The Implementation of Virtual Reality (VR) of Laboratories for Campus Marketing and Promotion

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Abstract

ITPLN's promotional target range extends to Indonesia. Currently, campus admissions only focus on 35 out of 38 provinces, with a limited number of students from remote and outlying areas. Several promotional techniques have been implemented, yielding satisfactory results; however, there is room for improvement. ITPLN utilises VR to showcase campus facilities through virtual media to enhance its efforts. It offers virtual tours that introduce various laboratories. Integrating the laboratory as a promotional tool is deemed appropriate for several reasons, including broader coverage, more comprehensive information, and an immersive and interactive experience. The development of VR facilities followed the MDLC method, and thorough testing was conducted to refine the existing VR resources. The outcome of this process is nine laboratory tours highlighting VR-based practical and research facilities, which can further enhance web-based learning and campus promotion.

Keywords: Virtual Reality, Laboratory, Virtual Tour, Marketing, Promotion

Abstrak

Jangkauan target promosi ITPLN menjangkau seluruh Indonesia. Saat ini, penerimaan mahasiswa baru berfokus pada 35 dari 38 provinsi, dengan jumlah mahasiswa yang terbatas dari daerah terpencil dan terluar. Beberapa teknik promosi telah diterapkan dan memberikan hasil yang memuaskan, namun masih ada ruang untuk perbaikan. Untuk meningkatkan upayanya, ITPLN memanfaatkan VR untuk menampilkan fasilitas kampus melalui media virtual. Ini menawarkan tur virtual yang memperkenalkan berbagai laboratorium. Integrasi laboratorium sebagai alat promosi dianggap tepat karena beberapa alasan, termasuk cakupan yang lebih luas, informasi yang lebih komprehensif, dan pengalaman yang imersif dan interaktif. Pengembangan fasilitas VR mengikuti metode MDLC, dan pengujian menyeluruh dilakukan untuk menyempurnakan sumber daya VR yang ada. Hasil dari proses ini adalah sembilan tur laboratorium yang menyoroti fasilitas praktikum dan penelitian berbasis VR, yang selanjutnya dapat meningkatkan pembelajaran berbasis web dan promosi kampus.

Kata-kata kunci: Realitas Virtual, Laboratorium, Tur Virtual, Pemasaran, Promosi

1.   Introduction

As an institution of higher education, the campus plays a significant role in producing competent young individuals well-prepared to confront global challenges. To fulfil this role, it is essential for the campus to effectively promote and introduce itself to the broader community. Various media channels, such as brochures, websites, and socialisation events, have traditionally promoted and introduced campuses. Presently, these promotional media are enhanced by several alternative innovations in marketing and promotion, including Augmented Reality (AR) and Virtual Reality (VR) technology.

Institut Teknologi PLN (ITPLN) is an educational institution that endeavours to cultivate future leaders in energy. ITPLN harnesses several distinct advantages, such as its collaboration with PT PLN (Persero) in disseminating campus-related information and utilising Virtual Reality (VR) technology. The promotional scope of ITPLN extends throughout Indonesia. While the campus admissions target 35 out of the 38 provinces, more students are needed from some of the most remote and peripheral regions. Diverse promotional endeavours have been undertaken, yielding satisfactory outcomes. Nonetheless, these initiatives necessitate enhancement. In its quest for improvement, ITPLN capitalises on VR technology to enable the presentation of campus facilities via virtual media.

ITPLN has developed numerous virtual tours for laboratories within various faculties on campus via its VR laboratory. The laboratory was selected based on its significance as a fundamental component of the Engineering campus. Providing comprehensive, contemporary, and current equipment is essential for Engineering students to engage in practical exercises. Table 1 enumerates a few of the laboratories incorporated into the VR virtual tours.

Table 1. Name of Laboratories with Virtual Tour

No	Name of Laboratory	Faculty
1	Technics of Materials and Metallurgy	FTBE
2	Embedded System	FTEN
3	Computer Network	FTEN
4	Computer Network	FTEN
5	High Voltage	FKET
6	Distribution and Utilization of Electricity Power	FKET
7	Manufacture and Production Process	FTBE
8	Mini Steam-Electric Power Plant and Micro-Hydro	FTBE
9	Soil Mechanics	FTIK
10	Electrical Machineries	FKET

This endeavour is anticipated to furnish a mechanism for individuals from provinces distant from Jakarta. Predicated on interviews conducted with ITPLN Admissions, a considerable number of potential students aspire to have the opportunity to explore the campus physically and personally witness the diverse array of amenities on offer, such as the laboratories.

VR Technology has been embraced across various domains, including promoting and acknowledging educational institutions. Through VR, individuals can engage in immersive encounters that closely resemble reality, all without being physically present at the location in question. The significance of VR technology in campus promotion and introduction can be attributed to its capacity to offer prospective students an unparalleled and captivating experience. By utilising VR, these potential students can experience the sensation of being physically present on the campus grounds. They can explore the numerous amenities provided, such as lecture halls, classrooms, libraries, and sporting facilities, while simultaneously acquainting themselves with the overall ambience of the campus, the student community, and the array of extracurricular activities available.

Utilising virtual reality (VR) technology in promotion yields various advantages regarding its visually captivating nature and interactive capabilities. VR enables prospective students to select their desired path of exploration, engage with virtual objects and individuals, and obtain supplementary information about the courses that pique their interest. This personalised encounter facilitates informed decision-making when it comes to campus selection. Additionally, the implementation of VR technology can also surmount certain obstacles encountered in campus promotion and introduction. For instance, geographical distance often hinders prospective students from physically visiting campuses. Nonetheless, VR allows them to experience the campus environment without extensive travel. The research focuses on the implementation of VR technology, which is utilised as one of the spearheads of campus promotion facilities through the presentation of direct experience in conducting virtual tours in several laboratories at ITPLN.

Numerous scholarly publications have emerged to elucidate the role of virtual reality (VR) in the introduction of campuses, as evidenced by references [1] [2] [3]. Conversely, some publications utilise VR as a conduit for disseminating campus-related information, as exemplified by references [4] [5]. In certain instances, VR provides visitors with a virtual perspective of college infrastructure, enabling remote access to specific departments or

laboratories **[6]**. These technological advancements rely on a feature-based automatic image stitching approach, which presents challenges such as corrupted images caused by noise, indexing multiple images, high image resolution, parallax, and scene erosion.

A different scholarly publication explores the development of a digital educational institution created by integrating virtual surroundings publication capabilities and virtual scenario geometric modelling technology provided by the Google Earth platform **[7]**. In addition, another scholarly work utilises the 360-degree video functionality of Google Cardboard **[8] [3]**.

The Multimedia Development Life Cycle (MDLC) is widely utilised in the creation of virtual reality (VR) tours **[8] [9] [10]**. Scholars have converted the entire campus building into a virtual entity through 360-degree video recording. By employing compatible devices such as VR glasses, incoming students can explore the campus and learn about the various rooms through virtual reality applications.

These applications that utilise virtual reality offer numerous advantages to their users. These include providing captivating information and functioning as a virtual promotional tool for the campus **[10]**. Moreover, they enable users to interact interactively and communicatively with information media designed for interactive dissemination **[4]**. Additionally, they can enhance and supplement physical tours while creating opportunities to explore spatial presence and motivation within the educational context **[11]**.

Based on several studies above, a general deduction can be made that virtual reality (VR) technology can assist educational institutions in promoting themselves. This can be achieved by utilising the Model-Driven Layered Construction (MDLC) approach and integrating various elements from Google, including Google Earth and Google Cardboard.

In the forthcoming study undertaken by the authors, several resemblances and disparities exist between the research endeavours mentioned above. One notable similarity is the employment of virtual reality (VR) technology to disseminate campus information using virtual tours. Furthermore, the creation of the application involved the utilisation of MDLC, and additional features such as Oculus goggles, Google Earth, and Google Cardboard were incorporated. To give potential students comprehensive lectures and practical experiences, the research team selected 9 Engineering laboratories as a prominent showcase for the virtual tour functionality on campus. This innovative approach not only presents a general overview of the campus but also focuses on the specific aspects of genuine interest to prospective students and

their parents.

2. Method

This research involves several stages, starting with problem identification and ending with report writing. As with other studies using VR **[2] [3] [12]**, the authors developed the system using the Multimedia Development Life Cycle (MDLC) method, which includes concept creation, design, data and material collection, assembly, testing, and deployment. The MDLC method provides more adequate work results than other methods **[9]**. **Figure 1** is MDLC.
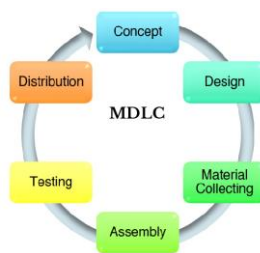

Figure 1. MDLC

Marketing and promotion success relies heavily on information technology, particularly the Internet [13][14]. Manual marketing systems cannot offer the diverse features internet technology guarantees to engage customers [15][16]. Furthermore, by incorporating images, videos, and 3-dimensional graphics, the marketing team can enhance customer interest in their products [17]. This technology is also utilised in higher education institutions, where campuses use it [18]. The process of promoting campus laboratories using virtual reality can be outlined in **Figure 2**.
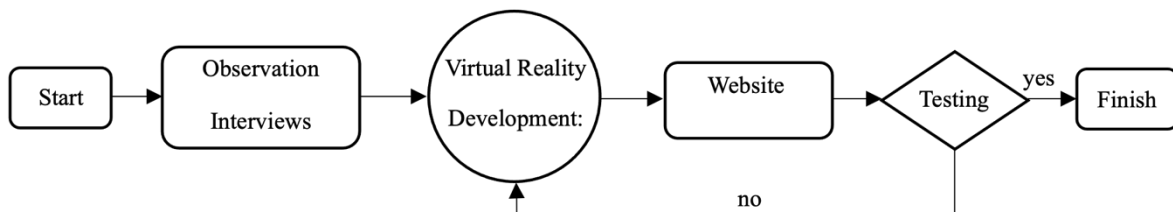

Figure 2. Flowchart of VR Promotion for Campus

Implementing VR for the virtual tour laboratory in the campus admissions department involved conducting observations, interviews, and in-depth studies. Subsequently, the VR virtual tour for the campus was developed, followed by the implementation of VR on the official campus website. This was then followed by functional and usability testing to ensure that the features in VR were tested and utilised appropriately.

3.   Results and Discussion

Using VR technology to create a virtual campus offers a more immersive and comprehensive encounter for potential students and individuals interested in exploring the campus atmosphere. At the ITPLN campus, the Oculus Quest 2 is the primary device for VR implementation, while the Oculus App from Facebook is the intermediary application. The laboratory VR application at ITPLN was crafted using CorelDraw 17 and Adobe Photoshop for 2D images, and the Unity 3D engine combined with Blender 3D and Sketchup for 3D images. Windows 11 is the chosen operating system. The development process for several VR features is depicted in the accompanying figure. **Figure 3** is the login page, and **Figure 4** is the virtual lab options page.

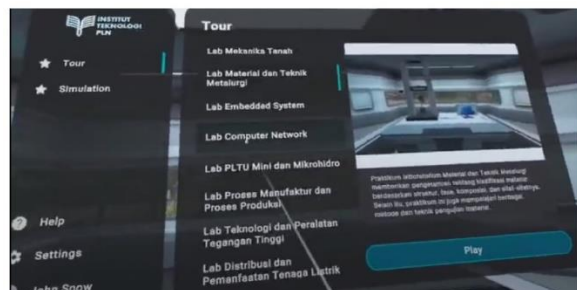**Figure 3.** Login page   **Figure 4.** Virtual Lab Options Page

One of the outcomes achieved through this virtual reality program is the ability for students to engage in virtual practice before physically visiting the actual location. An attribute found within the Hydraulics laboratory virtual reality application is the simulation of water current measurement using a current meter, as illustrated in **Figure 5**.

Figure 5. VR Water current measurement with Current Meter

Regarding campus marketing and promotion, VR features in various laboratories are placed on the official campus website to reach enthusiasts and prospective students from different regions, both in Indonesia and abroad. The website display is in **Figures 6** and **Figure 7.**
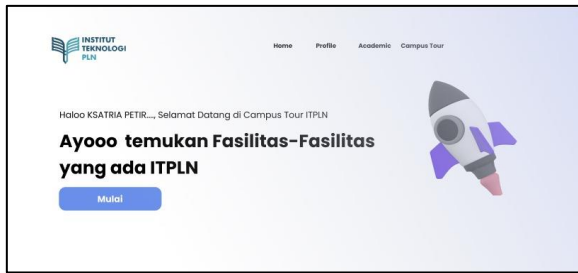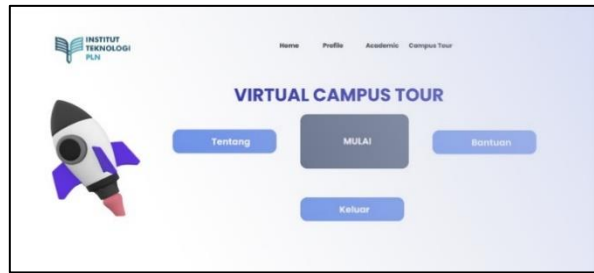
Figure 6. Virtual Tour on the Web

Figure 7. Virtual Tour feature on the Web

During the testing phase, the team engaged multiple entities within the campus community and stakeholders, including lecturers, management teams, high school students, and industry representatives. Overall, the participants in the test demonstrated enthusiasm and intrigue toward the diverse array of features offered within the virtual reality laboratory through this VR facility: **Figure 9** presents feature testing.

Figure 8. Feature Testing by Lecturers

Figure 9. Feature Testing by Students

4.   Conclusion

The Laboratory Virtual Tour, utilising the concept of Virtual Reality, offers several features that provide two distinct advantages to the campus. First, it enables the provision of novel practical experiences to students while fostering the development of technology-driven learning. Second, this feature holds potential as a marketing and promotional asset that can effectively reach all parts of Indonesia and even extend to international audiences, including prospective students residing in disadvantaged, frontier, and outermost areas.

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