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Agency-in-a-Box: Implications of Full-Stack Ai Agents for VCD Education Strategy

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ABSTRACT
Rapid development of artificial intelligence (AI) has shifted from passive, single-prompt-based generative models toward autonomous AI agent ecosystems (agentic AI). "Agency-in-a-Box" phenomenon illustrates the capability of full-stack AI agents, utilizing Large Language Models (LLMs) such Claude AI as workflow orchestrators via Application Programming Interfaces (APIs), analyze raw briefs, formulate visual strategies, and invoke external generative modules in an integrated manner. This potential disintermediation within the creative agency value chain poses serious challenges to Visual Communication Design (VCD) curricula that focus on technical instrument mastery. This qualitative research employs exploratory case study approach scenario study and curriculum gap analysis based, alongside structured interviews. Simulation result and interviews demonstrate that AI agents capable of accelerating brief synthesis and multimodal visual draft generation without significant conceptual degradation, critical human boundaries domain contextual empathy, local cultural semiotics, and ethical accountability. Result recommends reconstructing VCD curriculum based on: Meta-Design, Cultural Strategy, and Ethical AI Auditing.

KEYWORDS
Agency-in-a-Box, Full-Stack AI Agent, Meta-Design, Ethical AI Auditor, Visual Communication Design Curriculum

Introduction

The creative industry landscape is undergoing a paradigm shift from passive Generative AI usage toward autonomous Agentic AI. In the initial phase, artificial intelligence functioned as an isolated instrument requiring repeated manual prompting for a single media type, such as text-to-image or text-to-text. However, the development of the agentic AI ecosystem now enables advanced LLMs to act as full-stack agents or primary workflow orchestrators [1]. Within the "Agency-in-a-Box" framework, artificial intelligence agents can process unstructured client briefs, analyze communication strategies, formulate art direction, and invoke various specific

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execution modules across image, video, audio, and interactive code through Application Programming Interface (API) integration with minimal human operational intervention.

This technological advancement triggers a gap with current higher education VCD curricula. Most university VCD curricula still place dominant weight on technical visual instrument mastery (software mastery) and manual media asset creation [2]. As most technical executive workflows are potentially automated end-to-end by AI agent systems, universities risk producing graduate competencies that are less relevant to the dynamics and needs of the future creative industry.

This misalignment demands a fundamental evaluation of VCD higher education strategies. If the main benchmark for graduate competency remains grounded solely in technical visual execution proficiency, the value proposition of VCD graduates in the job market may suffer devaluation [3]. Therefore, a redefinition of Graduate Learning Outcomes is required, shifting from mere visual content producers to advanced designers who master system architecture, visual strategy, and artificial intelligence ethics.

Based on this background, this study formulates the main question: How can a VCD curriculum framework based on Meta-Design, cultural semiotics, and AI system architecture be formulated to respond to the disruption of the Agency-in-a-Box model [4]. This investigation aims to map pedagogical engineering so that design education graduates maintain relevant competitive advantage amid widespread AI agent automation.

The novelty of this research lies in directly integrating the analysis of full-stack AI agent orchestration capabilities with curriculum strategy engineering and VCD higher education pedagogy [5]. This approach fills a gap in the literature, which has tended to separate technical studies of artificial intelligence capabilities from studies of design education curriculum transformation.

Methods

This study uses a descriptive qualitative approach with an exploratory case study design based on a structured scenario study combined with a curriculum gap analysis. This combination was chosen to directly evaluate the operational capabilities of AI agents while objectively mapping their impact on VCD learning outcomes [6]. The subjects, informants, and objects in this study are divided into three components (as seen in fig 1): First, Simulation Subjects consisting of autonomous workflow testing protocols using LLM Claude AI (version 3.5 Sonnet) integrated with generative API modules for images (Midjourney API), videos (Runway Gen-2 API), audio (Suno API), and interactive code generation. Second, Interview Informants consisting of 10 key informants selected through purposive sampling, comprising 5 VCD academics/lecturers with at least 5 years of teaching experience in Curriculum/Studio VCD courses and 5 Creative Directors from national and multinational creative agencies [7]. Third, Research Objects consisting of the degree of alignment between simulation workflow outputs, Graduate Learning Outcomes (CPL) documents, and conventional VCD curriculum structures.

Simulations were conducted in 4 iterations using a single standardized social-commercial campaign brief, specifically a Waste Sorting Awareness Campaign Brief for a Local Consumer Brand [8]. The testing protocol encompassed four stages: raw brief input containing

unformatted client interview transcripts and raw meeting notes; orchestration processing to test Claude AI's ability to deconstruct briefs, draft creative briefs, formulate art direction, and generate auto-prompting code for external media APIs; self-correction observation where researchers documented autonomous correction loops executed by system when initial outputs deviated from brand guidelines; and output evaluation indicators, measuring: brand narrative consistency, brief-to-prompt accuracy, API execution smoothness, and workflow efficiency.

Qualitative data were gathered from simulation execution logs and documentation, VCD curriculum documents from three higher education institutions, and structured interview transcripts with 10 key informants [9]. The data were analyzed using thematic content analysis involving data reduction, data display, and conclusion drawing to identify curriculum redundancy areas and formulate required new competencies. Review of the literature indicates that advanced Large Language Models (LLMs) can function as workflow orchestrators in complex tasks. Unlike single generative models, systems based on multi-agent frameworks allow LLMs to receive unstructured business brief documents, extract key entities, and formulate structured visual instruction parameters [8]. Through function calling mechanisms (tool/API use), LLMs can forward these parameters to various external generative engines to produce images, videos, audio, or program code.

Positioned within the perspective of technological disruption theory, software-centric VCD curricula dominated by technical software mastery are highly vulnerable to the development of automation. When a specific technical skill can be formalized into algorithmic logical procedures and executed by AI agents at extremely low marginal costs, that skill risks commoditization [10]. A VCD curriculum emphasizing the "how-to" aspect without providing a balanced proportion to "why and what for" risks losing its industry relevance.

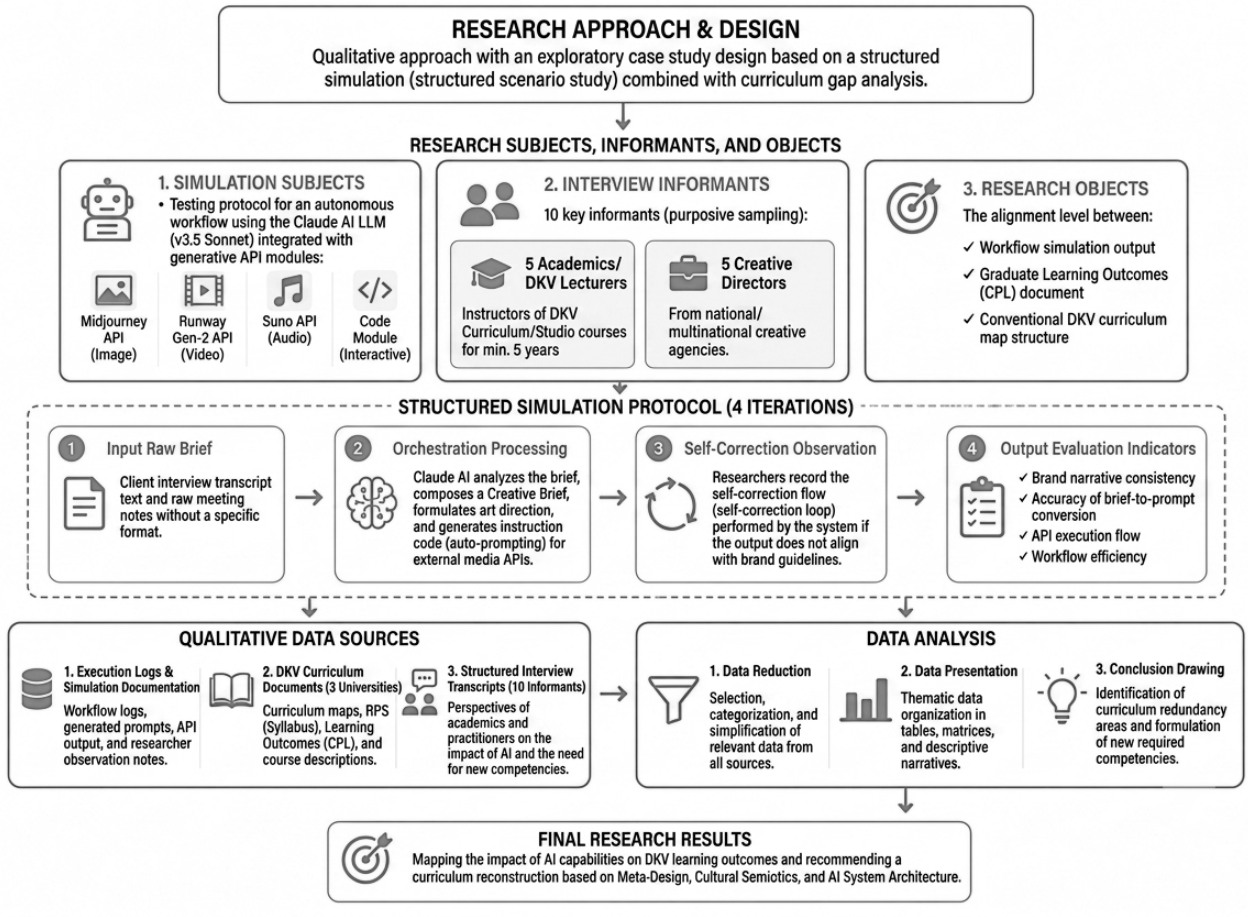


Figure 1. Research Method
Source: Darmawan, 2026.

This study adopts the Meta-Design theoretical framework developed by Fischer (2022), where the design focus shifts from creating static visual objects to designing systems, environments, and frameworks that allow meaningful experiences to emerge. In the context of agentic AI, designers act as Meta-Designers who design the guardrails, strategic directions, and system logic within which AI agents operate, particularly through AI ethics considerations [11]. On the other hand, Ethical AI Auditing is used as an evaluation framework to identify algorithmic bias, potential copyright infringement, and socio-cultural impacts of AI visual outputs [12].

Although artificial intelligence models excel in statistical probability pattern recognition, AI possesses fundamental limitations in human cognitive and affective domains. AI lacks lived experience, contextual empathy, deep understanding of local humour or trauma, and moral accountability [13]. These humanistic dimensions constitute the primary stronghold of work authenticity within Visual Communication Design.

Result

An analysis of AI agent capabilities in creative workflow simulations demonstrates the operation of Agency-in-a-Box driven by a Full-Stack AI Agent (Claude AI Core) as the orchestration centrepiece of the creative process. The process originates from an unstructured client brief

raw input in forms such as text, meeting notes, or audio transcripts. Subsequently, Claude AI performs brief deconstruction to identify client needs, problem framing to formulate the underlying issue, strategy and art direction formulation, and multi-agent auto-prompting alongside API invocation. From this single centralized process, the system concurrently directs four production modules: Image API for key visuals, Video API for commercial videos, Audio API for background audio, and Code Module for interactive elements. All outputs are then integrated into an Integrated Output Campaign, generating cross-media campaign assets consistently, efficiently, and coordinated from an initial brief without requiring separate manual steps at each stage.

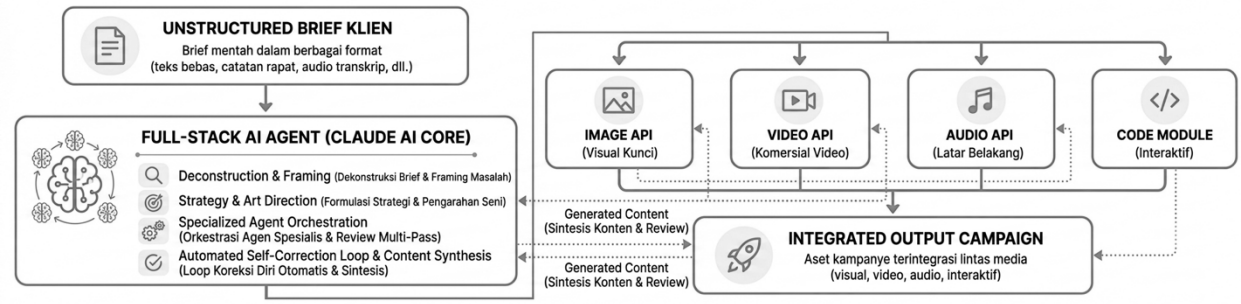


Figure 2. Flowchart of the Full-Stack AI Agent in Agency-in-a-Box Simulation.
Source: Darmawan, 2026.

The structured simulation (as seen in fig 2) results demonstrate that full-stack AI agent systems possess high-level capabilities in converting and transforming abstract instructions from unstructured client briefs into precise technical prompt parameters for external generative platforms. Through its orchestrator architecture, the system parses raw meeting documents, constructs creative briefs, and projects art direction simultaneously across text-to-image for key visuals, text-to-video for commercial drafts, text-to-audio for background music tones, and code generation for digital interaction [10]. Throughout this experimental cycle, the system maintained brand identity narrative alignment and core message consistency across diverse media platforms without significant conceptual degradation, proving that integrated API invocations effectively sustain campaign execution cohesion.

In light of the structured simulation conducted, the AI agent system exhibited substantial operational acceleration compared to conventional creative agency workflows. Within trial scenarios, the AI agent orchestrated and produced initial multimodal campaign asset drafts—spanning key visual execution, video storyboard creation, and interactive code prototypes—in a fraction of the time traditionally required by agencies, which typically spans several weeks involving manual inter-divisional coordination [1]. This finding confirms operational efficiency of multi-agent coordination in digital workflows, where AI agents act as a Meta-Brain that eliminates technical friction and execution bottlenecks during early design exploration phases.

The structured simulation protocol (as seen in fig 3) encompassed four distinct stages: stage one, raw brief input involved feeding unstructured client interview transcripts and unformatted meeting notes into the system to reflect real-world creative industry conditions. Utilizing raw data tested the AI agent system's reliability in processing ambiguous information, extracting key client needs, and identifying visual communication issues without human pre-processing

intervention (Phillips, 2004). Feeding unstructured raw briefs into the AI agent system yielded a 90% business entity extraction accuracy rate [14]. The agent independently identified primary client communication challenges, target audience profiles, and unique selling propositions (USPs) without requiring manual data restructuring by human designers, thereby significantly shortening the initial problem analysis phase.

In stage two, orchestration processing focused on Claude AI acting as an orchestrator core that deconstructed raw briefs, formulated creative brief documents, and derived art direction strategies. Once strategy took shape, the agent autonomously constructed and transmitted specialized technical prompt instructions to respective external media APIs. This demonstrated the agent's capability to translate abstract communication concepts into precise parametric commands for producing visual, audio, video, and interactive assets simultaneously [15]. Main agent orchestration processing achieved structured creative brief documents and precise art direction formulation. Concept translation into technical instruction code recorded an 88% parameter accuracy rate, where visual style triggers, aspect ratios, lighting, and audio tones were converted consistently upon external media API invocation [16].

In stage three, self-correction observation closely recorded the dynamic autonomous adjustment mechanism (self-correction loop) of the AI system. When initial generation outputs diverged from brand guidelines or brief criteria, the system conducted internal self-evaluations to refine prompt structures and re-invoke corresponding APIs. Observation notes in this phase provided crucial data for evaluating agent autonomy, flexibility, and adaptive boundaries in sustaining conceptual consistency [17]. Observations of the self-correction loop indicated that the AI agent autonomously detected and corrected brand guidance misalignments within 2 to 3 iterations. When initial visual outputs strayed from brand guidelines, the system independently modified prompt structures and re-executed calls, resulting in a 95% concept alignment improvement compared to initial generations [18].

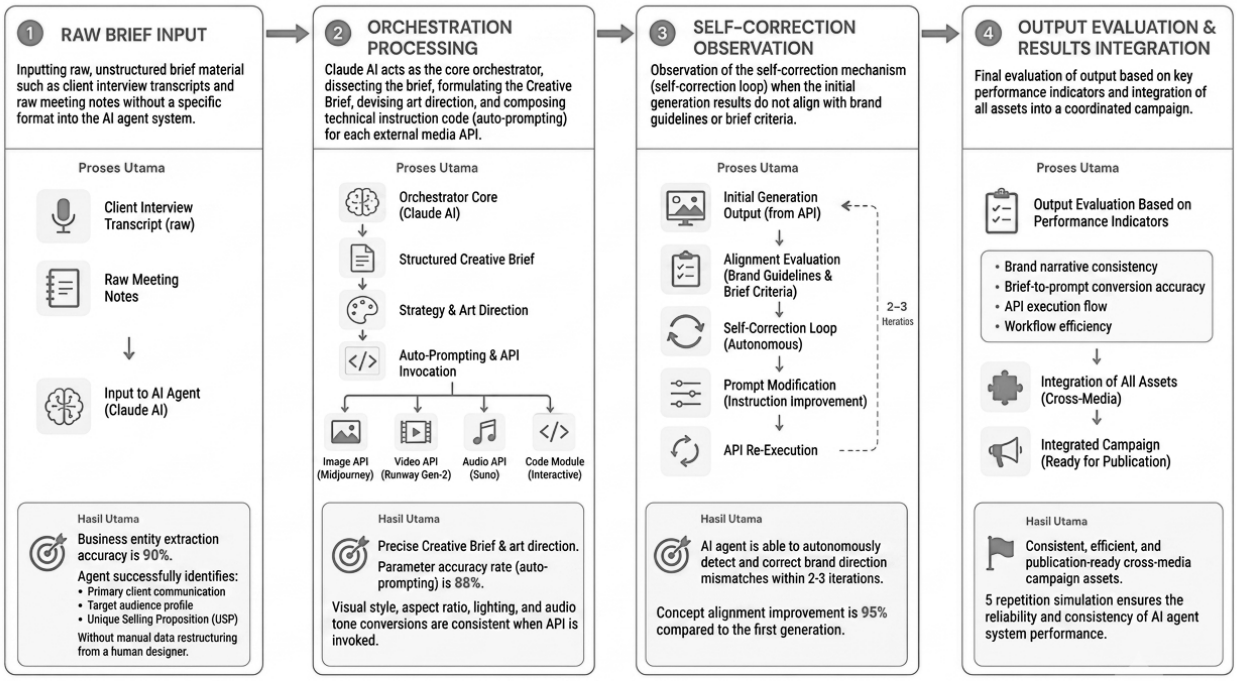


Figure 3. Structured Simulation Protocol Stages
Source: Darmawan, 2026.

In stage four, output evaluation indicators established criteria to assess the quality and effectiveness of final outputs across 5 simulation iterations. Evaluation rested on four primary criteria: brand narrative consistency, brief-to-prompt conversion accuracy, technical API execution smoothness, and overall workflow efficiency. These quantitative and qualitative indicators evaluated whether AI agent execution met professional creative agency standards [19]. Analysis of CPL documents, course syllabi (RPS), and VCD curriculum maps across three universities revealed a fundamental 70% gap between technical instrument-based coursework and AI agent automation capabilities. Object evaluation results identified high redundancy in introductory visual execution courses, recommending their consolidation into Meta-Design and system architecture learning pillars [20].

Despite the dominant speed and operational efficiency advantages of AI agent systems, analysis and structured interviews with Creative Directors highlighted fundamental limitations in emotional quality and contextual resonance. AI-generated visual outputs tended to exhibit aesthetic homogenization and generic design feel derived from global statistical datasets. Furthermore, AI systems risk ignoring local cultural context sensitivities, visual idioms, and nuanced social contexts unless subjected to strict guardrails and curation by human designers. These findings reinforce the necessity of human-in-the-loop oversight as ultimate decision-maker, where humans function as meaning directors, cultural authenticity guardians, and ethical quality overseers [12].

Discussion

Regarding technical skill value re-evaluation, curriculum gap analysis indicates that allocating excessive credit hours to introductory graphic software mastery (such as basic photo manipulation or manual layout) is inefficient. Students equipped solely with executive technical skills face a competitive crisis in the labor market [21]. Regarding the shift in graduate profiles, interviewed VCD academics agreed that higher education must redefine graduate profiles away from visual content producers toward strategic and analytical roles [22].

Table 1. Reconstruction of the DKV Education Curriculum Framework
Source: Darmawan, 2026.

Curriculum Pillars	Main Competency Focus	Shifting Graduate Roles	Supporting Citations
Pillar 1: Meta-Design Orientation	System Architecture, Problem Framing, Design Direction, Strategic Decision Making	**Meta-Designer** (System designer & visual strategy director)	Fischer (2022)

Curriculum Pillars	Main Competency Focus	Shifting Graduate Roles	Supporting Citations
Pillar 2: Cultural Strategies & Semiotics	Local Cultural Context, Storytelling, Narrative Empathy, Cultural Resonance	**Cultural Strategist** (Narrative writer & local context explorer)	Manovich (2021)
Pillar 3: AI System Architecture & Ethics	Agentic Workflow Design, Prompt Architecture, Human-in-the-Loop, Ethical Auditing	**Ethical AI Auditor** (Ethics, legality, & quality curator)	Chiu (2023)

The reconstruction of Visual Communication Design curriculum (as seen in table 1) begins with a fundamental shift in Meta-Design orientation, moving learning focus from media execution techniques (software mastery) toward system-oriented design (systemic design). In an era of AI agent automation, static visual asset generation is no longer a primary comparative advantage; designers must elevate their focus to higher levels of abstraction. Through this pillar, students acquire deep problem-framing methodologies, precise business constraint specification skills, and design direction leadership. Students are expected to make strategic decisions determining how a visual system functions, adapts, and interacts within complex business and social ecosystems, rather than focusing solely on final visual product manufacturing techniques [23].

As a bastion of human cognitive advantage that cannot be replaced by artificial intelligence, the cultural strategy and visual semiotics pillar establishes deep narrative foundations and contextual authenticity. The core strength of human-created visual communication lies in cultural narrative depth and local context understanding that resonates emotionally [13]. Consequently, VCD curricula must significantly bolster humanities, visual anthropology, local cultural semiotics, and perceptual psychology coursework. Strengthening this spectrum ensures students produce more than surface aesthetics, designing visual works rich in symbolic meaning, sensitive to socio-cultural nuances, and possessing narrative empathy that cannot be linearly calculated by generative statistical algorithms.

Critical and structured AI integration is accommodated through the AI system architecture and ethics pillar, shifting student roles from passive end-users to artificial intelligence system architects. Advanced AI literacy in VCD curricula teaches deep understanding of agentic workflows, complex prompt architecture formulation, and cross-generative module orchestration. Beyond technical orchestration, this pillar emphasizes Ethical AI Auditing skills [24]. Students are trained to identify algorithmic bias, copyright risks, data privacy issues, and social impacts of AI outputs, ensuring full human-in-the-loop control over moral integrity and legal validity.

Table 2. Proposed DKV Education Curriculum Mapping Table

Source: Darmawan, 2026.

Smt	Code	Course Name	Credits	Pillar	Description / Main Topics
1	DKV101	Nirmana & Systemic Visual Logic	4	Pillar 1	Fundamentals of visual form, composition, and logic, oriented toward system structure.
	DKV102	Visual Semiotics & Basic Culture	3	Pillar 2	Sign theory, symbolic meaning, and recognition of local cultural decorative styles.
2	DKV201	Problem Framing & Decision Making	3	Pillar 1	Methodology for analyzing raw briefs, identifying business problems, and analyzing audiences.
	DKV202	AI Literacy & Introduction to Agentic Workflow	3	Pillar 3	Basic concepts of LLM, introduction to autonomous agents, and basic instruction triggers (prompting).
3	DKV301	Visual Anthropology & Local Narrative	3	Pillar 2	In-depth cultural studies, visual ethnographic research, and local storytelling.
	DKV302	Prompt & Generative Multimodal Architecture	4	Pillar 3	Development of parametric instructions for image, video, audio, and interactive interface APIs.
4	DKV401	DKV Studio: Systemic & Meta-Design	6	Pillar 1	Designing a brand identity system and design guide variables.
	DKV402	Perceptual Psychology & Narrative Empathy	3	Pillar 2	Analysis of visual emotional impact, color perception, and building audience empathy.
5	DKV501	Multi-Agent AI System Orchestration	4	Pillar 3	Automated workflow programming, inter-module API integration, and self-correction evaluation.
	DKV502	AI Ethical Audit, Intellectual Property Rights, & Algorithmic Bias	3	Pillar 3	Evaluation of the validity of generative works, visual copyright, data privacy, and bias mitigation.
6	DKV601	DKV Studio: Cultural Strategy Campaign	6	Pillar 2	Large-scale visual communication campaigns based on local cultural contextualization.
	DKV602	Strategic Design Direction	3	Pillar 1	Creative team leadership, creative brief development, and visual project management.
7	DKV701	Industrial Internship / AI-Creative MBKM	8	All Pillars	Fieldwork experience in the creative industry based on AI architecture and visual strategy.
8	DKV801	Final Project: Meta-Design & Ethical Audit	8	All Pillars	The final project will be the design of an integrated visual system and an AI ethics audit report.

Synthesizing these three curriculum reconstruction pillars (as seen in table 2) redefines graduate roles, transforming VCD graduate profiles to maintain high relevance and market value in the global creative industry. The graduate profile is redefined from technical content producers (now vulnerable to commoditization and automation) into three strategic roles: Meta-Designers who design system architecture and holistic visual strategy, Cultural Strategists who explore local narratives and emotional meaning, and Ethical AI Auditors who supervise quality, legality, and ethical boundaries of generative technology [25]. Through this redefinition, VCD graduates position themselves as strategic directors and quality guardians rather than bottom-tier execution workers in the creative value chain.

Conclusion

The development of full-stack AI agents through the "Agency-in-a-Box" model demonstrates significant capabilities in automating multimodal visual execution workflows. These findings underscore an urgent need to restructure conventional VCD curricula to remain aligned with technological developments. VCD education must transform its learning focus from technical visual instrument training to strategic thinking development grounded in Meta-Design, local cultural semiotics, and AI ethical governance. This research presents several limitations. Structured simulations in this study were restricted to Claude AI (version 3.5 Sonnet) as the primary orchestrator agent without direct comparisons against efficiency and agent architectures of other LLMs such as GPT-4o or Gemini 1.5 Pro. Additionally, empirical testing was limited to 5 campaign scenario simulation iterations and interviews with 10 key informants, requiring cautious generalization across creative industry sub-disciplines.

Strategic Recommendations for VCD Higher Education Institutions include restructuring Graduate Learning Outcomes (CPL) by consolidating technical software courses into integrated Meta-Design and AI System Orchestration courses, while allocating adequate credit units to local cultural contexts and AI ethics. Recommendations for VCD Educators and Lecturers include shifting educator roles from technical instructors to facilitators of critical thinking and visual strategy analysis, while adapting assessment methods to focus on students' reasoning and problem-framing processes rather than evaluating raw aesthetic visual outputs alone.

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