

Proposed Integrated Quadrant-Based Input-Process-Output and Presentation Models: Innovative IPO Conceptual and Demonstration Frameworks in Industry 5.0 (Education) and Beyond

Brandon G. Sibbaluca¹, Rico Gabriel A. Ramos²

Research and Development Office, Emilio Aguinaldo College Cavite
brandon.sibbaluca@eac.edu.ph¹, ricogabriel.ramos@eac.edu.ph²

It is widely known that the input-process-output (IPO) paradigm is commonly utilized in research conceptual frameworks at high school and multidisciplinary college levels. Additionally, it is a common scenario in the educational field that most young researchers experience challenges in demonstrating their research with the limitation of the number of presentation slides. Hence, this creative work proposed the quadrant-based IPO and presentation models to innovate the conceptual framework and demonstration skills of young researchers in this Industry 5.0 (Education) and beyond.

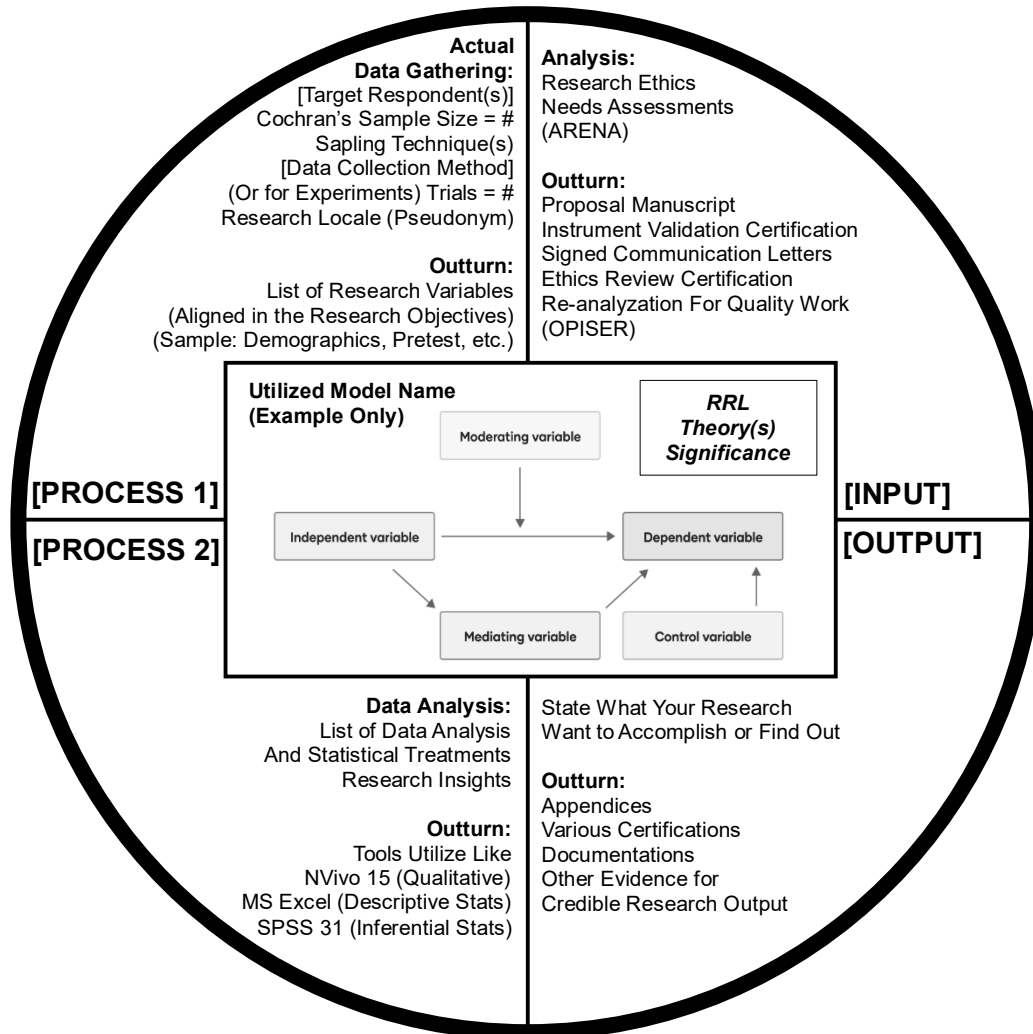


Figure 1. Sample Proposed Integrated Quadrant-Based IPO Framework in Industry 5.0

Figure 1 shows the sample IPO framework in a proposed integrated quadrant-based concept in this Industry 5.0 (Education). It is well known that the quadrant concept of René Descartes in the mathematics topic of “Coordinate System” is divided into four areas by two perpendicular horizontal (x-axis) and vertical (y-axis) lines. It is called “Quadrants I to IV” from top right (northeast) to top left (northwest) to bottom left (southwest) and to bottom right (southeast) positions. The idea of presenting a written concept visualization figure came from that idea with a square shape or box in the middle or origin part for the basis of the notion. Quadrant I is the input phase, Quadrant II is the first process phase, Quadrant III is the second process phase, and Quadrant IV is the output phase with the basis of the main concept and embedded with a review of related literature (RRL), theory(s), and significance of the study.

For the first phase, early analysis of research ethics and needs assessments (ARENA) will be inputted. Theoretical definitions of the word “arena” involve an enclosed area for combat, public entertainment, a sphere of interest, and a place for controversy. The most important part of research is the ethics and needs assessments, because no matter how good the work is, if it is AI-generated, copy-pasted, has no originality, involves illegal conduction of study, violates data privacy, has fabricated results, and has forged writing and other similar negative contexts in research, it is not credible and will not be recognized and might get you punished. ARENA would strengthen the credibility of the article by explaining how they analyze research ethics and needs assessments, such as proper citation aligned in the reference list; responsible AI usage declaration in terms of writing; meeting the similarity index and AI detection percentage institution threshold measure in Turnitin; secured data management for privacy compliance and evidence of works; and accomplishment of various certifications like instrument validation, ethics review clearance, proofreading and editing, and data analysis by the author. This phase assumes that it is in the planning and design stage, and the proposal manuscript is the most vital component of research, as it serves as the foundation of the study; hence, the outturn includes the proposal manuscript, instrument validation certification, signed communication letters, ethics review clearance certification, and re-analysis of work for quality (OPISER) by the researchers with the guidance of their advisers.

After ethics review clearance, the researchers can now proceed to actual data gathering (the first process), which should have been discussed in the proposal manuscript, specifically in the methodology section, and each method subsection should be aligned with each other and with the research questions or objectives (needs assessments). Simply showcase the study’s target participant(s); sample size and how it was computed (sample is Cochran’s unknown population formula); data collection method; trials for experiments; and pseudonym research locale to visually summarize the concept and have room for explanation in the article. Afterwards, the data analysis phase will be done, which should automatically be followed by developing the results and discussion, conclusion, and recommendations with appendices (fourth and last phase: what to achieve or find out). Appropriate data analysis that is aligned with the research questions or objectives is crucial in this part for quality work.

The square or box shape in the middle of the quadrant or in the origin is the basis of the framework, which is the main model with an embedded foundation or extended baseline. The center model is how the variable will be utilized and analyzed in the

study. The extended baseline includes RRL, discussing how the research gap would fill in and explain the novelty because of the showcase of the evidence-based method. Additionally, theory(s) could explain how variables are connected and possible ways to achieve the output. And last, the significance of the study motivates the proposed article to proceed in the research planned and designed in an ethical way with evidence.

As you notice in the sample figure, it is not colorful or very well designed. This is just the representation of the proposed quadrant-based concept figure, and it is flexible, as every researcher or person is unique. It was designed to be fluid and just a concept so that researchers, writers, or presenters have their own way to visually layout their own original work. They could include other things in the quadrants as the flow follows its same concept of “coordinate system” by René Descartes as a procedural or sequential paradigm. And the quadrant-based is not limited to a sphere shape; any form will do if it has four phases equivalent to four quadrants as procedure or flow events in an IPO model.

Sample 1: Actual Data Gathering and Outturn (Process 1) Sample 2: Design and Development (Process 1) Sample 3.1 (Research Presentation Slide): RRL and Anchored Theories with In-Text Citation Sample 3.2 (Research Presentation Slide 2): List of Research Questions or Objectives3 Sample 3.3 (Final Research Presentation Slide 3: Extended Slide in Proposal Stage): Table 2 for Objective 2 (For Showcasing of Alignment) Sample 4: (Presentation Slide for Non-Research): Second Phase of your Content	Sample 1: ARENA and Outturn (Input) Sample 2: ARENA Sample 3.1 (Research Presentation Slide: Proposal Stage): Rationale and Significance of the Study Sample 3.2 (Research Presentation Slide 2: Proposal Stage): List of Data Analysis Used (Generic) Sample 3.3 (Final Research Presentation Slide 3: Extended Slide in Proposal Stage): Table 1 for Objective 1 (For Showcasing of Alignment) Sample 4: (Presentation Slide for Non-Research): First Phase of your Content
Samples 1/2/3.1-3.3/4: Showcasing of Main Model (Optional) with Embedded Bases of RRL, Theory(s), and Significance (Simply Mention These 3 Similar Above) (Depends on the Writer/Presenter)	
Sample 1: Data Analysis and Outturn (Process 2) Sample 2: Implementation (Process 2) Sample 3.1 (Research Presentation Slide): State your Methods (Research Design Used, Sample Size Formula Used with Computed Value, Sampling Technique(s) used, Instruments Used, and Ethical Considerations) Sample 3.2 (Research Presentation Slide 2): List of Statistical or Qualitative Tool Treatments Aligned with Each of the Research Questions or Objectives Sample 3.3 (Final Research Presentation Slide 3: Extended Slide in Proposal Stage): Table 3/Figure Number for Objective 3 (For Showcasing of Alignment) Sample 4: (Presentation Slide for Non-Research): Third Phase of your Content	Sample 1: State What Your Research Want to Achieve or Find Out and Outturn (Output) Sample 2: Evaluation (Output) Sample 3.1 (Research Presentation Slide): Show Sample Actual Research Instrument Sample 3.2 (Research Presentation Slide 2): You May Insert a Logo of Data Analysis Software Tools Utilized and Logo of Appropriate Grounded Sustainable Development Goals (SDGs) Sample 3.3 (Final Research Presentation Slide 3: Extended Slide in Proposal Stage): Table Number/Figure Number for Objective 3 or 4 (For Showcasing of Alignment: May Continue as Needed) Sample 4: (Presentation Slide for Non-Research): Fourth and Last Phase of your Content

Figure 2. Sample Integrated Quadrant-Based IPO and Presentation Frameworks
Figure 2 displays another sample of the proposed integrated quadrant-based IPO framework with the inclusion of a presentation model. To understand the sequence, follow the quadrant concept in the “Coordinate System” of René Descartes and focus on the sample number (e.g., sample 1 in quadrants, sample 2 in quadrants, etc.). Sample 1 is the same as the concept in Figure 1. Sample 2 is a four-phased

overarching research framework in a quadrant-based ADDIE model in an IPO paradigm—comprising analysis (research ethics and needs assessments) or ARENA, design and development, implementation, and evaluation—that will be utilized to conceptualize the study, which aligns with the objectives, design, and methods and is best for the system end-to-end lifecycle of transforming a concept into a tangible, functional product in computer engineering. Samples 3.1 to 3.3 are sample research presentation slides for a proposal or final oral defense. Sample 4 is presentation slides for non-research or general content demonstration in a four-phased sequential flow of discussion and can be continued similarly to samples 3.1 to 3.3. And the basis is the main model framework (optional) with an embedded baseline of RRL, theory(s), and significance by simply writing them. Note that the quadrant-based framework is flexible, and writers or presenters always have a choice for their own original works.

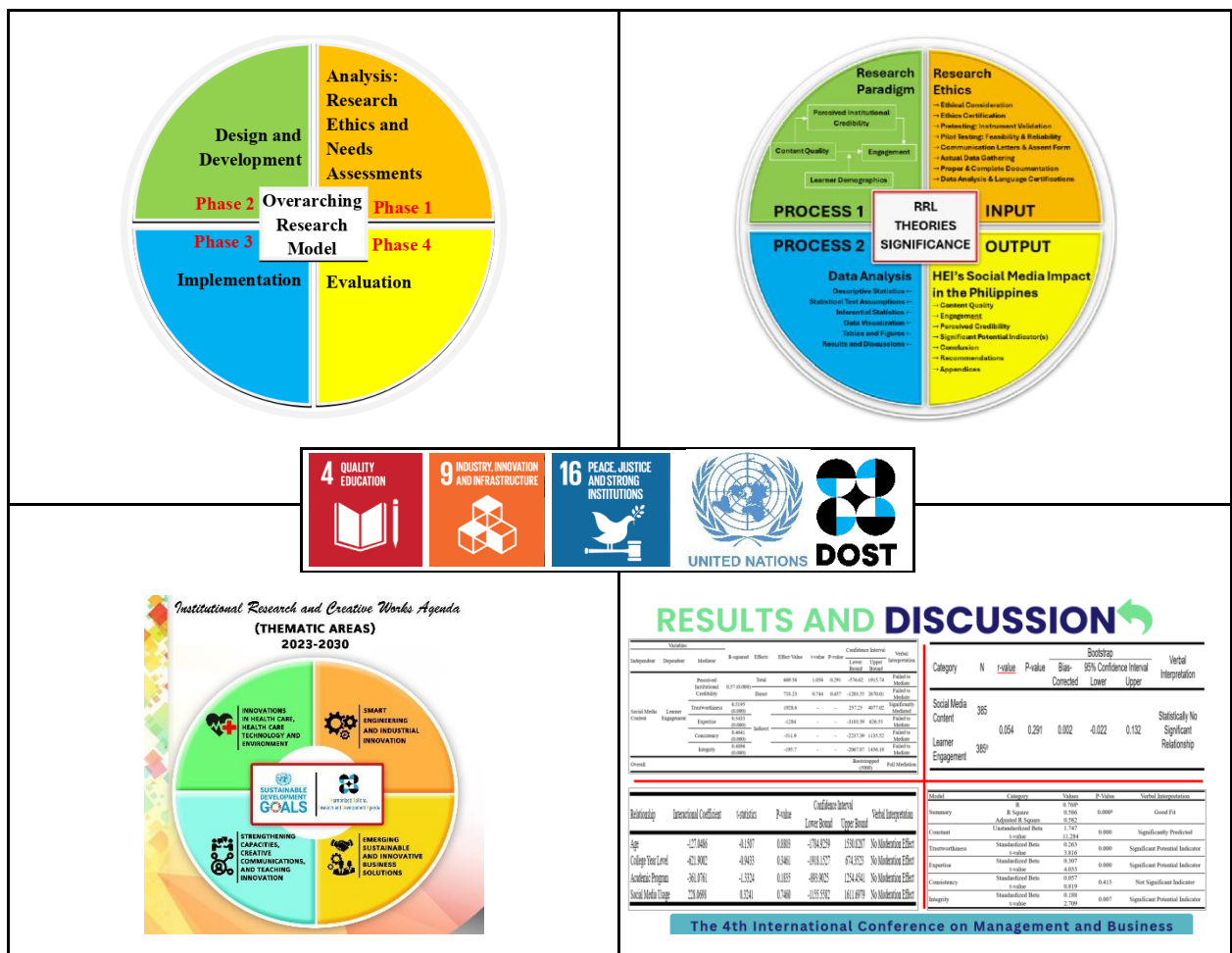


Figure 3. Sample Quadrant-Based IPO, Four-Phased, and Presentation Frameworks

Figure 3 presents the actual sample quadrant-based IPO (quadrant I), four-phased (quadrant II), and presentation (quadrant IV) frameworks. Quadrants I and IV are related to each other, as they come from one of my studies presented at the 4th International Conference on Management and Business (ICoMB 2025), hosted by Universitas Sarjanawiyata in Yogyakarta, 55167, Indonesia. Quadrant I is the conceptual framework of my presented article, and quadrants III and IV are on one of my presentation slides, titled “Exploring the Impact of Social Media Content of a Philippine Higher Education Institution on Learner Engagement: The Mediating Role

of Perceived Institutional Credibility and the Moderating Effect of Learner Demographics,” for which I won the best presenter award. Additionally, I also applied the same presentation framework technique, and I won the best presenter and best paper research awards during the 21st National Conference and 6th International Research Conference at the Philippine Association of Colleges and Universities of Industrial Technology (PACUIT), Inc. in Cagayan de Oro, Philippines. Quadrant 3 is the institutional research and creative works agenda of Emilio Aguinaldo College Cavite (EACC).

This creative work in research conceptual framework innovation would contribute internationally to the sustainable development goals (SDGs) 2015-2030 of the collaborative work of the United Nations (UN) with the Department of Economic and Social Affairs (DESA). Specifically, it would contribute to quality education (SDG 4), innovation (SDG 9), and strong institutions (SDG 16) for the improvement of research presentation quality in writing and oral demonstration of work at EACC, which other institutions, researchers, and presenters could reference. Additionally, this creative work would benefit nationally in the Harmonized National Research and Development Agenda (HNRDA) 2022-2028 of the Philippine Department of Science and Technology (DOST), specifically in the Blue Skies or Pure Basic Research area.



<https://tinyurl.com/PACUIT2025-Award>



<https://tinyurl.com/ICOMB2025-Award>

Figure 4. Proof of Awards

To end this creative work, I would like to leave a message: “Future and strategic thinking are reactive problem-solving to proactive value creation that leads to innovation, which generations should embrace.”