

AdvenTour: PSU-BC 3D Tour

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Abstract-AdvenTour: PSU-BC 3D Tour is an Android-based three-dimensional virtual touring application developed to help students, particularly new students, explore and navigate the facilities of Pangasinan State University - Bayambang Campus. The application was developed using Unity and Blender and followed the Rapid Application Development methodology through requirements planning, user design, rapid construction, and cutover. The project used a descriptive-developmental and mixed-methods approach. Survey questionnaires were used to assess perceived benefits and app acceptability, while prototypes and iterative testing guided feature development. Chapter 4 reports 80 respondents in the completed evaluation, although the Methodology chapter states that 100 respondents were initially selected. The results reported weighted means of 4.20 for game features, 4.19 for perceived ease of use, 3.69 for perceived usefulness, 4.16 for perceived enjoyment, and 3.85 for attitude toward the app. The detailed perceived benefits table yielded a mean of 3.82, while the overall summary table reports 3.96 for that category. The source manuscript reports an overall acceptability mean of 4.00, interpreted as acceptable. These findings indicate that the application was generally well received for its navigation, visual design, ease of use, and interactive campus-tour experience.

Keywords- 3D campus tour, virtual tour, mobile navigation, Unity, Blender, Rapid Application Development, Technology Acceptance Model, usability

INTRODUCTION

Virtual tours and mobile navigation technologies provide users with interactive ways to explore unfamiliar spaces before or during a physical visit. In university settings, three-dimensional maps and virtual walkthroughs can support orientation, spatial understanding, and access to information about facilities and services (Al-Zoubi & Abualara, 2023; Marasco, 2020).

Incoming students may have trouble locating classrooms, offices, student-service areas, libraries, and other campus facilities. The source manuscript describes traditional orientation methods such as printed maps, verbal directions, and fixed guides as limited because they may not fully represent the campus environment or provide an interactive means of exploration.

AdvenTour was developed in response to these navigation and orientation concerns at Pangasinan State University - Bayambang Campus. The app uses a three-

dimensional representation of the campus, selectable avatars, navigational controls, building labels, and a minimap to simulate the experience of walking around the university.

The study therefore examined the app's features, environment, characters, perceived benefits, and acceptability. Evaluation dimensions included game features, perceived ease of use, perceived usefulness, perceived enjoyment, attitude toward the app, and perceived benefits.

OBJECTIVE OF THE STUDY

The major goal of the project was to develop a 3D tour application that would enable first-year students to observe the campus from inside and outside and explore and learn about the facilities and other areas of Pangasinan State University - Bayambang Campus.

1. Identify the different features of the application.

2. Describe the scenario, environment, and characters of the touring application in terms of the 3D map view, 3D navigation, and navigator.
3. Identify the perceived benefits of using the campus tour application.
4. Test the level of acceptability of the application in terms of game features, perceived ease of use, perceived usefulness, perceived enjoyment, and attitude toward the app.

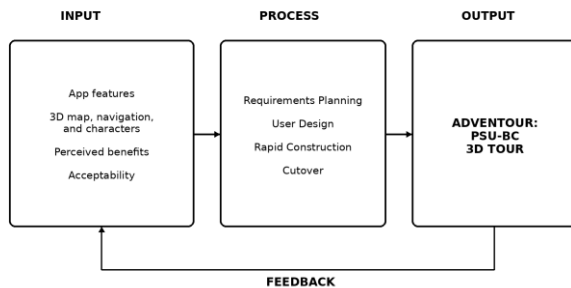


Figure 1. Conceptual framework of the AdvenTour: PSU-BC 3D Tour project.

Figure 1 summarizes the Input-Process-Output structure of the project. The inputs consist of the desired app features, 3D environment and characters, perceived benefits, and acceptability criteria. These inputs are transformed through the RAD phases to produce the AdvenTour application, with feedback supporting iterative revision.

MATERIALS AND METHODS

Research Design

The project used mixed methods and descriptive-developmental approach. The qualitative component was described as involving interviews and feedback from users and developers, while the quantitative component relied on survey questionnaires and descriptive analysis. The developmental component covered prototyping, three-dimensional modeling, coding, testing, and refinement of the Android application.

System Development Method

Rapid Application Development was used as the basis of system development. The four phases were Requirements Planning, User Design, Rapid Construction, and Cutover. Requirements Planning

established the problem and application requirements; User Design emphasized iterative prototypes and feedback; Rapid Construction converted prototypes into a functional Unity application and integrated 3D assets created in Blender; and Cutover covered final testing, bug fixing, refinement, and preparation for release.

Rapid Application Development (RAD)

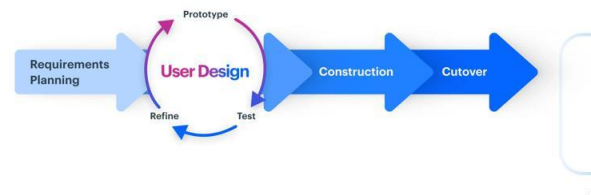


Figure 2. Rapid Application Development phases used in the project.

Figure 2 illustrates the RAD process used to create the application. The model highlights requirements planning, iterative user design and prototyping, construction, and cutover. This structure allowed the proponents to refine navigation, characters, visuals, and other functions through repeated testing and feedback.

Study Locale and Respondents

The study was conducted at Pangasinan State University - Bayambang Campus and focused primarily on first-year students and campus visitors. The Methodology chapter states that 100 respondents were selected to answer the survey questionnaire. However, the Results and Discussion chapter reports a completed tester sample of 80 respondents. Accordingly, the descriptive results in this IMRAD manuscript are based on the 80 respondents reported in the results tables.

Data-Gathering Instruments

For Objectives 1 and 2, the developed prototype was analyzed to identify app features and to describe the 3D environment, characters, and navigation experience. For Objective 3, a survey questionnaire adapted from the National Literacy Trust study on video game playing and literacy was used to assess perceived benefits. For Objective 4, a questionnaire based on the Technology Acceptance Model was used to assess app acceptability.

Data Analysis

The study used descriptive statistics and weighted means. Questionnaire responses were tallied, summarized, and interpreted using the five-point Likert scale. Feature analysis and prototype review were used to document the main app components, while survey results were summarized for game features, perceived ease of use, usefulness, enjoyment, attitude toward the app, and perceived benefits.

Table 1. Likert Scale for Acceptability Testing

Numerical Equivalent	Weighted Value	Descriptive Equivalent	Interpretation
5	4.21-5.00	Strongly Agree	Acceptable
4	3.41-4.20	Agree	Acceptable
3	2.61-3.40	Slightly Agree	Acceptable
2	1.81-2.60	Disagree	Not Acceptable
1	1.00-1.80	Strongly Disagree	Not Acceptable

Table 1 presents the five-point scale used to interpret survey responses. Scores from 2.61 to 5.00 were interpreted as acceptable, whereas scores from 1.00 to 2.60 were interpreted as not acceptable.

Development and Implementation Requirements

Table 2. Hardware Requirements for App Development and Use

Hardware	Specification
Processor	Helio G99, Snapdragon Series, or Dimensity Series
RAM	6-12 GB
System Type	64-bit operating system
Mobile Operating System	Android 9-14

Table 2 lists the mobile hardware specifications identified in the source manuscript. These requirements were intended to support smooth rendering, navigation, and interaction with the three-dimensional campus environment.

Table 3. Software Requirements for App Development

No.	Software	Specification
1	Unity Game Engine	C++, C#
2	Blender Game Engine / Blender	C, C++, Python, OpenAL
3	Operating System	Windows 11

Table 3 presents the main software environment used in development. Unity provided the application engine and interaction logic, while Blender was used to create and refine the three-dimensional campus assets. Windows 11 served as the development operating system.

RESULTS AND DISCUSSION

Developed App Features

The developed application incorporated menu controls, character selection, sound and brightness settings, map-based navigation, minimap functions, building labels, environmental assets, and selectable male or female avatars. These elements were designed to support an immersive but accessible campus touring experience.

Table 4. Major Buttons and Controls

Control	Description
Start	Opens the app and proceeds to character selection.
Settings	Provides access to sound and brightness settings.
Quit	Close the application.
Back	Returns the user to the previous screen or main menu.
Next/Switch	Changes the selected character.
Play/Start	Begins the 3D campus tour.
Volume Slider	Adjust the app's sound volume.
Brightness Slider	Adjusts the app's brightness.

Table 4 summarizes the primary buttons and controls used throughout AdvenTour. The controls provide straightforward access to startup, character selection, navigation, settings, and application-exit functions.

Table 5. Major Icons

Icon/Feature	Description
Book Icon	Displays the school's mission, vision, quality policy, and core values.
Close Icon	Close the currently displayed window.

Icon/Feature	Description
Arrow Icon	Represents the character's position on the minimap.
Zoom In Icon	Enlarges or maximizes the minimap.
Zoom Out Icon	Reduces or minimizes the minimap.

Table 5 presents the icons that support information access and minimap navigation. These icons reduce the number of steps required for common functions and help users understand their location within the virtual campus.



Figure 3. Main menu of AdvenTour: PSU-BC 3D Tour.

Figure 3 shows the main menu displayed when the application is opened. The screen provides immediate access to Start, Settings, and Quit, making it the central entry point for the touring experience.



Figure 4. Settings panel of AdvenTour.

Figure 4 presents the settings panel where users can adjust audio and other display-related preferences before or during the tour. The feature supports customization of the touring experience.



Figure 5. Male character-selection screen.

Figure 5 shows the male avatar option available to users. The character functions as the user's on-screen navigator while exploring the campus.



Figure 6. Female character-selection screen.

Figure 6 presents the female avatar option. Providing multiple avatars gives users a basic level of personalization before entering the campus environment.



Figure 7. Loading screen of AdvenTour.

Figure 7 shows the loading screen displayed while the application prepares the three-dimensional environment. It provides visual feedback to users during the transition from character selection to the campus tour.

3D Environment, Characters, and Campus Resources



Figure 8. Three-dimensional map view of the PSU-Bayambang Campus.

Figure 8 presents the virtual campus map used as the principal touring environment. The map was based on the university's bird's eye-view information and the developers' physical inspection of the campus premises.

Table 6. Character Representations

Character	Description
Male Student	A virtual representation of a male PSU-Bayambang student used as a navigator during the campus tour.
Female Student	A virtual representation of a female PSU-Bayambang student used as a navigator during the campus tour.

Table 6 describes the two selectable characters included in the app. Both avatars are intended to represent typical PSU-Bayambang students and serve as the user's navigational character within the 3D environment.



Male Character



Female Character

Figure 9. Male and female navigator character models.

Figure 9 shows the two-character models used in the touring environment. These models support the app's third-person navigation approach and provide a visual representation of the user while moving around the campus.

Table 7. Major Campus Buildings Represented in the App

Building	Description
Main Building	One of the oldest and most iconic campus structures, with a central garden and shaded student areas.
Science and Math Building	A major academic building with nearby botanical and shaded outdoor spaces.
ROTC Building	Headquarters for ROTC activities, meetings, training, and administration.
Registrar and Admin Building	Connected administrative buildings that house registrar and administrative offices.
Learning Resource Center	Contains the library and additional learning or conference spaces.
High School Building	A two-story building serving high school students, with classrooms and outdoor study areas.
Academic Building	A modern academic structure designed for study, collaboration, and innovation.
CAST Building	The College of Arts, Sciences, and Technology

Building	Description
	facility supporting interdisciplinary academic activity.
Elementary Building	An older-style structure serving younger learners.
English Department 1	A two-story language and literature building.
English Department 2	A newer English Department building with larger windows and classrooms.
Food Innovation Center	A facility for culinary and food-related learning and activities.
Aldana Gymnasium	A major venue for orientations, indoor sports, activities, and campus gatherings.

Table 7 lists the major campus structures modeled in the application. Representing these buildings in the virtual environment allows new students and visitors to become familiar with important academic, administrative, learning, and activity spaces before or during an actual campus visit.



Figure 10. Representative campus buildings modeled in AdvenTour.

Figure 10 provides a visual overview of the campus structures reproduced in the 3D environment. The modeled buildings give users recognizable

landmarks and support spatial orientation while navigating the virtual campus.

Table 8. Environmental Resources

Resource	Description
Buildings	Users can identify and enter modeled campus buildings.
Plants	Environmental objects that add realism and may act as movement barriers.
Room Labels	Identifiers used to recognize rooms and internal building details.
Chairs	Visible environmental objects placed around the campus.
Trees	Landscape elements that add realism and reflect actual shaded campus areas.
Street Signs	Navigation markers help users identify campus routes.
Old Buildings	Historic structures contribute to the character and identity of the campus.

Table 8 summarizes environmental resources used to make the virtual campus recognizable and navigable. These assets provide contextual cues that support orientation while also improving the visual realism of the app.

Table 9. Profile of the Testers

Variable	Profile	Frequency	Percentage
Gender	Male	38	47.5%
Gender	Female	42	52.5%
Age	15-20	69	86.3%
Age	21-25	11	13.7%
Total	—	80	100.0%

Table 9 shows the demographic profile of the 80 respondents reported in the Results chapter. Females represented 52.5% of the sample, while males represented 47.5%. Most respondents were between 15 and 20 years old, consistent with the project's focus on student users.

Table 10. Assessment of Terms of Game Features

Item	Mean	Interpretation
I like the graphics of the game.	4.05	Acceptable
The buttons and icons work properly based on their given functions.	4.32	Acceptable

Item	Mean	Interpretation
I like the characters of the game.	4.17	Acceptable
I like the navigation guide.	4.27	Acceptable
Average Weighted Mean	4.20	Acceptable

Table 10 presents the assessment of the app's game features. The category obtained an average weighted mean of 4.20. Buttons and icons received the highest mean of 4.32, followed by the navigation guide at 4.27, indicating positive responses to the application's interface and navigation components.

Table 11. Assessment in Terms of Perceived Ease of Use

Item	Mean	Interpretation
It is easy for me to play this mobile game.	4.38	Acceptable
The character is easy to control.	4.20	Acceptable
I can clearly see the details and names of the buildings.	4.06	Acceptable
It is easy for me to master the mechanics of the game.	4.12	Acceptable
Average Weighted Mean	4.19	Acceptable

Table 11 shows an average weighted mean of 4.19 for perceived ease of use. Respondents rated ease of playing highest at 4.38, suggesting that the app's controls and overall interaction were generally understandable and manageable.

Table 12. Assessment in Terms of Perceived Usefulness

Item	Mean	Interpretation
Playing mobile games is useful for me.	3.86	Acceptable
Using this app makes me put a lot of effort into it.	3.63	Acceptable
I felt skillful while playing this game.	3.58	Acceptable
Average Weighted Mean	3.69	Acceptable

Table 12 presents a perceived-usefulness mean of 3.69. Although this was lower than the feature and

ease-of-use categories, all listed indicators remained within the manuscript's acceptable range.

Table 13. Assessment in Terms of Perceived Enjoyment

Item	Mean	Interpretation
I find the game exciting.	4.10	Acceptable
I find the game enjoyable.	4.18	Acceptable
I find the game interesting.	4.20	Acceptable
Average Weighted Mean	4.16	Acceptable

Table 13 shows an average weighted mean of 4.16 for perceived enjoyment. Interest in the app received the highest mean at 4.20, indicating that respondents generally found the virtual touring experience engaging and enjoyable.

Table 14. Assessment in Terms of Attitude Toward the App

Item	Mean	Interpretation
I regard playing the game as a good idea.	4.10	Acceptable
For me, playing computer games is extremely interesting.	4.02	Acceptable
I forgot everything around me while playing this game.	3.43	Acceptable
Average Weighted Mean	3.85	Acceptable

Table 14 reports an average weighted mean of 3.85 for attitude toward the app. Respondents generally viewed the experience positively, although immersion, represented by forgetting the surroundings, received a lower mean than the other indicators.

Perceived Benefits of the Developed App

Table 15. Results for Perceived Benefits Testing

Item	Mean	Interpretation
Playing the game improves problem solving.	3.74	Acceptable
I found the game adventurous.	3.89	Acceptable
Playing the game helps me to be a	3.75	Acceptable

better reader.			
Playing the game improves my hand-eye coordination.	4.03	Acceptable	
Playing the game helps create my own imaginary world.	3.87	Acceptable	
Playing the game helps me appreciate stories and other arts that inspire me to read stories.	3.90	Acceptable	
Playing the game shows me different perspectives from different people.	3.79	Acceptable	
Playing the game entertains me in my free time.	3.88	Acceptable	
Playing the game is a way for me to escape sadness.	3.60	Acceptable	
Average Weighted Mean	3.82	Acceptable	

Table 15 presents the perceived benefits results reconstructed from the detailed items in the source manuscript. The item scores produce an average of approximately 3.82, matching the narrative immediately following the table. Hand-eye coordination received the highest mean at 4.03, while using the game as an escape from sadness received the lowest mean at 3.60.

Table 16. Overall Level of Acceptability

Category	Weighted Mean	Descriptive Interpretation	Interpretation
Game Features	4.20	Agree	Acceptable
Perceived Ease of Use	4.19	Agree	Acceptable
Perceived Usefulness	3.69	Agree	Acceptable
Perceived Enjoyment	4.16	Agree	Acceptable
Attitude Toward the	3.85	Agree	Acceptable

Category	Weighted Mean	Descriptive Interpretation	Interpretation
App Perceived Benefits of the Developed App	3.96	Agree	Acceptable
Overall Mean	4.00	Agree	Acceptable

Table 16 reproduces the source manuscript's overall acceptability summary. The reported overall mean is 4.00, interpreted as acceptable. The table reports 3.96 for perceived benefits, which differs from the detailed perceived-benefits table and accompanying narrative mean of 3.82. This discrepancy should be verified against the original spreadsheet or tabulation before publication.

CONCLUSION AND RECOMMENDATIONS

CONCLUSION

The project successfully developed an Android-based three-dimensional campus tour using Unity and Blender. The app provides a virtual representation of Pangasinan State University - Bayambang Campus through a campus map, selectable avatars, navigation controls, labels, environmental resources, and modeled buildings.

The RAD approach supported iterative prototyping and refinement of navigation, visuals, controls, and usability-related features. The app was designed to provide new students and visitors with a more interactive alternative to printed maps and verbal directions.

The completed evaluation reported positive responses across game features, ease of use, usefulness, enjoyment, attitude, and perceived benefits. The source manuscript's overall acceptability table reports a weighted mean of 4.00, interpreted as acceptable. The manuscript nevertheless contains two numerical inconsistencies—the planned sample of 100 versus 80 reported testers, and a perceived benefits mean of 3.82 in the detailed results versus 3.96 in the overall summary, which should be checked before final publication.

RECOMMENDATIONS

1. Make the campus tour application widely accessible so that new students and visitors can use it as part of orientation and campus familiarization.
2. Improve and standardize room labels across modeled buildings and facilities for clearer navigation.
3. Unify and standardize text styles throughout the application to improve readability and visual consistency.
4. Resize and refine the minimap so that it remains useful without obstructing the main touring interface.
5. Enhance character selection by adding more avatar options and personalization features.
6. Provide clear instructions or an interactive tutorial for first-time users.
7. Future researchers may extend the developed application with additional buildings, navigation functions, updated campus information, and stronger usability evaluation.

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