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E-PASYAL: An Electronic Photographic Architecture Simulation Yielding the Actual Location

Jason Paul L. Glina*, Richard G. Rabulan

Sorsogon State University, the Philippines

*Correspondence: E-mail: jasonpglina@sorsu.edu.ph

ABSTRACT

This system is a future-driven technology that seeks to find a solution to one of the problems faced by prospective students or even students of Sorsogon State University – Bulan Campus, referring to the very tiresome process of familiarizing and locating the specific areas of the campus. This system is entitled “E-PASYAL is an Electronic Photographic Architecture Simulation Yield Actual Location” that gives a simulation of the infrastructures and areas in Sorsogon State University – Bulan Campus. This system provides the users with a sequence of videos or still images of the different areas of the campus that will be used for making a virtual reality tour using the algorithm for virtual reality software. With this, the system generates a virtual tour function that the user can interact with it with a 360-degree rotation tour around the selected area. Additionally, the user can navigate through it and become familiar with the details of the offices, rooms, and buildings on the campus. With interactive campus experiences, it will have elements that make the campus unique and bring it to life virtually. Moreover, this system makes it easy for prospective students to see the school from their comfort zone, and, at the same time, allows them to highlight the best features of the school property without having to be there physically.

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1. INTRODUCTION

Peregrinating the school campus, especially a large campus area like Sorsogon State University Bulan Campus, is very exhausting and time-consuming. Inspectors and auditors, such as ISO, ISA, etc., are perambulating the campus, so they need to inspect the whole area of the campus thoroughly. And also, prospective students make up a significant portion of their potential target schools. Some of them can travel to visit the campus, but many of them simply cannot. Some may not be able to schedule an in-person visit due to their hectic schedules and having to choose how many schools they can physically visit.

When a student is unable to visit, they miss out on a lot of crucial information that they would otherwise get when they were on campus. This could be something simple, like experiencing walking from one building to another to touring the residence halls, to meeting other students. Through Virtual Simulation Technology and self-paced exploration, a Photographic Architecture Simulation helps prospects start to visualize themselves as if they are on the campus. Virtual reality technology can simulate a very similar environment to the real world, feel the surrounding things, and make people have a sense of immersion (Biocca & Delaney, 1995; Slater & Sanchez-Vives, 2016; Mandal, 2013). Virtual Simulation Reality is a very powerful and compelling technology that aims to mimic the real world with a computer-generated environment and engage all the senses of a human being. A virtual tour is a visual tool that replicates the experience of visiting and walking through an area. With this kind of technology, students and stakeholders of Sorsogon State University, Bulan Campus, will experience its ambiance even when they are away from the campus.

The integration of virtual tours in educational settings represents a significant advancement in how prospective students and stakeholders engage with school buildings. By enabling users to virtually experience educational spaces, virtual tours for facilities provide a creative substitute for conventional in-person visits. And also, interactive elements within virtual tours can further enrich the user experience. The findings from a recent study on playable 3D virtual campus tours indicate that incorporating gamified features enhances student interest during recruitment processes (Lin & Neo 2024; Su *et al.*, 2023). By utilizing frameworks like the Technology Acceptance Model, researchers have demonstrated that such interactive formats are not only engaging but also effective in delivering informative experiences about prospective institutions. As technology continues to evolve, integrating these tools into educational practices will likely play an essential role in shaping future recruitment strategies.

One of the systems developed by (Calingasan *et al.*, 2019). In La Verdad Christian College entitled “Into The Campus: Creating An Android-Based Interactive Virtual Tour Of La Verdad Christian College – Apalit Using Unity 3d”, this application helped the students of La Verdad Christian College, applicants and their parents to be familiarized with the appearance of the school and know the different basic application process of the school even before they visit the school personally which would help them make their application process faster, and convenient. This application also helps the applicants with their decision-making on applying to the school.

E-PASYAL is An Electronic Photographic Architecture Simulation Yield Actual Location that gives a simulation of an existing location, usually composed of a sequence of videos or still images of specific areas, which transferred into Virtual reality software and use algorithm so that user can interact to the virtual tour by doing some gestures like zoom in, move left and right, forward and backwards also having rotation 360 degrees tour around the area. Thus, a visitor will be able to navigate on their own and move from one room to another, go to all the floors, and check out every detail of the area. And most of the students do not take the time

to read; they need to experience it, to believe it (Mann, 2000). With interactive campus experiences, it will have elements that make the campus unique and bring it to life virtually. This system is a valuable tool for employees, students, prospective students, and organizations because it enhances accessibility for employees, clients, and stakeholders who may need to familiarize themselves with the office layout, understand where different departments are located, and find their way during in-person visits.

This developed system can greatly contribute to locating offices that will lessen the burden of users searching for them. It is also a strategic way to enhance engagement, orientation, and accessibility. By following the outlined steps—planning, capturing, creating, providing context, sharing, and maintaining businesses can produce an interactive, informational resource that effectively guides users through the office environment. This not only enhances the onboarding experience for new employees but also elevates the organization's professionalism, making it an invaluable asset to the company.

Moreover, this system makes it easy for prospective students to see the school from their comfort zone, and, at the same time, allows them to highlight the best features of the school property without having to be there physically (Zomorodian *et al.*, 2016). To make sure that the developed system is a quality product, ISO 25010 is used for evaluating the system. A system's quality is determined by how well it meets the explicit and implicit needs of its different stakeholders, adding value in the process. The ISO 25010 evaluation terms that have been used for this system are functional suitability, performance efficiency, reliability, and compatibility. The proponent used the Feature Driven Development methodology that emphasizes the gradual and iterative creation of software functionality. It is to produce high-quality software rapidly by segmenting the development process into manageable, smaller jobs, which makes the development of the system much easier to manage.

This project aims to: (i) Develop a system that simulates the architectural buildings of Sorsogon State University, Bulan Campus; (ii) Carry out and deliver the following features (Interactive and engaging, and individually paced scene, 360-degree panoramic image/view, Architectural Building simulation); (iii) Validate the application in terms of performance efficiency, functional suitability, reliability, and portability.

2. METHODS

2.1. Research Design, Data Collection Procedures, and Data Analysis Procedures

This study focuses on the development of the E-PASYAL: an Electronic Photographic Simulation Yielding Actual Location. Quantitative data will be collected to ensure that the development will be aligned with the needs of the client. Surveys and questionnaires will be conducted. However, in the system development stage, the study will employ the Feature Driven Development Methodology wherein which promotes continuous iteration of development and testing throughout the software development lifecycle of the project.

2.2. Informal and Semi-Structured Interviews

Interviews with key informants were conducted in an informal setting, and during these interviews, we only asked a select few questions that have been predetermined questions, while the remaining questions were free-flowing.

2.3. Feature Driven Development Methodology

The feature-driven methodology is well-suited for long-term projects that continually change and add features in a regular manner that works well with large-scale, long-term, or ongoing projects. This Methodology will be employed during the development of the system.

The following are the phases: (i) Develop an overall model; (ii) Build a feature list; (iii) Plan by feature; (iv) Design by feature, and (v) Built by feature

2.4. Respondents and Sample Population

The importance of the various factors in the software development process will guide the selection of the respondents. These are Administrators, Instructors, SorSU-BC prospective students, and students chosen at random from across all year levels. Moreover, the selection of respondents will be based on a Purposive Sampling population to ensure the quality of responses during the activities.

3. RESULTS AND DISCUSSION

The different modules comprising the system were tested for implementation, and taking into consideration all the required components were present, and were presented to the different respondents, wherein the result is “more than what is expected”. Moreover, an interval using a scale was used to show the description and interpretation of the average response in the system. **Table 1** presents the Table of Verbal Interpretation, and **Table 2**, which is the Evaluation Rubric that was utilized to interpret and describe the user satisfaction level of the system’s efficiency and effectiveness. Evaluating the developed system using the assessment tools for a quality product plays a vital role in the development of the system, as it enhances the features and functionalities, and fixes the bugs and errors in the developed system.

Furthermore, during the testing phase, the system was evaluated and the evaluation was guided by an industry-accepted assessment model – ISO 25010. It is to make sure that the developed system is a quality product. ISO 25010 is used for evaluating the system. The areas that were evaluated in the developed system were its functionality suitability, performance efficiency, reliability, and portability. Thus, the results of the evaluation from the respondents were presented in a series of tables below. Moreover, 4 sets of respondents provided understandings on the overall quality of the system, these respondents were composed of 7 Administrators, 10 Instructors, 30 Students selected from the school, and 7 IT Experts. The respondents evaluated the system using the five-point scale system, reflecting 1 as the lowest and 5 as the highest. **Table 3** shows the result of the evaluation of the different respondents for the Functional Suitability. With an overall mean of 4.8550, the system is deemed to be “far more than what is expected” in terms of its functionality Suitability. This feature indicates the extent to which a system or product fulfills explicit and implicit needs when utilized by predetermined guidelines. **Table 4** displays the results of the evaluation of different respondents to the system’s Performance Efficiency. This characteristic indicates how well a product operates within predetermined time and throughput constraints and how resource-efficient it is when operating under predetermined settings. The respondents guaranteed that the system is “far more than what is expected” when it comes to the system’s Performance Efficiency, with an overall mean of 4.9275.

Table 5 reflects the results of the evaluation from different respondents regarding the system’s reliability. The extent to which a product, system, or component can carry out a given task under a given set of circumstances and for a given amount of time. With an overall mean of “4.7975”, the respondents approved that the system is reliable and that it is “far more than what is expected”. **Table 6** displays the results of the evaluation of the system’s portability from the different respondents. The respondents determined that the system is portable and it is “far more than what is expected”; thus, the system met an overall mean of 4.8550 on its portability phase.

Table 1. Table of verbal interpretation.

Mean	Verbal Interpretation
0 – 1.0	Absence of the expectation
1.1 – 2.0	Less than what is expected
2.1 – 3.0	Presence of the expectation
3.1 – 4.0	More than what is expected
4.1 – 5.0	Far more than what is expected

Table 2. The evaluation rubrics.

Interval Scale	Description	Interpretation
4.1 – 5.0	Highly Applicable	The system efficiently and effectively satisfied all quality model characteristics in terms of functionality suitability, reliability, usability, speed, and maintainability.
3.1 – 4.0	Very Applicable	The system efficiently and effectively satisfied some of the quality model characteristics in terms of functionality, reliability, usability, speed, and maintainability.
2.1 – 3.0	Applicable	The system minimally satisfied all quality model characteristics in terms of functionality, reliability, usability, speed, and maintainability.
1.1 – 2.0	Slightly Applicable	The system hardly satisfied the quality model characteristics in terms of functionality, reliability, usability, speed, and maintainability.
1.0 or less	Not Applicable	The system did not meet the quality model characteristics in terms of functionality, reliability, usability, speed, and maintainability.

Table 3. Functional suitability rates of the developed system.

1.0 Functional Suitability	
Respondents	Mean
Administrators (7)	4.90
Instructors (10)	4.87
SorSU-BC Students (30)	4.73
1.0 Functional Suitability	
Respondents	Mean
IT Experts (7)	4.92
Overall Mean	4.8550

Table 4. Performance efficiency rates of the developed system.

2.0 Performance Efficiency	
Respondents	Mean
Administrators (7)	5.00
Instructors (10)	4.92
SorSU-BC Students (30)	4.89
IT Experts (7)	4.90
Overall Mean	4.9275

Table 7 displays the result of the evaluation from the Administrators of Sorsogon State University – Bulan Campus regarding the developed system's functionality suitability, performance efficiency, reliability, and portability. With an overall mean of 4.8825, the respondents concluded that the system is “far more than what is expected.” **Table 8** shows the result of the evaluation from different Instructors of Sorsogon State University – Bulan Campus regarding the developed system's functionality suitability, performance efficiency, reliability, and portability. With an overall mean of 4.8500, the respondents concluded that the system is “far more than what is expected”. **Table 9** presents the result of the evaluation

from the Administrators of Sorsogon State University – Bulan Campus regarding the developed systems' functionality suitability, performance efficiency, reliability, and portability. With an overall mean of 4.185, the respondents concluded that the system is “far more than what is expected.”

Table 10 shows the result of the evaluation from the different IT experts regarding the system's functionality suitability, performance efficiency, reliability, and portability. With an overall mean of 4.8900, the respondents concluded that the system is believed to be “far more than what is expected.” Furthermore, **Table 11** presents the overall evaluation of the system’s quality characteristics from different respondents, thus, the result of the evaluation was “far more than what is expected”, with an overall mean of 4.8588. The respondents determined that the system is perceived to be “Highly Applicable”. ISO 25010 Assessment tools are used for evaluating the quality of the developed system, which is a quality attributes for the product that the client can assure that they can experience an interactive and user-friendly Virtual Reality System.

Table 5. Reliability rates of the developed system.

3.0 Reliability		
	Respondents	Mean
	Administrators (7)	4.78
	Instructors (10)	4.86
	SorSU-BC Students (30)	4.73
	IT Experts (7)	4.90
	Overall Mean	4.7975

Table 6. Portability rates of the developed system.

4.0 Portability		
	Respondents	Mean
	Administrators (7)	4.85
	Instructors (10)	4.75
	SorSU-BC Students (30)	4.90
	IT Experts (7)	4.92
	Overall Mean	4.8550

Table 7. Evaluation from the administrators of the developed system.

	Quality Characteristics	Section Mean
1.0	Functional Suitability	4.90
2.0	Performance Efficiency	5.00
3.0	Reliability	4.78
4.0	Portability	4.85
	Overall Mean	4.8825

Table 8. Evaluation from the instructors of the developed system.

	Quality Characteristics	Section Mean
1.0	Functional Suitability	4.87
2.0	Performance Efficiency	4.92
3.0	Reliability	4.86
4.0	Portability	4.75
	Overall Mean	4.8500

Table 9. Evaluation from the SorSU-BC students of the developed system.

	Quality Characteristics	Section Mean
1.0	Functional Suitability	4.73
2.0	Performance Efficiency	4.89
3.0	Reliability	4.73
4.0	Portability	4.90
	Overall Mean	4.8125

Table 10. Evaluation from the IT experts of the developed system.

	Quality Characteristics	Section Mean
1.0	Functional Suitability	4.92
2.0	Performance Efficiency	4.90
3.0	Reliability	4.82
4.0	Portability	4.92
	Overall Mean	4.8900

Table 11. Overall evaluation of the developed system.

Characteristics	Administrator	Instructor	Student	IT Experts	Mean	Interpretation
Functional Suitability	4.90	4.87	4.73	4.92	4.8550	Far more than what is expected
Performance Efficiency	5.00	4.92	4.89	4.90	4.9275	Far more than what is expected
Reliability	4.78	4.86	4.73	4.82	4.7975	Far more than what is expected
Characteristics	Administrator	Instructor	Student	IT Experts	Mean	Interpretation
Portability	4.85	4.75	4.90	4.92	4.8550	Far more than what is expected
Mean	4.8825	4.85	4.8125	4.89	4.8588	Far more than what is expected
Overall Mean			4.8588			Highly Applicable

4. CONCLUSION

Based on the findings of this study, the following conclusions are formulated: (i) The developed system is considered to be “Highly Applicable” as perceived by the different respondents. The developed system is serviceable to the Sorsogon State University – Bulan Campus. The administrators, Instructors, and Students were the immediate beneficiaries. The system generates a virtual tour function that the user can interact with it with a 360-degree rotation tour around the selected area. Additionally, the user can navigate through it and become familiar with the details of the offices, rooms, and buildings on the campus; (ii) The Photographic Architecture Simulation is successfully integrated into the system. The features of Photographic Architecture Simulation are working successfully as the user's main functionality. The user will be able to navigate on their own and move from one room to another, go to all the floors, and check out every detail of the area. This feature can rotate up to 360 degrees for them to familiarize themselves with the campus premises; (iii) The developed E-PASYAL: An Electronic Photographic Architecture Simulation Yield Actual Location of Sorsogon State University Bulan Campus with an overall mean of 4.8588 is “Highly Applicable” to the needs of the following clientele: The administrators, the instructors, the student of Sorsogon State University – Bulan Campus, and the prospect students from different schools as perceived by the fifty-four (54) respondents. Therefore, the developed E-PASYAL: An Electronic Photographic Architecture Simulation Yield Actual Location passed the

ISO 25010 (which is concerned primarily with the definition of quality characteristics to be used in the evaluation of software products). Therefore, this developed system is serviceable to the needs of the Sorsogon State University – Bulan Campus.

Based on the conclusions, the following recommendations are hereby offered: (i) The developed system from the perspective of the respondents turned out to be “Far More than what is expected” based on the overall mean of 4.8588. Thus, the system is considered to be “Highly Applicable” in terms of Functional Suitability, Performance Efficiency, Reliability, and Portability. Therefore, the newly developed E-PASYAL: An Electronic Photographic Architecture Simulation Yield Actual Location of Sorsogon State University, Bulan Campus may be deployed and used to improve the services of the Sorsogon State University – Bulan Campus. This system will greatly contribute to the innovation of processes for the offices in the Bulan Campus.; (ii) Additional functionalities and improvements to the system may be studied and integrated in the new E-PASYAL: An Electronic Photographic Architecture Simulation Yield Actual Location of Sorsogon State University, Bulan Campus, to greatly improve the service offered; (iii) The proponent’s availability can be extended to the client or the Sorsogon State University – Bulan Campus to conduct necessary training for the users on how to use or implement the newly developed E-PASYAL: An Electronic Photographic Architecture Simulation Yield Actual Location of Sorsogon State University, Bulan Campus.

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6. AUTHORS’ NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

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