

Development and Implementation of an Interactive, Project-Based Business Model Canvas (BMC) Learning Medium for the Digital Entrepreneurship Course

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KEYWORDS	ABSTRACT
Keywords: <i>Business Model Canvas; SMART BMC; digital entrepreneurship; project-based learning; learning media.</i> Conflict of Interest Statement: The author(s) declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest. Copyright ©2026 Vifada Journal of Education. All rights reserved	Purpose: This study aims to develop SMART BMC, an interactive, project-based <i>Business Model Canvas</i> learning medium for the Digital Entrepreneurship course. Research Design and Methodology: The study employed a <i>Research and Development</i> approach by adapting the ADDIE model. The first-year research covered the <i>Analysis, Design, and Development</i> stages. Data were collected through syllabus review, classroom observations, and a needs assessment questionnaire administered to 98 students and were analyzed descriptively. Findings and Discussion: The results revealed that 94.9% of students required a learning medium to validate their business ideas before completing the BMC, while 93.9% needed a medium that connected theoretical concepts with real-world business practices. In response, SMART BMC was developed by integrating card-based BMC activities, project scenarios, QR codes, and scoring and feedback mechanisms across the nine BMC elements. These features transform the conventional static BMC into an interactive medium that supports business model evaluation and improvement. Implications: SMART BMC has the potential to strengthen project-based digital entrepreneurship learning. Further implementation and effectiveness testing are required to assess its impact on students' digital entrepreneurship competencies.

1. Introduction

The *Business Model Canvas* (BMC) is widely used in entrepreneurship education because it helps students understand a business model concisely through nine interconnected elements. Several studies have shown that BMC can help students understand business planning and improve learning outcomes in entrepreneurship education. Hutasuhut et al., (2020), for example, found that the use of BMC in learning resulted in better learning outcomes than those achieved in the control group. Other studies have also shown that BMC can be used to develop students' *entrepreneurial mindset* through more practical learning activities.

Nevertheless, the use of BMC in learning has not fully addressed students needs when developing and improving their business models. In practice, BMC is often used primarily to complete the nine elements and produce an overview of a business model, while the processes of examining relationships among elements, assessing the feasibility of ideas, and improving the model gradually have received limited support. Entrepreneurship education is increasingly directed toward active and experiential learning so that students not only understand concepts but are also able to apply them in real-world situations (Amalia & von Korflesch, 2021).

This condition creates an opportunity to develop BMC as a learning medium that goes beyond business model mapping and supports students in evaluating and improving their models. BMC has also been applied as a learning tool to help students develop business planning competencies and apply business modeling concepts in practical contexts (Holdford et al., 2022; Widyastuti et al., 2024). This need is particularly relevant in the Digital Entrepreneurship course. In this course, BMC is not only used to introduce the concept of business models but is also related to business planning, understanding the relationships among elements, and evaluating and improving business models. The mapping of the course syllabus (RPS) in this study indicates that these abilities form part of the intended learning outcomes.

To support these learning outcomes, BMC needs to be incorporated into a learning process that allows students to develop, test, evaluate, and improve their business models. The *Project-Based Learning* (PjBL) approach is relevant to this need because it engages students in project activities that involve the development of business ideas, products, or solutions through practical learning experiences (Hayati, 2022; Santoso et al., 2023). In this study, PjBL is integrated with BMC within the context of digital entrepreneurship so that business model development does not end with a final product but becomes part of a gradual learning process. The study employs a *Research and Development* (R&D) approach by adapting the ADDIE model, with the first year focusing on needs analysis, design, and media development.

These needs were subsequently explored through an analysis involving students who had previously used BMC in the Digital Entrepreneurship course. A total of 98 students participated in the needs analysis, and all had experience creating BMCs, including using Canva. Nevertheless, they still required support in understanding the relationships among elements, evaluating their business models, and making improvements. Specifically, 94.9% of the students needed a medium to help validate their business ideas before completing the BMC, while 93.9% needed a medium that connects theory with real business practices.

These findings indicate that students need more than a medium that simply assists them in completing the BMC. They require guidance throughout the development process and information to help evaluate their results. These needs were subsequently translated into the design of SMART BMC. The medium retains the nine BMC elements while incorporating guiding questions, information from preceding elements, *combination rules*, and *scoring* and *feedback* mechanisms. A dashboard is also provided to display a summary of the elements, scores or status, and the progress of business model development.

Based on this process, the study focuses on developing SMART BMC as an interactive, project-based learning medium for the Digital Entrepreneurship course. This article discusses the results of the student needs analysis, the translation of these needs into design decisions, and the SMART BMC prototype developed during the first year of the study. As the product remains at the development stage, its effectiveness in improving students' entrepreneurial competencies cannot yet be determined. Validation and effectiveness testing remain part of the subsequent stages of the research. Accordingly, the scientific contribution of this article lies in developing BMC from a business model mapping tool into a learning medium that supports students in developing, evaluating, and improving their business models gradually. The first-year development results also provide a basis for the validation, implementation, and effectiveness testing of SMART BMC in the second year.

2. Research Design and Methodology

Research Design and Development Approach

This study employs a *Research and Development* (R&D) approach using an adapted ADDIE model (*Analysis, Design, Development, Implementation, and Evaluation*) to develop an interactive, project-based *Business Model Canvas* (BMC) learning medium for the Digital Entrepreneurship course. Conducted over two years, the first year focuses on *Analysis, Design, and Development*, including needs analysis, RPS-based material mapping, media design, prototype development, validation, and refinement, while *Implementation* and *Evaluation* are planned for the second year. The resulting

SMART BMC prototype incorporates the nine BMC elements, a guided completion flow, *scoring*, *feedback*, and a dashboard.

Research Setting, Participants, and Data Sources

The study was conducted at the Faculty of Economics and Business, Universitas Negeri Jakarta, involving students who were taking or had taken the Digital Entrepreneurship course. The first-year study was conducted over 12 months in 2026, with a needs analysis questionnaire administered to 98 students on June 11-19, 2026. Primary data were collected through needs assessment questionnaires, observations, interviews, and Focus Group Discussions (FGD), while secondary data were obtained from the course syllabus (RPS) and learning outcomes. These data were used to align the BMC learning content with students' needs and the features developed in SMART BMC.

Data Collection and Research Instruments

Data collection in the first year was conducted using several complementary techniques. The techniques and instruments used were as follows:

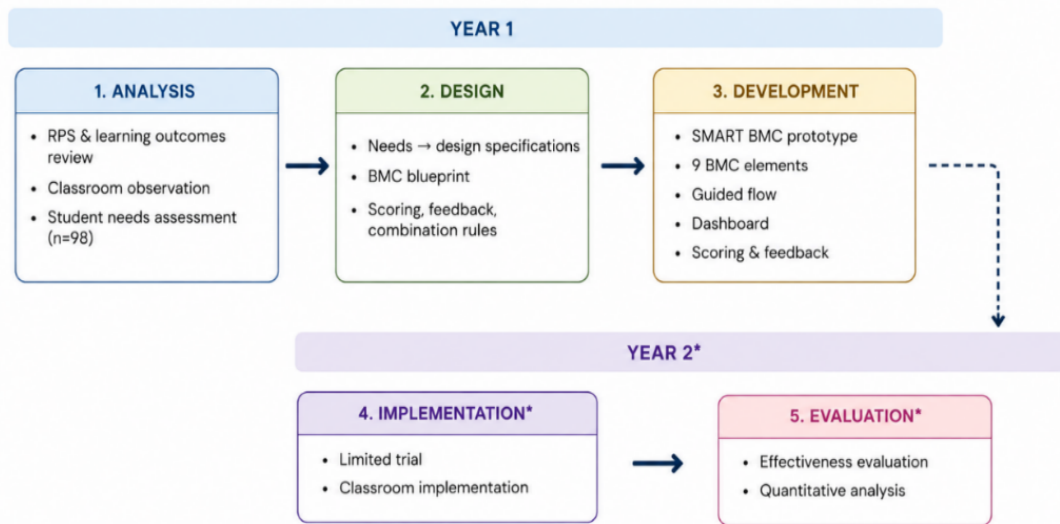
1. Document Review, the RPS and learning outcomes of the Digital Entrepreneurship course were reviewed to identify relevant BMC learning content and ensure its alignment with the learning medium being developed. The instrument used was a document review guideline.
2. Classroom Observation, were conducted to identify the learning process, particularly students' use of BMC and their activities in developing business models. The instrument used was an observation guideline.
3. Needs Assessment Questionnaire, a questionnaire was administered to 98 students to identify their experience in using BMC, learning media needs, and the support required to develop and validate business ideas. The instrument used was a learning needs assessment questionnaire.
4. Interviews and Focus Group Discussion (FGD), interviews and FGD were conducted during the product development process to obtain input regarding the content, usability, and features of the proposed SMART BMC. The instruments used were interview and FGD guidelines.
5. Expert Validation, for subject matter and media experts were prepared to assess the content and design of SMART BMC before the product proceeds to limited testing. The validation instruments consisted of expert assessment sheets.
6. Limited Trial, was planned with a small group of students to examine the comprehensibility, ease of use, and initial responses to the developed BMC learning medium. The results were intended to serve as a basis for product revision.

Data Analysis and Research Procedures

Data were analyzed according to each research stage. In the first year, quantitative data from the needs assessment questionnaire were analyzed descriptively, while qualitative data from observations, interviews, and FGD were analyzed thematically to inform the SMART BMC design and refinement. In the second year, quantitative analysis using Structural Equation Modeling-Partial Least Squares (SEM-PLS) is planned to examine the effectiveness of the media.

The research procedure follows the adapted ADDIE model and is structured into two stages over a two-year period. The first year covers *Analysis*, *Design*, and *Development* to establish the needs, design specifications, and SMART BMC prototype, while *Implementation* and *Evaluation* are planned for the second year. The overall research procedure is presented in the following figure.

Figure 1. Research Procedure Based on the Adapted ADDIE Model



3. Findings and Discussion

3.1. Findings

Curriculum Mapping as the Basis for Product Development

The results of the RPS mapping for the Digital Entrepreneurship course show that BMC is an important part of achieving students' competencies, particularly in designing, analyzing, and evaluating digital business models. The BMC-related content includes an introduction to the concept, development of the nine BMC elements, analysis of the relationships among elements, and evaluation and improvement of the business model. This mapping was then used as a basis for determining the content and features of SMART BMC to align with the learning needs.

Table 1. Curriculum Mapping as the Basis for SMART BMC Development

No	BMC Learning Content	Learning Competency
1	Introduction to <i>Business Model Canvas</i> (BMC)	Students understand the concept, functions, and structure of BMC.
2	Nine BMC Elements	Students are able to develop the nine BMC elements according to the business model being developed.
3	Relationships Among BMC Elements	Students are able to analyze the relationships and consistency among the elements within the business model.
4	BMC Evaluation and Improvement	Students are able to evaluate the business model, understand <i>feedback</i> , and improve the BMC they have developed.

Student Needs for BMC Learning Media

A needs analysis was conducted involving 98 students who had taken the Digital Entrepreneurship course. The results showed that all respondents had experience in creating BMC, including using Canva. However, students still needed support in developing and evaluating their business models, particularly in validating business ideas and connecting the concepts learned with real business practices. The needs analysis findings based on the aspects examined are presented in the following table.

Table 2. Student Needs Analysis Findings

No	Aspects Analyzed	Needs Analysis Findings
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1	Experience in Using BMC	All 98 students had experience creating BMC, including using Canva.
2	Relationships Among BMC Elements	Students still needed support in understanding the relationships among BMC components.
3	Business Idea Validation	94.9% of students needed media that could help validate their business ideas before completing the BMC.
4	Connection Between Theory and Practice	93.9% of students needed media that could connect the concepts learned with real business practices.
5	Evaluation and Improvement	Students needed support to evaluate and improve the business models they had developed.
6	Step-by-Step Learning	Students needed media that could guide them through the BMC development process step by step.

Blueprint Derivation from the Analysis Results

Based on the student needs analysis and the BMC curriculum mapping in the RPS, the identified needs were translated into design decisions for SMART BMC. These decisions cover the BMC development flow, guidance for each element, relationships among elements, scoring and feedback mechanisms, and features that support business model evaluation and improvement. The relationship between the identified needs, design decisions, and their rationale is presented in the following table.

Table 3. Translation of Needs into SMART BMC Design Decisions

No	Needs Specification	Design Decision	Rationale
1	Guidance in developing BMC	Provide guiding questions and answer options for each BMC element.	Guide students in developing their business model.
2	Understanding relationships among BMC elements	Display information from previous elements and apply <i>combination rules</i> .	Help maintain connections and consistency among elements.
3	Business model validation	Apply <i>scoring</i> to each BMC element based on responses and answer combinations.	Indicate the quality of each component and areas for improvement.
4	Feedback on BMC results	Provide automatic <i>feedback</i> based on scores, responses, and quality status.	Help students identify aspects that need improvement.
5	BMC evaluation and improvement	Provide a dashboard showing the nine BMC elements, scores/status, and completion progress.	Help students and lecturers monitor progress and identify areas for improvement.

SMART BMC Design and Prototype

Based on the curriculum mapping and student needs analysis, an interactive learning media called SMART BMC was developed. The prototype retains the nine main BMC elements and adds guiding questions, a scoring mechanism, automatic feedback, and a dashboard to monitor the development of each element. The SMART BMC menu structure is presented in Figure 2.

Figure 2. SMART BMC Menu Design

DASHBOARD

PROFIL

1. CUSTOMER SEGMENT

2. VALUE PROPOSITION

3. CHANNELS

4. CUSTOMER RELATIONSHIP

5. REVENUE STREAM

6. KEY RESOURCES

7. KEY ACTIVITIES

8. KEY PARTNERS

9. COST STRUCTURE

Each BMC element is completed through a series of wizard-based questions with predefined answer options. The system then calculates the score for the respective element and provides automatic feedback in the form of strengths, areas needing improvement, potential risks, recommendations, and reflection questions. An example of the Customer Segment section and its automatic feedback is shown in Figure 3.

Figure 3. Example of Customer Segment Input and Automatic Feedback

<< Back to Menu

No	Pertanyaan	Jawaban
	Kategori Usaha	Fashion
1	Siapa target pelanggan utama?	Karyawan
2	Berapa rentang usia pelanggan?	35–49 tahun
3	Di mana lokasi pelanggan?	3/3 VALID
	Sekitar lokasi usaha	Y
	Dalam kota	Y
	Luar kota	
	Nasional	
	Online	Y
4	Berapa kisaran pendapatan pelanggan?	5–10 juta
5	Bagaimana gaya hidup pelanggan?	3/3 VALID
	Praktis	
	Hemat	Y
	Peduli kualitas	
	Mengikuti tren	Y
	Peduli kesehatan	
	Digital aktif	Y
6	Seberapa sering membeli produk/jasa sejenis?	Bulanan
7	Apa kebutuhan utama pelanggan?	3/3 VALID
	Harga terjangkau	Y
	Mudah diperoleh	
	Praktis	Y
	Berkualitas	Y
	Cepat	
	Nyaman	Y
8	Apa masalah utama (Pain Point) pelanggan?	3/3 VALID
	Harga terlalu mahal	Y
	Sulit memperoleh produk/jasa	
	Kualitas belum memuaskan	Y
	Pelayanan kurang baik	
	Tidak praktis	
	Kurang sesuai kebutuhan	Y
	Pilihan metode pembayaran terbatas	
9	Gaya fashion yang disukai?	3/3 VALID
	Casual	Y
	Formal	
	Sport	Y
	Muslim	
	Streetwear	Y
10	Media mencari referensi fashion?	3/3 VALID
	Instagram	Y
	TikTok	Y
	Marketplace	
	Influencer	
	Website	Y

CUSTOMER SEGMENT READINESS

Score: 75% - Cukup. Batas blok: 70% (prototype)

FEEDBACK – CUSTOMER SEGMENT

✓ STRENGTH

Target pelanggan sudah teridentifikasi, tetapi masih perlu dipertajam.

⚠ NEED IMPROVEMENT

Prioritaskan kebutuhan pelanggan yang paling penting.

• POTENTIAL RISK

Perjelas pain point yang paling kuat dan relevan.

↓ RECOMMENDATION

Validasi kesesuaian segmen dengan kondisi pasar.

? REFLECTION QUESTION

Validasi segmentasi dengan calon pelanggan.

REKOMENDASI UMUM

Pertahankan segmentasi yang sudah cukup kuat.

Prioritaskan kebutuhan yang paling penting.

Validasi pain point dengan calon pelanggan.

Validasi kesesuaian daya beli dengan harga.

After all nine BMC elements have been completed, the system displays a summary dashboard containing project information, the score for each element, quality status, such as “Strong,” “Moderate,” or “Needs Improvement,” and the overall completion progress. The dashboard is shown in Figure 4.

Figure 4. SMART BMC Dashboard After Completing All Elements

◀ Back to Menu

SMART BMC

INFORMASI PROYEK											
1. CUSTOMER SEGMENT		2. VALUE PROPOSITION		3. CHANNELS		4. CUSTOMER RELATIONSHIP		5. REVENUE STREAM			
1. Judul Usaha Judul Usaha		Target: Karyawan Usia: 35-49 tahun Lokasi: Sekitar lokasi usaha, Dalam kota, Online Pendapatan: 5-10 juta Lifestyle: Hemat, Mengikuti tren, Digital aktif Kecif: Harga terjangkau, Berkualitas, Nyaman		Menawarkan Materi ringkas kepada Karyawan yang membutuhkan Harga terjangkau, Berkualitas, Nyaman. Nilai yang diberikan: Lebih memahami materi; Meningkatkan keterampilan. Keunggulannya adalah Pendampingan lebih personal; Jadwal lebih fleksibel; Latihan dan umpan balik lebih lengkap.		Promosi produk dapat ditemui di Instagram, TikTok, WhatsApp. Pemesanan bisa melalui DM Instagram, Live shopping, Datang langsung. Customer dapat membeli/mendapatkan produk melalui Kurir instan, Toko fisik, Marketplace		Tujuan: Membangun kepercayaan. Bentuk hubungan: Self-service, Automated service. Personalisasi: Pesan sesuai kebutuhan, Penawaran personal, Jadwal fleksibel. Dukungan: FAQ, Live chat, Penanganan komplain. Retensi: Membership, Promo pembelian ulang, Reminder pembelian/penggunaan.		Pendapatan dari Pelanggan akhir dengan model Penjualan satu kali dan Customisasi. Pembayaran Bayar saat checkout via QRIS, Transfer bank, Cash/COD; pendapatan berulang: Repeat purchase, Membership/loyalty, Retainer/kontrak; tambahan: Add-on/produk tambahan, Paket/bundling. Kesesuaian harga: Cukup sesuai; kekuatan model: Cukup kuat.	
2. Kategori Usaha Fashion		3. Nama Kelompok		Nama Kelompok		4. Anggota Kelompok		1. Mahasiswa		2. Mahasiswa	
3. Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
4. Anggota Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
1. Mahasiswa		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
2. Mahasiswa		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
3. Mahasiswa		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
4. Mahasiswa		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
5. Mahasiswa		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
6. Mahasiswa		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
7. Mahasiswa		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
8. Mahasiswa		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
9. Tanggal		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
09 August 2026		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
7. PROGRES PENYELESAIAN		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
89%		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
81.21%		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
53.08%		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
37.69%		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	
78.46%		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok		Nama Kelompok	

In the example shown in Figure 3, the fashion business case has completed all nine BMC elements. Value Proposition and Revenue Stream received the highest scores, at 90.48% and 86.97%, respectively, with both categorized as “Very Strong.” In contrast, Key Partners received a score of 37.69% and was categorized as “Needs Revision,” while Key Activities scored 53.08% and was categorized as “Needs Improvement.” The overall project completion progress was 89%.

3.2. Discussion

The finding that all students had prior experience in developing BMC, but still needed media to validate their business ideas and evaluate the models they developed, indicates that BMC learning should go beyond the ability to complete its nine elements. Gifford, (2021) emphasizes that BMC can be used in entrepreneurship education not only to represent a business model but also to formulate and test assumptions and examine the relationships between its different blocks. In line with this, the finding that 94.9% of students needed media to validate their business ideas became the basis for developing SMART BMC with *scoring* and *feedback* mechanisms for each element. These features are designed to help students not only develop their BMC but also identify which parts are already strong and which still need improvement.

The need to evaluate the business model is increasingly relevant because 93.9% of students also need media that can connect theory with real business practice. This finding indicates that experience in developing a BMC does not automatically enable students to apply each component within the context of the business they are developing. Aysi et al., (2024) showed that digital entrepreneurship learning in higher education needs to be supported by approaches that connect knowledge with practical experience. This is in line with Hutasuht et al., (2020), who found that learning using BMC can support students’ entrepreneurial learning outcomes. Based on these findings and the results of the RPS mapping, the need to connect theory and practice was translated into the design of SMART BMC through project scenarios, guiding questions, and a digital entrepreneurship context that supports the process of developing, evaluating, and improving business models.

The connection between the need for validation and practice was subsequently realized through the *Project-Based Learning* (PjBL) approach in the design of SMART BMC. This approach provides students with opportunities to apply the concepts they have learned through the direct development of a business model. Crespi et al., (2022) showed that project-oriented learning can support the development of entrepreneurial competencies, such as planning, collaboration, communication, and achievement orientation. Similar findings were also reported by Zhai & Chen, (2024), who found that the implementation of PjBL in entrepreneurship learning can support the development of students’ competencies in identifying opportunities, managing businesses, and collaborating. Based on these findings, SMART BMC was designed through guiding questions for each element, the use of information from previous elements and *combination rules* to maintain the relationships among elements, as well

as *scoring* and *feedback* to support evaluation. This design follows the results of the needs analysis and the research *blueprint* to enable students to develop, understand the relationships among, evaluate, and improve their business models gradually.

The series of findings and design decisions indicates that the achievements of the first year have established a foundation for the development of SMART BMC within the *Analysis*, *Design*, and *Development* stages of the ADDIE model. These stages produced needs analysis data from 98 students, a design *blueprint*, and a SMART BMC prototype comprising the nine BMC elements, a dashboard, and *scoring* and *feedback* mechanisms. However, these results cannot yet be used to assess the quality or effectiveness of the media, as expert validation, product revision, and limited trials are still the next stages to be conducted. This is consistent with the characteristics of ADDIE, which place the development and implementation processes as sequential stages. Thus, the main contribution of the first stage lies in establishing the needs, design, and prototype as a foundation to help students develop, validate, evaluate, and improve their business models. The effectiveness of SMART BMC on the learning process and outcomes will be tested during the *Implementation* and *Evaluation* stages in the second year, in accordance with the research design.

4. Conclusion

The first-year research findings show that although all students had prior experience in developing the Business Model Canvas (BMC), 94.9% and 93.9% of the 98 respondents still needed a learning medium to validate business ideas and connect theory with real-world practice. These findings became the basis for developing SMART BMC, an interactive, project-based BMC learning medium that retains the nine BMC elements and incorporates guiding questions, *combination rules*, *scoring*, automatic *feedback*, and a dashboard. The prototype has reached the *Analysis*, *Design*, and *Development* stages of the ADDIE model, with an estimated achievement of 70% of the first-year research target, covering the needs analysis, design *blueprint*, and product prototype. The scientific article publication and the proposed Intellectual Property Rights (IPR) document are still in progress.

Based on this development, BMC no longer functions merely as a worksheet for mapping a business model, but also as a medium that supports students in developing, evaluating, and improving their business models gradually through project-based learning. This approach can be considered in the development of Digital Entrepreneurship learning and similar courses, particularly to train students to make decisions based on feedback. The SMART BMC development model can also be replicated or adapted to suit the learning contexts of other higher education institutions.

At this stage, the effectiveness of SMART BMC cannot yet be concluded because the *scoring* weights, answer combination rules, and quality of the *feedback* are still part of the initial prototype and have not yet undergone expert validation. The data also come from only one higher education institution and one course, so the findings should be generalized with caution. The second year will include expert validation, product revision, limited trials, and implementation in experimental and comparison classes to quantitatively examine its effectiveness using SEM-PLS. The scope of the research subjects will also be expanded to test the applicability of the model in broader contexts.

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Statement on the Use of Generative Artificial Intelligence(AI)

During the preparation of this manuscript, the authors used generative artificial intelligence (AI) tools solely to support the scientific writing process. Specifically, Grammarly was used to improve grammar, language quality, readability, and writing clarity. The AI tools were not used to generate research ideas, analyze data, interpret findings, or draw scientific conclusions. All study design, data collection, analysis, interpretation of results, and conclusions were conducted and verified entirely by the authors. The authors take full responsibility for the accuracy, integrity, and originality of the content presented in this manuscript.

References :

- Amalia, Ria Tristya, and Harald F. O. von Korflesch. "Entrepreneurship Education in Indonesian Higher Education: Mapping Literature from the Country's Perspective." *Entrepreneurship Education* 4 (2021): 291-333. <https://doi.org/10.1007/s41959-021-00053-9>.
- Aysi, Siti Aenandari Hadatul, Susilaningsih, and Muhammad Sabandi. "The Implementation of Digital Entrepreneurship Learning in Higher Education: A Systematic Literature Review." *Pedagogia: Jurnal Pendidikan* 13, no. 2 (2024): 255-273. <https://doi.org/10.21070/pedagogia.v13i2.1692>.
- Crespí, Paula, Marián Queiruga-Dios, and Araceli Queiruga-Dios. "The Challenge of Developing Entrepreneurial Competence in the University Using the Project-Oriented Learning Methodology." *Frontiers in Psychology* 13 (2022): 966064. <https://doi.org/10.3389/fpsyg.2022.966064>.
- Gifford, Ethan. "Theory-Driven Methods for Practical Entrepreneurship: Hypothesis Testing in Entrepreneurship Education." *Industry and Higher Education* 35, no. 4 (2021): 497-504. <https://doi.org/10.1177/09504222211021761>.
- Hayati, Keumala. "Project-Based Learning in Teaching Entrepreneurship: A Review of the Literature." In *Proceedings of the 4th International Conference of Economics, Business, and Entrepreneurship (ICEBE 2021)*. EAI, 2022. <https://doi.org/10.4108/eai.7-10-2021.2316244>
- Holdford, David A., et al. "Using the Business Model Canvas to Guide Doctor of Pharmacy Students in Building Business Plans." *American Journal of Pharmaceutical Education* 86 (2022). <https://doi.org/10.5688/ajpe8628>.
- Hutasuhut, Saidun, Irwansyah, Agus Rahmadsyah, and Reza Aditia. "Impact of Business Models Canvas Learning on Improving Learning Achievement and Entrepreneurial Intention." *Cakrawala Pendidikan* 39, no. 1 (2020): 168-182. <https://doi.org/10.21831/cp.v39i1.28308>.
- Santoso, R. Tri Priyono Budi, Sony Heru Priyanto, I. Wayan Ruspindi Junaedi, Donald Samuel Slamet Santoso, and Lasmono Tri Sunaryanto. "Project-Based Entrepreneurial Learning (PBEL): A Blended Model for Startup Creations at Higher Education Institutions." *Journal of Innovation and Entrepreneurship* 12 (2023): 18. <https://doi.org/10.1186/s13731-023-00276-1>
- Widyastuti, U., E. Maulida, P. Yuniarti, F. D. Lestari, E. Gurendrawati, D. Dara, and I. Ulupui. "Business Model Canvas (BMC) Training to Support the Strengthening of Student Entrepreneurship." *Jurnal Pemberdayaan Masyarakat Madani (JPMM)* 8, no. 1 (2024): 71-84. <https://doi.org/10.21009/JPMM.008.1.06>.
- Zhai, Xue, and Pei Chen. "Developing College Students' Entrepreneurial Competences: Designing Project-Based Learning Entrepreneurship Foundational Course in Chinese Universities." *Journal of Curriculum and Teaching* 13, no. 4 (2024): 159-169. <https://doi.org/10.5430/jct.v13n4p159>.