

# **CHAPTER I**

## **INTRODUCTION**

This chapter outlines the basic framework for conducting the research, including the background, research question, objectives, benefits, and scope of the study as a guide for the research.

### **1.1 Background**

As the knowledge economy evolves, the role of alumni has become increasingly strategic for universities—both as a reflection of the institution's quality and as an intellectual, social, and professional asset. A strong relationship between alumni and their alma mater has the potential to open up opportunities for industry collaboration, enrich the curriculum with real-world insights, and sustainably strengthen the institution's reputation. Moreover, alumni engagement within the campus ecosystem has been shown to have a direct impact on current students. Sarah emphasized that a digitally integrated alumni engagement platform is a vital tool for bridging the communication gap between the university and its graduates, as well as for facilitating a more dynamic and inclusive exchange of career information [1].

Alumni management at UPN "Veteran" East Java, particularly by UPAPKK, still faces challenges in the form of fragmented communication channels. Based on observations and interviews with the Tracer Study Administrator, alumni interactions are currently scattered across various unintegrated channels, such as informal WhatsApp groups and general social media platforms like LinkedIn, which mix alumni networks with external professional contacts. To date, there is no centralized digital platform specifically designed to serve as a space for the alumni community to interact, share opportunities, and maintain an official connection with the institution. This situation weakens alumni's sense of connection to their alma mater after graduation and hinders the dissemination of important information from the university such as the Tracer Study program, event announcements, and collaboration opportunities thereby reducing alumni participation in various institutional initiatives.

Several studies have proposed technology-based solutions to address this issue. Radhika [2] developed a web-based alumni management system that supports career tracking and an events gallery. Buvana [3] designed an alumni-student connection

platform featuring a directory, mentoring, and a job board. Manepatil [4] even integrated an AI-based chatbot. Meanwhile, Budhyal [5] emphasizes that institution-specific platforms have a higher level of trust compared to public social media, thanks to user identity validation and better content control.

Existing platforms generally function only as one-way bulletin boards or static directories, lacking a theoretical framework specifically designed to foster deep and sustained social interaction. In fact, social interaction is key to the success of a digital community. This is supported by Martin's meta-analysis, which found that elements of the Community of Inquiry are positively correlated with users' perceptions of success. Although Cognitive Presence has a strong correlation ( $r = 0.663$ ), this success is still supported by significant moderate contributions from Social Presence ( $r = 0.432$ ) and Teaching Presence ( $r = 0.392$ ). [6]. This demonstrates that informational content cannot stand alone and requires the support of social interaction and structured guidance to achieve optimal results for users.

The mentoring feature, as a form of Direct Instruction in CoI on platforms or in previous research, is often still carried out manually. This process of searching for and matching mentors is highly inefficient because students must browse alumni profiles one by one to find relevant expertise [7]. To address this inefficiency, various recommendation system approaches exist, such as Collaborative Filtering (CF), Hybrid Systems, Content Based Filtering (CBF), and Rule Based systems [8]. Among these methods, CF works by providing recommendations based on the interaction history of other users with similar preferences. However, this method heavily relies on the availability of historical data, so it often faces the cold-start problem [8]. Meanwhile, Hybrid Systems can create a more robust system by combining CF with other methods, but their implementation requires a highly complex architecture and still needs initial data to operate optimally. Rule-Based systems can generate transparent and easily understandable recommendations thanks to their explicit decision logic. However, this method operates based on fixed rules and heuristics that must be manually formulated by experts at the outset. This approach becomes too rigid and cannot scale to match the dynamic and highly diverse combinations of user profile attributes, such as skills and career interests [8].

CBF operates based on an analysis of user profile attributes and characteristics, making it user-independent and more effective at addressing the cold-start problem for

new users [8]. Recent research also shows that CBF has proven effective for profile-based recommendations in academic and professional contexts. Zuhri successfully developed an academic community recommendation system using CBF with the TF-IDF and Cosine Similarity approaches, yielding a System Usability Scale (SUS) score of 76 (the "Good" category) [9]. In the context of algorithm evaluation, Anwar reported excellent Mean Average Precision (MAP) results for an academic project member recommendation system: 0.92 for a random community, 0.79 for a similar community, and 0.98 when compared to actual members [10]. These findings indicate that CBF is not only effective in terms of usability but also computationally accurate in matching attribute-based profiles.

This study proposes the development of an alumni community platform based on the Community of Inquiry (CoI), a constructivist framework focused on creating meaningful collaborative experiences through three core elements: Social Presence, which enables the expression of identity and interpersonal connection; Cognitive Presence, which fosters knowledge construction through discussion and reflection; and Teaching Presence, which provides facilitation, design, and guidance within the community [11]. The application of CoI in online forums has been shown to improve the quality of collaboration and the depth of discussion [12]. To support the efficiency of the mentoring feature, the system integrates the CBF method with the Cosine Similarity algorithm to match student and alumni profiles based on attribute similarities. The system's quality is further tested using Black Box Testing to ensure functionality meets requirements, and evaluated using the SUS to measure usability and user satisfaction. Additionally, the performance of the recommendation algorithm was assessed using the MAP metric to measure the accuracy and relevance of matching results. Thus, this interactive alumni community platform, grounded in a theoretical framework, is expected to strengthen relationships between alumni, students, and the institution while supporting sustainable collaboration and career development.

## **1.2 Problem Statement**

Based on the background described above, the research questions for this study are as follows:

1. How can an interactive alumni community platform based on the Community of Inquiry model be designed?
2. How can the elements of Social, Cognitive, and Teaching Presence be implemented into the platform's features to facilitate interaction among alumni and between students?
3. How can the CBF method be integrated into mentoring features to improve the relevance of mentor-student matching?
4. How are the results of system functionality testing using Black Box Testing, usability testing using the SUS, and method testing using MAP?

### **1.3 Research Objective**

Based on the research problem outlined above, this study was conducted with the following primary objectives:

1. To design an interactive alumni community platform based on the Community of Inquiry (CoI) framework.
2. To implement the elements of Social Presence, Cognitive Presence, and Teaching Presence into the platform's features to facilitate interactions among alumni as well as between alumni and students.
3. To integrate the CBF method into the mentoring feature to improve the relevance of matches between mentors and students based on profile similarities.
4. To test system functionality using Blackbox Testing, evaluate usability using the SUS, and evaluate the performance of the CBF method using MAP.

### **1.4 Research Benefit**

The results of this study are expected to provide benefits and practical value, both in terms of academic research and practical application for the ecosystem:

1. For the University, to provide an alumni community platform capable of sustainably increasing alumni engagement.
2. For Alumni and Students
  - a. Serving as a forum for sharing experiences, career opportunities, and professional networks across graduating classes,

- b. Providing access to mentoring and information on relevant job/internship opportunities.
3. For Researchers, it offers practical contributions in the form of adapting the CoI framework to a non-academic community platform and implementing CBF for the context of matching alumni-student mentoring.

### **1.5 Research Limitation**

To avoid an overly broad scope and ensure the focus of this study, the following research limitations have been established:

1. This study focuses on the design and development of a web-based alumni community platform.
2. The actors in the system are limited to Students, Alumni, Partners, and Admins.
3. The features developed are as follows:
  - a. Community Module: Group forums, articles, feed posts, direct messages, a follow system, and notifications.
  - b. Career Module: Job board and event management.
  - c. Mentoring Module: Mentor matching system using the CBF method.
  - d. Management: User profiles and alumni directory.
4. System evaluation and testing using Blackbox Testing, MAP, and SUS.