. 26–34, 2022.
- 11 S. Vahlepi and F. W. Tersta, “Implementasi Model Pembelajaran berbasis Case Method dan Project Based Learning dalam rangka mengakomodir Higher Order Thinking Skill mahasiswa dalam Mata Kuliah Psikologi Pendidikan Bahasa Arab di Masa Pandemi,” *J. Pendidik. Tabusai*, vol. 5, no. 3, pp. 10153–10159, 2021.
 - 12 C. T. Rosidah and P. Pramulia, “Team Based Project dan Case Method Sebagai Strategi Pengembangan Keterampilan Mengembangkan Pembelajaran Mahasiswa,” *MENDIDIK J. Kaji. Pendidik. Dan Pengajaran*, vol. 7, no. 2, pp. 245–251, 2021, doi: 10.30653/003.202172.196.
 - 13 S. Syam, “Penerapan Case Method Dalam Meningkatkan Hasil Belajar Mahasiswa,” vol. 8, no. 2, pp. 1397–1401, 2022, doi: 10.36312/jime.v8i2.3127/http.
 - 14 E. Schröter and M. Röber, “Understanding the case method: Teaching public administration case by case,” *Teach. Public Adm.*, vol. 40, no. 2, pp. 258–275, 2022, doi: 10.1177/01447394211051883.
 - 15 B. Vijaykumar and B. Kinjal, “Smart People-Smart Content -A New Trend of Education,” no. 1, pp. 48–55, 2017.
 - 16 A. Zerfass and B. Hartmann, “The usability factor: Improving the quality of E-Content,” *E-Content Technol. Perspect. Eur. Mark.*, pp. 165–182, 2005, doi: 10.1007/3-540-26387-X_9.
 - 17 F. Bate, I. Robertson, and L. Smart, “Exploring Educational Design :”.
 - 18 A. Nagy, “The Impact of E-Learning,” in *E-Content: Technologies and Perspectives for the European Market*, 2005, pp. 79–96. doi: 10.1007/3-540-26387-X_4.
 - 19 M. Rodríguez-Artacho and M. F. Verdejo, “High Level Design of Web-Based Environments for Distance Education,” *Comput. Educ. 21st Century*, pp. 275–285, 2005, doi: 10.1007/0-306-47532-4_25.
 - 20 T. Caswell, S. Henson, M. Jensen, and D. Wiley, “Open educational resources: Enabling universal education,” *Int. Rev. Res. Open Distance Learn.*, vol. 9, no. 1, pp. 1–11, 2008.
 - 21 Kinshuk, N.-S. Chen, I.-L. Cheng, and S. W. Chew, “Evolution Is not enough: Revolutionizing Current Learning Environments to Smart Learning Environments,” *Int. J. Artif. Intell. Educ.*, vol. 26, no. 2, pp. 561–581, 2016, doi: 10.1007/s40593-016-0108-x.
 - 22 C. Herreid, “Using {Case} {Studies} to {Teach} {Science},” *Handb. Coll. Sci. Teach.*, pp. 177–186, 2006, [Online]. Available: <https://eric.ed.gov/?id=ED485982>
 - 23 Z.-- Shibaura, “Akihiro Shibata NEC Corporation erience Sharing Case-Method Cycle Kitano,” pp. 303–308, 1993.
 - 24 A. K. N. Hess and K. Greer, “Designing for engagement: Using the ADDIE model to integrate high-impact practices into an online information literacy course,” *Commun. Inf. Lit.*, vol. 10, no. 2, pp. 264–282, 2016, doi: 10.15760/comminfolit.2016.10.2.27.
 - 25 Y. Hala, “Pengembangan Perangkat Pembelajaran Biologi Berbasis Pendekatan Saintifik Pada Konsep Ekosistem Bagi Siswa Sekolah Menengah Pertama,” *J. Educ. Sci. Technol.*, vol. 1, no. 3, pp. 85–96, 2015, doi: 10.26858/est.v1i3.1825.
 - 26 V. Nedeva, “the Possibilities of E-Learning, Based on Moodle Software Platform,” *Trakia J. Sci.*, vol. 3, no. 37, pp. 12–19, 2005, [Online]. Available: <http://www.uni-sz.bg>
 - 27 A. Strambi and E. Bouvet, “Flexibility and interaction at a distance: A mixed-mode environment for language learning,” *Lang. Learn. Technol.*, vol. 7, no. 3, pp. 81–102, 2003.
 - 28 G. Schraw, “The use of computer-based environments for understanding and improving self-regulation,” *Metacognition Learn.*, vol. 2, no. 2, pp. 169–176, 2007, doi: 10.1007/s11409-007-9015-8.