# Utilizing ChatGPT to Create a Riva-Based Business Process Architecture: The Online Teaching Case Study

Rana Yousef

CIS Department, KASIT, The University of Jordan, Amman, Jordan
Email: rana.yousef@ju.edu.jo (R.Y.)
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***Abstract*—A Business Process Architecture (BPA) describes the main processes within an organization and the dynamic relationships between them. One of the methods used to create a business process architecture is called the Riva method. In this paper, we employ ChatGPT to assist domain experts in generating BPAs and expediting the steps that require significant amounts of time and effort. The paper investigates the extent to which ChatGPT can aid in generating a BPA by examining each step of the Riva method through a conversational style and utilizing the online teaching case study. The results from each step were compared to an already-created online teaching business process architecture generated using the traditional Riva method. The results indicated that ChatGPT was helpful in identifying essential business entities, as well as the units of work. Typically, these require multiple meetings and brainstorming activities. However, ChatGPT was unable to generate the final process architecture, despite being provided with the necessary rules and heuristics needed for architecture generation. This limitation was attributed to a lack of contextual understanding, rule ambiguity, and difficulties aligning with business goals.**

***Keywords*—business process architecture, the Riva method, ChatGPT, online teaching process**

## I. Introduction

The integration of artificial intelligence to shape and optimize business processes has gained exceptional significance. This study aims to explore the role of ChatGPT in generating Business Process Architectures (BPAs). A BPA provides a systematic design and structure for all processes available in an organization. It is important to have a well-designed business process architecture in organizations as it provides a common framework for discussing and understanding main processes at a higher level of abstraction instead of dealing with detailed activities, especially if there is a large number of activities in the organization.

A Riva process architecture [1] is derived from an understanding of business in which the organization operates. It starts with identifying the essential business entities in the organization that constitutes its subject matter. Then these entities are filtered out to find the units of work that require handling during the process. A diagram that reflects the relationships between units of work is generated by a domain expert. After that, a first cut business process architecture can be created through a mechanical step and then refined to yield the second cut business process architecture. What differentiates the Riva method is that the resulting architecture is invariant for organizations in the same business, this is because it deals with main processes that are common rather than individual activities that are organizational-specific.

In the context of generating an architecture for online teaching processes, a well-defined business process architecture is not only beneficial; it is critical for the sustained performance of educational institutions. Such an architecture enables institutions to respond more adeptly to changing conditions, thereby improving efficiency and quality of instruction, enhancing the overall student experience, and reducing operational costs. Rawad *et al.* [2] highlight that developing a generalized business process model is crucial for e-learning, as it provides the flexibility and agility needed to meet the dynamic and individualized needs of learners. Also, Muñoz and Quiroz emphasize that effective online education requires a comprehensive architecture that integrates educational, administrative, legal, and ICT infrastructure aspects, going beyond just uploading materials to a platform [3].

The traditional process of creating a comprehensive BPA is challenging. Often, it involves exhaustive brainstorming sessions, complex analysis, and considerable discussions by domain experts. This can lead to extended timelines, potential inconsistencies, and sometimes, missed opportunities in capturing correct process designs.

ChatGPT, a state-of-the-art language model trained by OpenAI, offers a combination of scalability, consistency, and rapid processing. Its ability to go through vast amounts of information and identify patterns makes it a potentially invaluable asset in the realm of BPA derivation. When posed the right questions, ChatGPT can aid in capturing Essential Business Entities (EBEs) and Units of Work (UOW), elements often challenging to pinpoint in traditional methodologies.

This paper investigates the integration of ChatGPT in the BPA development process for online teaching. It provides a detailed description of the methodology used to create the architecture and discusses the potential benefits of using ChatGPT in this context.

Section II presents related work, Section III shows the derivation of the online teaching process architecture using the Riva method, Section IV shows how ChatGPT was utilized to help in deriving the process architecture for the same case study, Section V compares between the two derivations and emphasizes on the extent to which ChatGPT can be utilized in deriving the business process architecture. Finally, Section VI concludes the paper.

## II. Literature Review

The integration of Artificial Intelligence (AI) in Software

Engineering (SE) is an active field of study. This field focuses on combining AI solutions with SE practices to utilize intelligence in software development processes and tools [4, 5]. AI research in the architectural field is typically centered around creating decision support systems and development bots. These systems are designed to help architects through offering suggestions regarding design choices, pattern and style selection, as well as predicting potential areas of architectural failure and decline [6, 7].

Chat Generative Pre-trained Transformer (ChatGPT) is an advanced language model developed by OpenAI. It is designed to generate human-like text responses in natural language conversations and is capable of producing well-articulated responses to complex queries [8, 9]. At its core, ChatGPT employs a transformer-based architecture, which is renowned for its ability to handle sequential data, making it helpful at understanding and generating human-like text. This architecture, combined with the vast amounts of data it's trained on, equips ChatGPT with a deep understanding, allowing it to grasp complex software engineering concepts, terminologies, and practices. Furthermore, its training on diverse datasets ensures that it can be applied to a wide range of SE tasks, from code generation to architectural design discussions.

A number of research studies have been conducted to assess the capabilities of ChatGPT in the field of software engineering. These studies aim to explore and evaluate how ChatGPT can contribute to software engineering processes, such as requirements elicitation, code generation, software testing, and even software architecture design [10, 11]. for example, Xia and Zhang [12] proposed ChatRepair, which is used to repair programs using a conversational method. Other researchers used ChatGPT for code generation, repair and summarization [13].

Through these studies, valuable insights have been gained regarding the effectiveness, and the potential challenges associated with utilizing ChatGPT in software engineering contexts. For example, the authors in research [14] provided an initial exploration to determine whether ChatGPT can effectively understands an architectural scenario provided by an architect and perform activities to analyze, synthesize, and evaluate the software architecture within a collaborative architecting framework involving both human and AI components. Their results showed that ChatGPT is capable of processing an architectural scenario, articulating architectural requirements, specifying models, recommending patterns, and developing scenarios for evaluation.

A recent study explored the application of ChatGPT in business contexts [15], focusing on its potential benefits and challenges for corporate operations. The study emphasized on ChatGPT's capability in automating routine tasks such as order tracking and billing, thereby reallocating human resources to more complex strategic roles. However, the research also cautioned about the need for careful consideration of ChatGPT's applications, highlighting its necessity for domain-specific training data and the potential for generating inaccurate or ambiguous outputs.

The authors acknowledged difficulties posed by architecture centric software engineering such as the absence of standardized procedures and socio-technical barriers, compounded by a lack of expert knowledge [16]. Addressing these challenges, the research explored the role of Software Development Bots (DevBots) trained on extensive language models, like ChatGPT. These bots are shown to enhance the architecting process by synergizing human intellect with AI-driven decision support, exemplified in a case study where ChatGPT collaborates with a novice software architect. The study suggests that future research should focus on empirical evaluations of architects' productivity and the socio-technical dynamics of incorporating ChatGPT into architecture centric software engineering, providing valuable insights into tackling its prevalent challenges.

While traditional AI tools like static code analyzers or automated testing frameworks are designed for specific SE tasks, ChatGPT's versatility lies in its ability to understand and generate human-like text across different SE contexts. This makes it particularly suitable for tasks that require understanding, such as requirements elicitation or architectural designs. On the other hand, models like which are specifically trained for code-related tasks, might offer more precision in areas like code generation or bug detection. In this paper, we explore the degree to which ChatGPT can be utilized to help in generate business process architectures (BPA)s for organizations working in a certain domain.

## III. BPA for Online Teaching in Higher Education Using the Riva Method

In this section, we show the steps used to generate the BPA for the online teaching case study using ChatGPT incorporated with specific scenarios where ChatGPT has been employed, along with the resulting outcomes, the details can be found in previous research [13].

The Riva method [1] is used to generate a process architecture that captures all business processes in an organization. It is an object-based Business Process Architecture (BPA) approach that involves the generation of Riva-based business process architecture diagrams, which are essential for understanding and visualizing the structure and flow of business processes.

The first step is to identify the essential business entities of an organization which constitute the subject matter of that organization, this is a brainstorming activity that should be conducted by people working in the domain, where they can utilize the questions suggested by Ould [1] to help identify them. The list of EBE is shown in Fig. 1, then each EBE is examined to have lifetime during which we must look after. Accordingly, a unit of work starts, progresses and stops during the process, and during the process we take actions to handle it. Those units of work appear in boldface in Fig. 1.

Essential Business Entities (EBEs) for an online teaching process encompass the fundamental elements that are crucial for the effective functioning and delivery of online education. These entities can include courses and programs, course materials, assessments, learning resources, digital tools, curriculum structures, certifications, and research components. On the other hand, Units of Work (UOW) refer to specific tasks or activities within the online teaching process that have a distinct lifecycle. During this lifecycle, these units demand continuous attention and management to ensure their successful completion. For instance, the

development and updating of course materials is a UOW that begins with content creation, followed by periodic reviews, updates based on feedback, and eventual archiving or replacement. Similarly, the process of student enrollment can be viewed as a UOW, starting from the initial registration, progressing through course selection, and culminating in final enrollment confirmation.

Fig. 2 shows the UOW diagram which represents all units of work identified for online teaching and the dynamic relationships between them.

| | | | | |
|---|---|---|---|---|
| **Online courses** | **Course syllabus** | **courses material** | online lectures | handouts |
| videos | booklets | course files | **Assignments** | **Exams** |
| **projects** | conferencing | Lecture notes | Books | Teaching |
| **multiple class coordination** | **grading** | **students' evaluation** counseling | **online office hours** | guiding |
| giving references | **projects online supervision** | **students' performance monitoring** | exams reviews | accreditation requirements |
| **course regulations** | **stakeholder involvement** | **continuous improvement** | **course evaluation** | instructor evaluation |
| accreditation employees | External examiners | External researchers | external teachers | external students |
| teaching assistants | maintenance employees | service providers | Students | Instructors |
| **Disabled students' management** | administrative staff | lab supervisors | e-learning staff members | committee members |
| downloading files and videos | complaints | asking questions | submitting answers | uploading files and videos |
| Complaints | requesting grades review | requesting to update grades | **exit surveys** | **absent students management** |
| **university regulations** | students questions | **Teaching platform** | **exams platform** | **grading platform** |
| Labs | **quality standards** | system failure | time management | **Stakeholder involvement** |
| **students absence** | computers | Grades | students' information | instructors' information |
| Research information | students' grades | library | rooms | Lectures |
| instructors and students | staff members | | | |

Fig. 1. EBEs and UOW in boldface for online teaching [13].

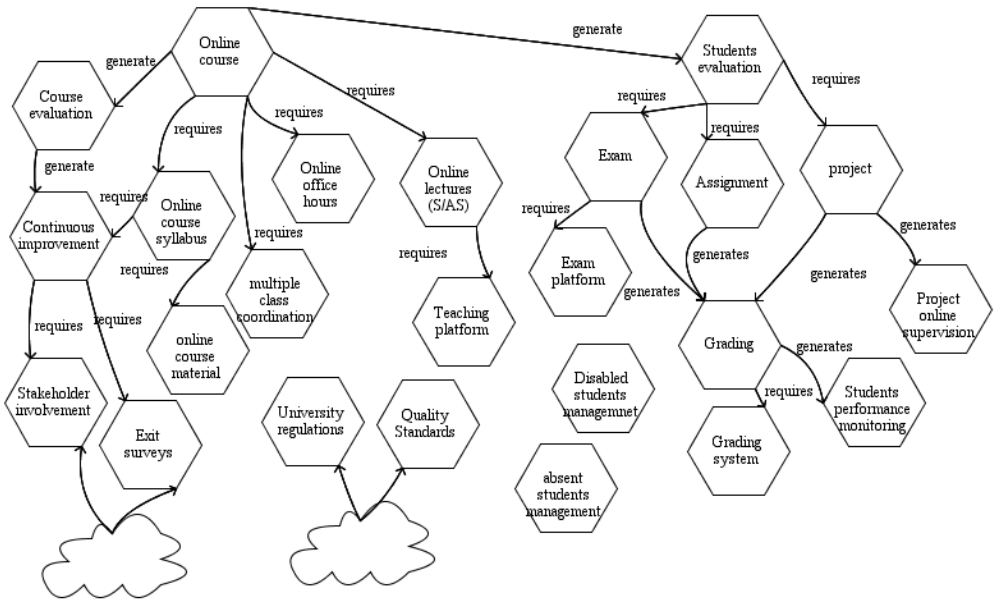


Fig. 2. Unit of work diagram for online teaching [17].

Generating the first cut process model is a mechanical step where for each UOW in the UOW diagram, there are three processes; a case process, a case management process and a case strategy process. The "generate" relationship between units of work are represented as follows: if unit of work A generates B, then the case process A requests the case management process B, and that starts the case process B which delivers to the case process A.

The first cut process architecture diagram can be generated automatically using tools such as RPage tool [18], Fig. 3 shows only part of the first cut process architecture.

The second cut process architecture involves revisiting the 1st cut process architecture by the domain expert to decide which case processes or case management processes should remain and which should be removed. Fig. 4 shows the second cut process architecture for the online teaching process after modifications by domain experts.

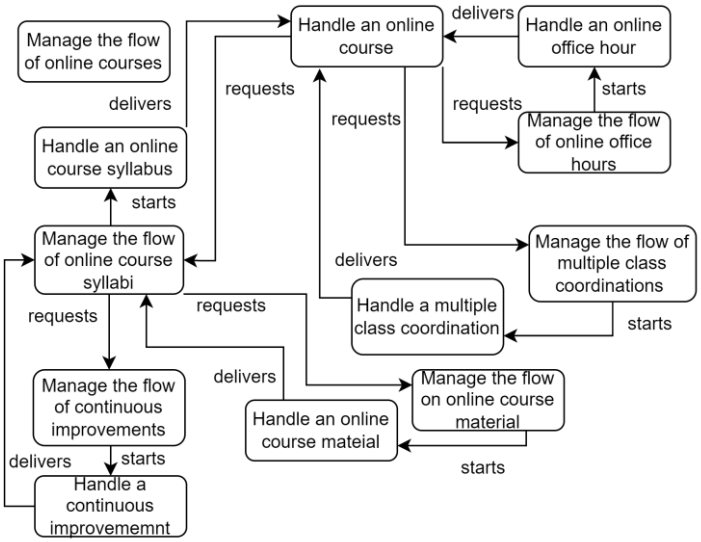


Fig. 3. Part of the 1st cut BPA for online teaching [17].

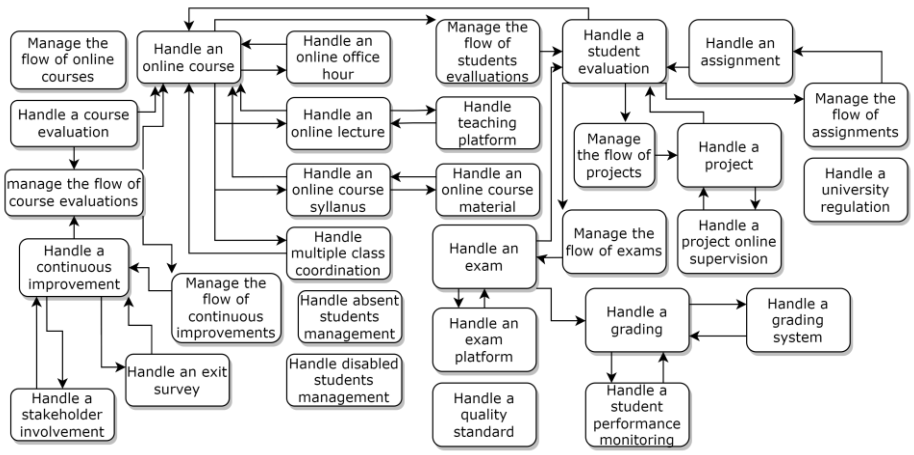


Fig. 4. Second cut business process architecture for the online teaching process [17].

The conventional process of developing a comprehensive Business Process Architecture (BPA) involves some challenges that are not immediately apparent. A notable difficulty encountered when applying the Riva method is the considerable time and effort needed to identify the essential business entities and determine which can be considered as units of work. This process is not only analytical but also collaborative, requiring extensive brainstorming and meetings among domain experts to establish the relationships between these units.

## IV. Creating Online Teaching Process Architecture with Riva and ChatGPT

In this section we show the steps used to generate the BPA for the online teaching case study using ChatGPT.

Step 1: Prepare the questions suggested by Ould [1] that are used to identify EBE.

Step 2: Query ChatGPT for EBEs: pose each question to ChatGPT sequentially to generate a list of EBEs.

Step 3: Remove Redundancies: refine the list by eliminating duplicate or overlapping EBEs.

Step 4: Define Units of Work: provide ChatGPT with a clear definition of "units of work."

Step 5: Generate UOW List: using the refined list of EBEs, ask ChatGPT to identify corresponding units of work.

Step 6: First-Cut Architecture Rules: clearly explain the rules and guidelines for generating the first-cut business architecture.

Step 7: Generate First-Cut Architecture: request ChatGPT to produce the first-cut architecture based on the provided rules.

Step 8: Define Second-Cut Heuristics: detail the heuristics necessary for creating the second-cut business process architecture.

Step 9: Generate Second-Cut Architecture: instruct ChatGPT to construct the second-cut architecture using the defined heuristics.

### *A. Steps 1–3: Identifying Essential Business Entities Using ChatGPT*

Asking a direct question to identify the list of EBEs for online teaching process resulted in a general list, so the questions suggested by Ould [1] where used to ask ChatGpt one by one, for example, the question "what essential business entities can be identified for the online teaching process in higher education by answering the question: what do we make?" resulted in 8 EBEs which are: courses and programs, course materials, assessments, learning resources, digital tools, curriculum, certifications, and research. The following are the Questions to ChatGPT about the EBEs for the online

teaching process and the EBEs resulted from answering each question by ChatGPT, there were around 100 total EBEs.

Q1: What do we make?

Courses and programs, Course materials, Assessments, Learning resources, Digital tools, Curriculum, Certifications, Research.

Q2: What services do we offer?

Teaching and learning services, Student support services, Faculty support services, Technical support services, Library resources and services, Academic advising services, Career services, Continuing education and professional development services, Enrollment and registration services, Student assessment and evaluation services.

Q3: What things can we simply not get away from?

Learning objectives and outcomes, Accreditation and regulatory compliance, Quality assurance, Technological advancements, Pedagogical research, Student feedback, Industry partnerships.

Q4: Who are our external customers?

Prospective students, Current students, Alumni, Employers and industry partners, Government agencies and regulatory bodies, Educational institutions and organizations, Donors and sponsors, Community members and organizations.

Q5: Who are our internal customers?

Faculty members, Academic departments and schools, Administrative and support staff, IT and technical support staff, Senior leadership and management, Human resources and employee development, Finance and budgeting, Facilities and maintenance staff.

Q6: Are there things that our customers have, or want, or do that are EBEs for us?

Learning outcomes, Student success, Accessibility and inclusivity, Technology and innovation, Customer service, Brand reputation, Partnerships and collaborations.

Q7: What things do we think differentiate our organization from others in the same business?

Unique programs and courses, Quality of instruction and teaching methodologies, Experienced and diverse faculty, Innovative use of technology, Strong partnerships and collaborations, High student satisfaction rates, Robust research and scholarly output, Comprehensive student support services, Attention to accessibility and inclusivity, Strong reputation and brand recognition.

Q8: What sorts of things do we deal with day in, day out?

Teaching and instruction, Curriculum development and improvement, Student support services and advising, Faculty support and development, Technical support and troubleshooting, Enrollment and registration services, Financial aid and billing services, Marketing and outreach, Research and scholarship, Continuous improvement and evaluation of programs and services.

Q9: What events in the 'outside world', the world outside our organization, do we need to respond to?

Changes in educational regulations and policies at the local, state, and federal levels, Advancements in technology and learning management systems, Economic and market trends affecting higher education, Global events and changes affecting international student enrollment and partnerships, Demographic shifts in the student population and workforce needs, Emerging educational and professional fields and skill sets, Public health crises and pandemics affecting teaching and learning modalities, Social and cultural movements affecting student experiences and diversity, equity, and inclusion efforts, Legal issues and developments affecting online learning and student data privacy, Competition and innovations from other higher education institutions and ed-tech companies.

Q10: What business entities are listed in our corporate data model?

Faculty, Courses, Curriculum, Learning Resources, Assessments, Enrollment, Financial Aid, Academic Advising, Institutional Research.

Q11: What things do our information systems keep information on?

Student records (e.g., personal information, enrollment status, academic history), Course catalogs and schedules, Curriculum and learning objectives, Learning Management System (LMS) data, such as course assignments, grades, and participation metrics, Assessment data, (such as exams, quizzes, and papers), Faculty records (e.g., personal information, employment status, course assignments), Financial aid and billing information, Institutional research data, such as enrollment trends and student outcomes, Library catalog and circulation records, Technical support and helpdesk ticket data.

### *B. Steps 4–5: Identifying Units of Work Using ChatGPT*

After having a list of EBEs, the definition of units of work was provided to ChatGPT and it was asked for a list of UOWs from the list of EBEs. ChatGPT identified 42 units of work:

Courses and programs, Course materials, Assessments, Learning resources, Digital tools, Curriculum, Certifications, Teaching and learning services, Student support services, Faculty support services, Technical support services, Library resources and services, Academic advising services, Career services, Continuing education and professional development services, Enrollment and registration services, Student assessment and evaluation services, Accreditation and regulatory compliance, Quality assurance, Technological advancements, Pedagogical research, Student feedback, Course design, Course alignment, Course mapping, Course evaluation and improvement, Course delivery, Course content creation and curation, Student engagement and interaction, Student motivation and retention, Student performance monitoring and intervention, Learning outcome assessment, Faculty training and development, Faculty workload management, Faculty performance evaluation, Faculty mentoring and support, Technical infrastructure maintenance and updates, Technology integration and adoption, Data management and analysis, Policy development and compliance, Student data privacy and security, Accreditation and program review.

These units of work have a clear start, proceed and stop point, and require specific actions to be taken during their lifetime, such as development, delivery, evaluation, and improvement.

ChatGPT was also able to generate a unit of work diagram after proving its definition, Fig. 5 shows the UOW diagram for the online teaching process. For the purpose of generating a graphical diagram, ChatGPT provided a startUml code and

suggested to use a design tool, plantText UML editor to generate the models. PlantText is an online tool that quickly generates images and diagrams from the text. It is mostly used to create UML diagrams (Unified Modeling Language) from a language called PlantUML.

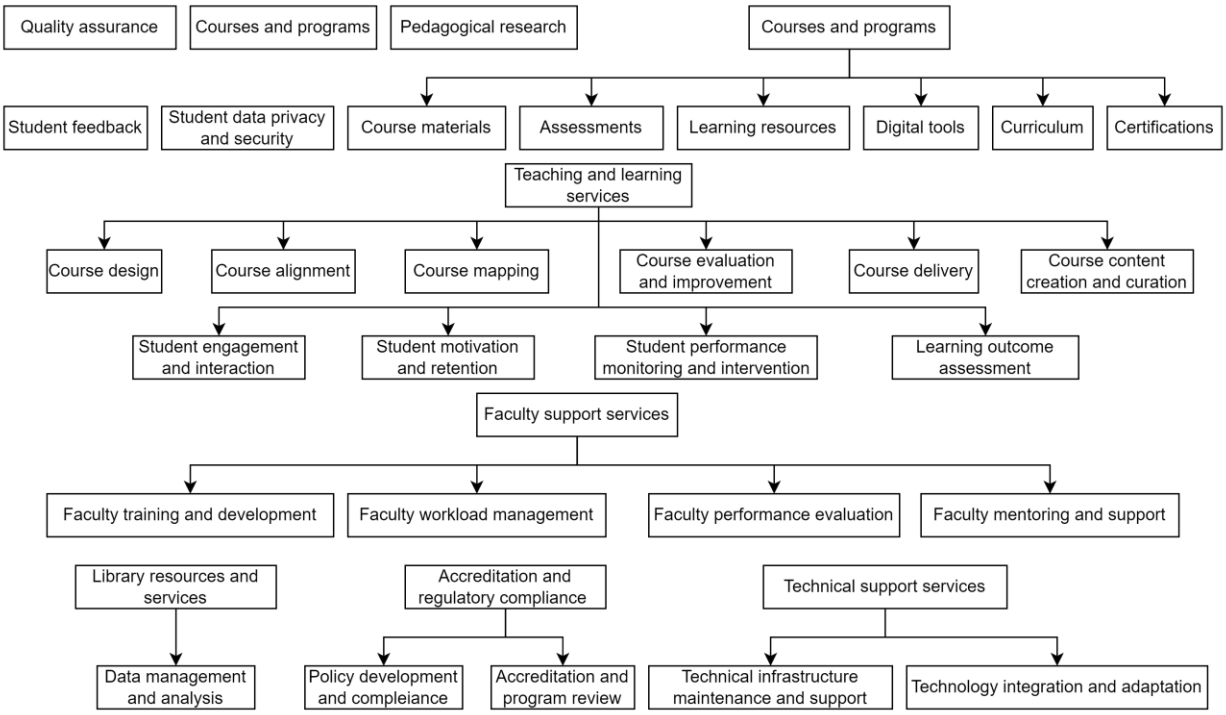


Fig. 5. Units of work diagram obtained using startUml code that was generated by ChatGPT.

### *C. Steps 6–9: First Cut and Second Cut Business Process Architecture*

In an attempt to generate the first-cut business process architecture, ChatGPT was employed by providing it with specific rules and guidelines. The methodology for generating the first-cut business process architecture was defined as follows: If unit of work "A" generates unit of work B, then two corresponding case processes, CP A: "Handle A" and CP B: "Handle B", should be created. Additionally, a case management process, CMP B: "Manage the Flow of Bs", is also created. The relationships between these processes are defined such that CP A requests CMP B, CMP B initiates CP B, and CP B delivers to CP A. Subsequently, the unit of work diagram was given to ChatGPT for the creation of the first-cut Business Process Architecture (BPA). However, due to the large number of units of work, ChatGPT was unable to produce the desired first-cut process architecture. Partitioning the diagram further complicates the process. However, this step can be efficiently performed using specialized tools designed for this specific task [14], where this task doesn't require the capabilities of AI tools. As for the second-cut business process architecture, it necessitates the application of heuristics, and decisions are best made by domain experts. This includes consolidating certain processes and determining the potential integration of one process into another. While these heuristic decisions could be posed to ChatGPT, the intricacy of explaining each heuristic makes the process time-intensive. Consequently, it was determined that utilizing ChatGPT to generate both the first and second-cut architectures was not the most efficient approach.

## V. Discussion

In this section we discuss our observations, insights and limitations of using ChatGPT to help derive business process architectures.

### *A. ChatGPT's Proficiency in Identifying EBEs and UOWs*

We have observed that ChatGPT possesses the capability to accurately identify essential business entities, units of work, and discern the relationships among these units.

#### *1) Identification of EBEs*

Comparing the two lists of Essential Business Entities (EBEs) generated by domain experts and ChatGPT, we can observe some similarities and differences. About 20 EBEs were identified by both domain experts as well as ChatGPT, and the same concept was used in both cases. These entities are in general listed under courses and curriculum, teaching and learning support, student-related entities, faculty and staff, and institutional support.

However, there are some differences in both lists, for example the lists generated by domain experts focus more on the specific entities related to online courses management by instructors, including syllabus, handouts, videos, booklets, exams reviews, counseling, online office hours, etc. On the other hand, ChatGPT's list covers a broader range of entities, including certifications, research, career services, alumni, employers, and government agencies. This is justifiable because the domain experts who were involved in the brainstorming activity were instructors and may have missed

some of the broader range entities. In addition, ChatGPT's list mentions technical aspects like digital tools, learning management systems, library resources, IT support, and technological advancements, while the domain experts' list emphasizes platforms like teaching platform, exams platform, grading platform, and complaints related to system failure. Also, ChatGPT's list highlights administrative functions like enrollment and registration services, financial aid, marketing and outreach, human resources, and facilities maintenance. These entities are not explicitly mentioned in the domain experts' list. regarding the entities mentioned by domain experts but not by ChatGPT, these were possible to be matched to ChatGPT entities, for example, Online courses syllabus is matched to Curriculum and Learning objectives and outcomes, Exams (projects, reviews) to Assessments, Learning objectives and outcomes, Instructor evaluation to Teaching and instruction, stakeholder involvement to Industry partnerships and Partnerships and collaborations, Maintenance employees to Facilities and maintenance staff, Students' evaluation counseling to Student support services and Academic advising services, Service providers to Technical support services, IT and technical support staff.

ChatGPT helps in identifying essential business entities for a certain domain by answering related questions, this offers the following benefits; (1) Efficiency: ChatGPT can quickly analyze questions and provide answers in a timely manner. This saves significant time compared to manual research or brainstorming activities. (2) Accuracy: With its vast knowledge base and language understanding capabilities, ChatGPT can provide accurate and relevant answers. It can extract essential business entities from the given domain and provide precise information. (3) Consistency: ChatGPT's responses are consistent across different questions. It avoids human bias or inconsistencies that may arise when multiple individuals provide answers. (4) Scalability: ChatGPT can handle a wide range of questions effectively and It can adapt to different business domains, making it versatile for various industries. (5) Accessibility: ChatGPT can be accessed easily through a user-friendly interface or integrated into existing systems. This makes it accessible to a wide range of users, regardless of their technical expertise. (6) Cost-Effectiveness: Using ChatGPT reduces the need for extensive manual research or hiring domain experts to identify essential business entities.

*2) Identification of units of work and the relationships between them*

Domain experts were able to identify 26 units of work, as was highlighted in Fig. 1, while ChatGPT was able to identify 42 units of work as was indicated in section 4. Both lists provide a comprehensive set of units of work for an online teaching process architecture. However, the second list appears to offer more extensive and detailed coverage of units of work compared to the first list identified by domain experts. It includes a broader range of concepts, such as curriculum design, course alignment, learning outcome assessment, faculty training and development, faculty mentoring and support, and data management and analysis. These additional units of work address various aspects of online teaching and support a more holistic approach to online education.

Accordingly, ChatGPT is able to draw units of work diagrams from a given set of essential business entities and determine the relationships between them. this can offer the following benefits: (1) Visualization: ChatGPT can help visualize the relationships and dependencies between different units of work, (2) Scalability and Adaptability: ChatGPT can handle a variety of business domains, making it adaptable to different industries and projects. It can draw units of work diagrams for complex systems or processes, accommodating a large number of entities and relationships. (3) Automation and Efficiency: By automating the process of drawing units of work diagrams, ChatGPT reduces the manual effort required. Table 1 below summarizes the comparison between the units of work diagram generated using the traditional way with the aid of domain experts and that generated through utilizing ChatGPT.

Table 1. Comparing the UOW diagrams generated using traditional way and utilizing ChatGPT

| **Criterion** | **UOW diagram using traditional way** | **UOW diagram utilizing ChatGPT** |
|---|---|---|
| Number of UOWs | 26 | 42 |
| Main focus | Essential elements | More details elements |
| UOW identification method | Brainstorming activity by domain experts | prompts to ChatGPT |
| Time duration | Two sessions with a total of 3 hours | Response time by ChatGPT which doesn't exceed few seconds |
| Relationships | 80% of units of work were related to other UOWs in a network style | 88% of units of work were related to other UOW in a grouping style, 7 groups of related UOW were generated |

To highlight our findings, we identify the following benefits: (1) Increased Number of Units of Work (UOWs); ChatGPT identified 42 UOWs compared to 26 identified using the traditional method. This indicates that ChatGPT can uncover a broader range of elements relevant to the business process architecture. (2) Focusing on Details; While the traditional method focused on essential elements, ChatGPT provided more detailed elements. This suggests that ChatGPT can offer a more granular and comprehensive view of the business process. (3) Efficient Identification Method; ChatGPT identified UOWs through prompts and responded in a matter of seconds, in contrast to the traditional method which required two sessions totaling 3 hours. This demonstrates the time efficiency of using ChatGPT in the identification process. (4) Improved Relationship Mapping; With ChatGPT, 88% of UOWs were related to other UOWs in a grouping style, forming 7 groups of related UOWs. In comparison, the traditional method only achieved a network style relationship mapping for 80% of UOWs. This indicates that ChatGPT might provide a more structured and organized mapping of relationships between UOWs.

### B. ChatGPT's Limitations in Producing the BPA

#### 1) Limitations in generating first cut BPA

Despite providing the rules to generate the first-cut business process architecture from a unit of work diagram to ChatGPT, it was difficult to generate it. Here are a few potential issues: Lack of Contextual Understanding: while ChatGPT is capable of understanding and generating text based on given rules, it may still struggle with grasping the full context of the business domain. It might not accurately capture the details and complexities involved in the process architecture; Ambiguity in Rules: If the rules provided for generating the business process architecture are ambiguous or incomplete, ChatGPT may not be able to infer the desired structure accurately. Unclear instructions can lead to inconsistencies or incorrect interpretations in the generated architecture.

#### 2) Limitations in generating the second cut BPA

It is also expected that ChatGPT would not be able to use heuristics to generate the second cut business process architecture from the first cut business process architecture. The first reason is the limited Training Data. The effectiveness of ChatGPT is highly reliant on the training data it has been exposed to. If the model hasn't been trained on a diverse and comprehensive dataset related to business process architecture, it may struggle to generate accurate or realistic structures. The second reason is due to handling Exceptions and Variations. Real-world business processes often have exceptions, variations, and conditional flows. ChatGPT might not have the capability to handle such complexities effectively, leading to oversimplification or omission of crucial elements in the generated architecture. The third cause is the lack of Iterative Feedback. ChatGPT's ability to improve and refine its responses relies on iterative feedback from users. In the absence of a feedback loop, it may not adequately learn from its mistakes or adapt to specific requirements, resulting in less optimal outputs. And finally, alignment with Business Goals. Generating the first-cut business process architecture goes beyond following predefined rules. It requires a deep understanding of the business goals, objectives, and operational requirements. ChatGPT might not possess the necessary domain expertise to align the architecture with specific business objectives.

### C. Research Significance and Practical Applications

The integration of advanced AI tools like ChatGPT offers a promising avenue to accelerate and enhance the creation of Business Process Architectures (BPA). This research, which focuses on the Riva method applied to an online teaching context, underlines both the potentials and pitfalls of employing ChatGPT in such a domain.

The ability of ChatGPT to identify essential business entities and units of work, where these tasks traditionally require multiple brainstorming sessions, stands as a testament to the potential of AI in expediting the BPA creation process.

The research opens a gateway to understanding how conversational AI can be fine-tuned and employed in other complex domains, signaling the shift from traditional methods to more automated solutions.

As practical applications, organizations can potentially reduce the time and resources required in the initial stages of the BPA design process. ChatGPT can be employed as a collaborative tool for domain experts, assisting in the brainstorming phase and providing insights that might be overlooked.

Highlighting the limitations of ChatGPT's contextual understanding brings to the fore the importance of enhancing AI's ability to deal with complex business nuances, setting a pathway for future research in the domain. For example, ChatGPT's natural language processing capabilities could be advanced to tailor industry-specific business scenarios. This improvement could be achieved through the integration of more sophisticated algorithms and exposure to diverse, real-world business contexts, perhaps in collaboration with business schools or corporate entities. Additionally, exploring synergies between ChatGPT and other AI technologies like predictive analytics could yield a more nuanced understanding of complex business environments.

## VI. Conclusion

The exploration of ChatGPT's capabilities in the realm of Business Process Architecture (BPA) revealed both the strengths and limitations of using AI in this domain. One standout finding is ChatGPT's proficiency in identifying Essential Business Entities (EBEs) and Units of Work (UOW). With ChatGPT, there was a marked increase in the efficiency, accuracy, consistency, scalability, and cost-effectiveness of identifying these elements, which traditionally would have required exhaustive brainstorming sessions with domain experts.

ChatGPT not only surpasses the traditional method by identifying a greater number of UOWs (42 compared to 26), but also excels in providing a more detailed and comprehensive view of business processes. Its ability to rapidly process prompts and deliver results within seconds stands in stark contrast to the traditional approach, which requires extensive time investment, spanning over three hours. Moreover, ChatGPT's advanced approach to organizing UOWs into coherent groups (88% in a grouping style) offers a more structured and understandable layout than the traditional network style

However, in the context of generating both the first and second cuts of BPA, challenges arose due to the difficulty in grasping full contextual understanding of the domain, ambiguity in rules, and reliance on domain experts. The inability to align with specific business objectives leads to challenges of automating complicated, domain-specific tasks.

From a practical side, organizations can derive benefits by incorporating AI tools like ChatGPT into the BPA design process. By serving as a collaborative tool, ChatGPT can enhance brainstorming sessions, bringing in insights that might otherwise be missed. The pinpointed limitations also serve as a roadmap for future research, emphasizing the need for enhancing AI's capabilities in understanding and navigating complicated business processes.

The collaboration between the AI model and domain experts is paramount. While ChatGPT provides advanced analytical capabilities, rapid data processing, and the ability to generate diverse solutions, domain experts offer the

required understanding, contextual insights, and years of experiential knowledge. To optimize this collaboration, it's essential to establish a feedback loop where domain experts continually refine the queries posed to ChatGPT, based on the model's outputs and the boundaries of the business domain. This iterative process ensures that the AI's solutions are aligned with real-world business needs.

In conclusion, the research problem addressed in this paper holds significant importance as organizations pivot toward AI-driven transformations. Utilizing ChatGPT as a tool for generating business process architectures can be effective when combined with domain expertise. It has the potential to reduce time and effort in certain aspects of the process and provide valuable insights, but domain expert involvement remains essential for ensuring accuracy, completeness, and alignment with specific business goals. In addition, this exploration of ChatGPT's role in BPA offers valuable insights that could guide businesses and researchers, emphasizing the synergy between human expertise and AI capabilities, and highlighting the boundless potential that awaits when they collaborate.

## Conflict of Interest

The author declares no conflict of interest.

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