

RoadKnows: Web-Based Driving Courses and Practice Examinations

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Abstract

The Capstone Project titled "Roadknows: Web-based Driving Courses and Practice Examinations" "Roadknows," is a comprehensive platform designed to assist individuals in obtaining a driver's license. The site focuses on providing information about road signage, rules, and regulations, aiming to enhance users' understanding of safe and legal driving practices. Key features include a practice examination section that allows users to prepare for the actual driving permit exam. The website employs a user-friendly interface, accessible on both mobile phones and computers, ensuring convenience for a wide range of users. Addresses challenges faced by first-time test takers, providing them with a valuable resource to improve their chances of passing the written permit exam. Through a strategic approach, Roadknows emphasizes the importance of continuous learning, encouraging users to recognize and absorb lessons from their mistakes.

INTRODUCTION

The Land Transportation and Traffic Office, or LTO, is the government body in charge of issuing driver's licenses, managing traffic, and creating policies and requirements for public transportation. Before both new and experienced drivers can practice driving on the road, the institution oversees the completion of the driving course and organizes the written exam. You need to be well-versed in driving laws and regulations, as well as road safety, to pass the test. Your ability to read, write and understand English is also important when taking the test (Lumina, 2023). Obtaining a driver's license is a significant milestone for many individuals, as it provides them with the freedom and independence to operate a motor vehicle legally. A driver must pass both the written and practical driving tests before being granted a license (Sy, 2017).

Not everyone has the fortune to succeed the first time they take their driving test. No matter how well-prepared we are, there will be occasions when stress and anxiety overcome us. This is the most frequent cause of us being distracted or mentally hindered during tests, whether they are written or practical (Philkotse, 2022). Factors such as the complexity of traffic laws, the need to demonstrate safe driving skills, and the pressure of the exam can

contribute to a high failure rate among aspiring drivers.

Imagine the frustration and inconvenience of having to retake the test and delay getting your driver's license. The exam can still be taken a month after failing one or both of the written and practical exams. Failing on the second attempt, on the other hand, means the opportunity to take the exam a year after failing it. Finally, flunking it on the third try will take two years before having to retake it again (Nicole, 2020).

According to a recent survey, 44% of the 555 drivers examined said they couldn't pass the driving permit exam. Nearly 60% of people taking the permit exam for the first time fail it on their first attempt. A common misconception among student drivers is that passing the written permit exam is quite difficult. Students frequently fail because it is very difficult to avoid mistakes that are generated when they are not knowledgeable enough to attempt any of the questions (Joshua, 2014).

According to a survey of 535 drivers in Manila, the majority of drivers had a poor understanding of what traffic signs meant. This is because the drivers' familiarity with traffic signs is primarily based on how common they are in the area and how simple it

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is to understand for other drivers (Fernandez et al., 2020).

In order to promote road safety, it is essential to understand the nuances of traffic lights. Francis Rae Almora, the regional director of LTO-CAR, has highlighted that formal training is essential for affecting how drivers interpret signals (Agoot, 2020).

In this project, we will explore the effectiveness of practice tests as a tool to improve the success rate of passing driver's license exams and to comprehend the rules more fully, you can view videos about driving laws and regulations. Study the rules to be able to respond to the questionnaire properly, paying particular attention to the ones that pertain to street signs and symbols. They are really close to being exact questions from the written exam. Don't assume you have everything covered by depending exclusively on the reviewer because it is not the actual test (Cruz, 2016).

Statement of the Problem

The need to obtain a driver's license is to successfully complete the practical and written tests, however many individuals continue to fail and have delays as a result. In light of this, the following issues will be the main subject of this study:

1. First-time test takers who failed the exam.
2. Lack of understanding of road signages, rules and regulations.
3. A lot of people nowadays are negligent about traffic laws and road safety.

Objectives of the Study

The main objectives of this capstone project are to assess the effectiveness of practice tests in improving the performance of aspiring drivers in passing their driver's license exam. The following objectives of this study will be the main focus:

1. To improve the success rate of passing driver's license exams even on their first attempt. They can take the quiz as a pretest which contains the topic of their exam.
2. All users of this website will benefit from being adequately informed so that they can respond to any questions regarding road signages, rules and regulations.

3. To reiterate people about traffic laws and road safety so that they don't rely solely on their own knowledge due to overconfidence.

Scope of the Study

This research centers on online practice tests designed for people applying for a driver's license who want to practice before the real exam. The study took place in Sto. Rosario, Angeles City, from 2022 to 2023. The primary focus is on individuals getting ready for the driver's exam and those interested in promoting safe driving. The research utilized a digital questionnaire and a web-based form. Our study is about an online platform where you can learn about different signs and licenses. It has a variety of sign categories to study, each with its own test. You can also watch videos and get information to help you learn. The platform offers exams for different licenses like theoretical, Non-professional, and Professional, making it a great resource for those working towards getting licensed. It also gives details about what you need to qualify for licenses and shares information about road rules and penalties.

One cool thing about our platform is that when you pass exams for theoretical, Non-professional, and Professional licenses, you get certificates. These certificates show that you successfully completed the tests on our website, adding a special recognition to your achievements in the learning community.

The following are covered in detail in this study:

Login and sign-up module- this module the user needs to sign up or login first before they can access the website.

Certification module- The user can view all the certifications for the exams taken

Delimitations of the Study

The study will exclude certain aspects due to time constraints. Firstly, the quantity of contents is limited, with only a restricted number of video clips depicting traffic signs available. Secondly, the "Contact Us" form database will not be covered, due to lack of time. Lastly, the feature of viewing certificates on the admin page is excluded from the study due to time limitations, and as a result, the

certificates of users will not be displayed on the admin page.

Conceptual Framework

INPUT	PROCESS	OUTPUT
Brainstorming	Category Reviewer	Roadknows: Web-based
Research	Practice Examinations	Driving Courses and Practice Examinations
User's Data	Flowchart, Planning, System Design	
Exams	View Certificates	
Violations & Penalties	Programming Languages	
Certificates	Database Management	
Pictures and Videos of signages		
Hardware & Software Requirements		

Significance of Study

The result of this study would be beneficiary to the following:

To anyone that want to know the process of getting a driver's license. The website can assist anyone looking to obtain a driver's license by guiding them toward the necessary steps and requirements.

To the student that want to have a reviewer to the exam. They can benefit from using the practice exam on the website to review and gain understanding of the traffic laws and regulations.

To the future researcher. Future researchers can get an idea of this website and also, they may improve some information that they can used and may added in their future system.

Definition of Terms

Traffic law -Traffic laws are designed to protect you and other drivers on the streets.

2. Negligence- The failure to meet a standard of behavior established to protect society against unreasonable risk.

METHOD

This chapter defines how the researchers conduct the methods and procedures used in this study. It explains the following including research design, system development life cycle, participants, procedures, data analysis, design and implementation.

Research Design

Descriptive research design is a research method that describes the characteristics of the population, situation or phenomenon. The researcher uses descriptive design to find patterns in a group's traits that effectively establish everything one needs to know, aside from why something occurred (McCombes, 2019).

Quantitative research is a gathering of data to the respondents such as observations or surveys to confirm the theories or assumptions. It is analyzed using the math and statistical analysis that is expressed in numbers, graphs or tables. The questions should be close-ended or a multiple choice (Streefkerk, 2019).

Researchers chose this research design to evaluate the differences between the experimental group without intervention and the control group with the intervention.

Systems Development Methodology

Agile is an approach to project management that centers around incremental and iterative steps to completing projects. The incremental parts of a project are carried out in short-term development cycles. The approach prioritizes quick delivery, adapting to change, and collaboration rather than top-down management and following a set plan (Coursera, 2023).

The researcher uses the agile methodology because the iterative approach can be tested and improved in every iteration, this can also determine the minor issue easily that can be resolved before it grows into a major issue.

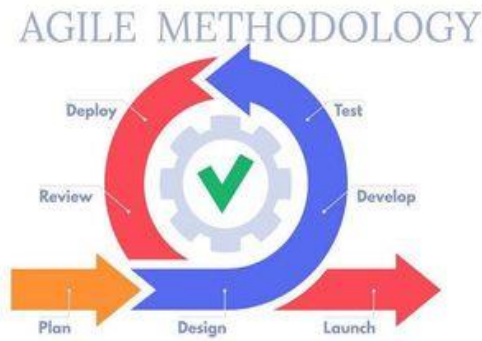


Figure 1. Agile Development Model

Agile methodology is a project management framework that breaks projects down into several dynamic phases, commonly known as sprints. In this article, get a high-level overview of agile project management, plus a few common frameworks to choose the right one for your team. (Laoyan, 2022)

Plan - is a written detailed explanation and description of what the researcher plans to do to attain their objective. The plan consists of steps and procedures that the researcher needs to undertake as well as content related to the topic to be researched.

Design - language used can be HTML, CSS, and PHP. Consists of a number of elements that you may use to enclose or wrap particular parts of the content in order to change how it appears or functions. Researchers used HTML and CSS for this website.

Develop - This part which starts the building for the website. Development approaches focus on producing tiny, functional pieces of software as soon as possible to increase user's satisfaction. These tactics emphasize ongoing improvement by utilizing flexible strategies and group collaboration.

Test - The approaches and strategies used for testing a precise product to make sure it is fit for purpose. Testing is built into the development process in an agile manner to ensure that defects are found as frequently and early as possible. As a result, testers can spot issues at every stage of

development, speeding up the release of the product.

Deploy - How quickly a product can adapt to changes in client preferences or requirements as well as the quality of each update will depend on the processes developers use to generate, test, and release new code.

Review - involves looking at each step that was created during the deadline and gathering input from important participants. Researchers will determine at this stage if the website performance is satisfactory or needs improvement.

Launch - plans allow participants to estimate how much functionality can be provided and how long it will take to produce. You can consider it as a prioritized list of features that will soon be made available on the market in an effort to enhance the user experience.

Participants

This part the researchers will choose the participants of the study that will give data on this website.

The respondents to this survey will be for those who are legible in getting a driver license within Sto. Rosario LTO office in Angeles. The researchers used a purposive sampling to get 50 respondents chosen based on their knowledge of the study being conducted that is enough to answer the questionnaires. 3 IT users to check the website requirements.

Procedure

The researchers used the following type of procedure to gather the data needed for this website:

Survey is defined as the act of examining a process or questioning a selected sample of individuals to obtain data about a service, product, or process. Data collection surveys collect information from a targeted group of people about their opinions, behavior, or knowledge

The participants will be asked to respond to a short list of questions.

Data Analysis

In this portion it shows how the data analysis procedure on what computation that is used to interpret the collected data results from the respondent.

The researcher uses the Likert scale to get data from the respondents in a way of getting the rating scale to understand how the user used the system and also widen the idea of improving the system. The Likert scale is to ask the respondents how much they agree or disagree on every question that typically has 5 but some have 7 to 9 numbers of options represented for a selection. its measures attitude, perceptions, belief, preferences, and self-reported behavior using rating-scale questions. Rosala. (2020). Rating Scales in UX Research: Likert or Semantic Differential? Nielsen Norman Group LogoNielsen Norman Group.

Researchers used the formula below to compute and analyze the result that gathered from the respondents.

Formula For Getting the Mean

Mean: $\bar{x} = \frac{\sum fx}{N}$

N

where \bar{x} = mean

f = frequency of each class

x = mid-interval value of each class

n = total frequency

fx = frequency multiplied in mid-interval

Table 1. Five-point Likert Rating Scale

Likert scale description	Numerical rating
Strongly agree	5
Agree	4
Neutral/Uncertain	3
Disagree	2
Strongly disagree	1

Numerical rating scale has a value of 1 to 5 and in every value there's an equivalent description for this that can be seen in column 1 for table 1.

Table 2. Range in Interpretation for Result

Description	Numerical rating
Excellent	4.20-5.00
Very good	3.40-4.19
Good	2.60-3.39
Fair	1.80-2.59
Poor	1.00 - 1.79

The Numerical rating column is a range in an interpretation for result based on the respondent's responses. Interpretation for range in tables are: Poor have range of 1.00 - 1.79, Fair is 1.80-2.59, Good is 2.60-3.39, Very good is 3.40-4.19 and the Excellent is 4.20-5.00.

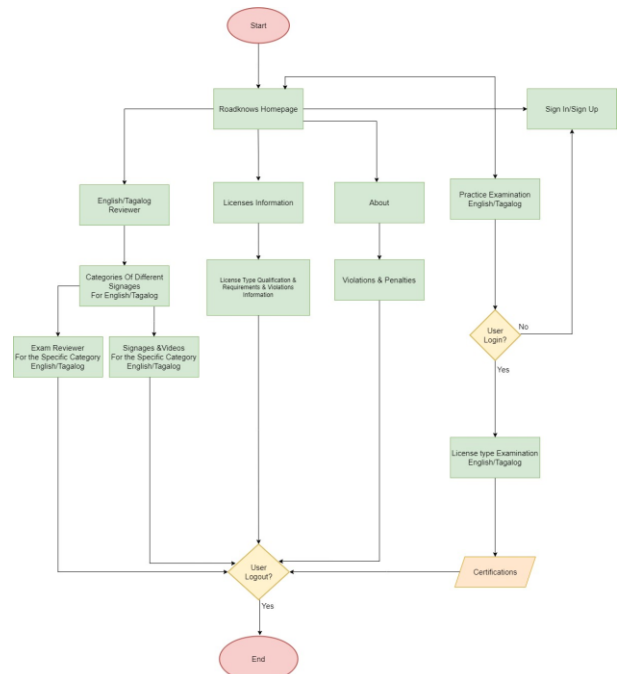
Design and Implementation

Logical specification

This show what is the flow of the system and the interaction or user within the website:

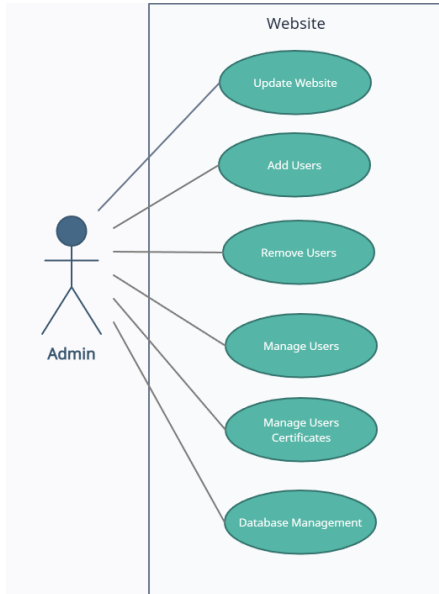
Flowchart

It is a step-by-step process of the system algorithm. The flow cart used a different shape that depends of it uses.



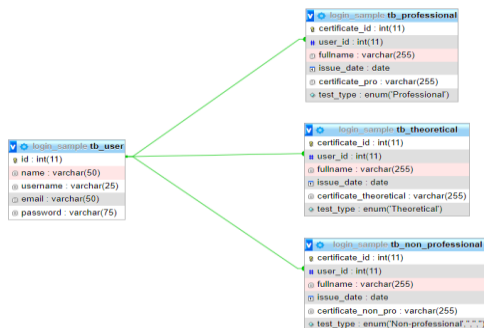
Use Case Diagram

Made up of many choices and interactions that your actors can encounter. The user and developer show what are the interactions that they can do within the website.



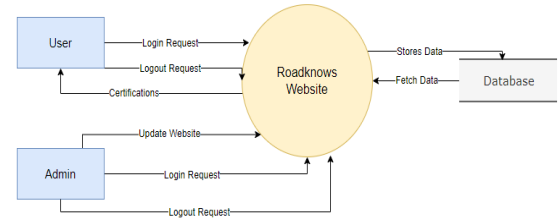
Entity Relationship Diagram

Specifies the relationship between two entities. Expressed as lines connecting two entities, and frequently includes a description that comprehends the relationship.



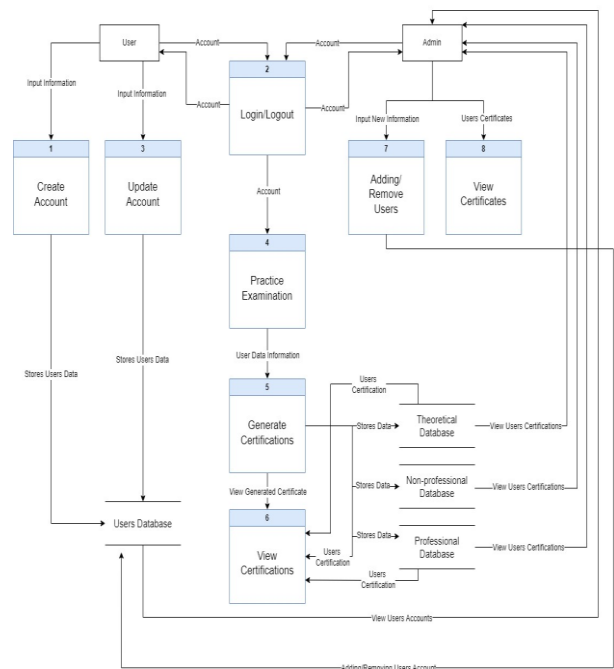
Data Flow Diagram Level 0

It is a context diagram used in outlining the information flow in order to better understand systems and processes. Intended to be brief, clear overviews of a procedure or system.



Data Flow Diagram Level 1

They provide deeper understanding of the underlying processes by dividing the single process node of the system into subprocesses. It gives more information and brings attention to a system's main functions.



Hardware Specifications

The developer utilized a particular device with specific specifications for constructing and testing the website. The detailed specifications of the device are presented in (Tables 3, 4 and 5).

Table 3. Hardware Specifications for the Development

Hardware Specification	Minimum PC	Recommended
Processor	Intel(R) Core (TM) i7-3770 CPU @ 3.40GHz 3.40 GHz	Intel(R) Core (TM) i3-10110U CPU @ 2.10GHz 2.50 GHz
RAM	16 GB	8.00 GB
Storage	111 GB	199 GB

Table 4. Hardware Specifications for the Testing

Hardware Specification	Minimum PC	Recommended
Processor	Intel(R) Core (TM) i7-3770 CPU @ 3.40GHz 3.40 GHz	Intel(R) Core (TM) i3-10110U CPU @ 2.10GHz 2.50 GHz
RAM	16 GB	8.00 GB
Storage	111 GB	199 GB

Table 5. Hardware Specifications for the Implementation

Hardware Specification	Minimum PC	Recommended
Processor	Intel(R) Core (TM) i7-3770 CPU @ 3.40GHz 3.40 GHz	Intel(R) Core (TM) i3-10110U CPU @ 2.10GHz 2.50 GHz
RAM	16 GB	8.00 GB
Storage	111 GB	199 GB

Software Specifications

This section listed the software resources needed for the development of the system.

Front-end

The front end is the interface between the user and the system. In this project, HTML is used to provide the system's user interface, and CSS style codes are used for the design.

JavaScript is a programming language used to create dynamic and interactive features on websites.

Bootstrap is a front-end framework used in web development to streamline and expedite the process of designing responsive and visually appealing websites.

Back-end

Visual Studio is an integrated development environment (IDE) for writing, editing, debugging, building, and deploying apps, offering compilers, completion tools, source control, extensions, and more.

PHP is a widely used general-purpose programming language and can be integrated into HTML and is particularly well suited for Web development (Ullman, (2011).

RESULTS

This chapter consist of the system output and explain the uses of this in the system. It is also the overview the result and interpretation of the data gathered from the respondent of IT experts and non-IT experts.

System/Application Output

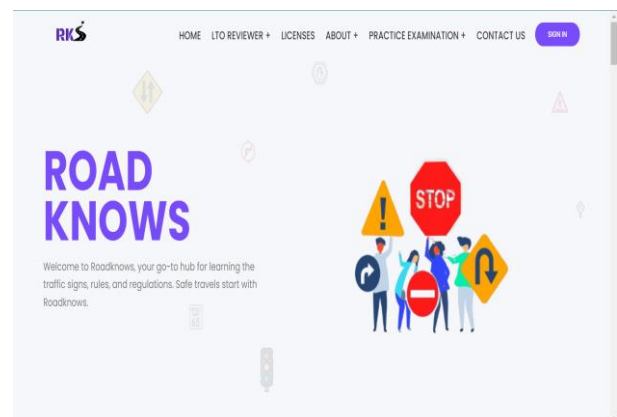


Figure 1. Home page – user can view the whole page and the other features of the website

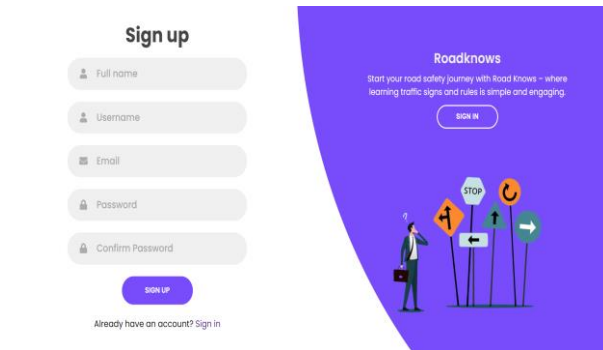


Figure 2. Sign up - To access the practice exam, users must sign in first or make an account by completing the sign-up process

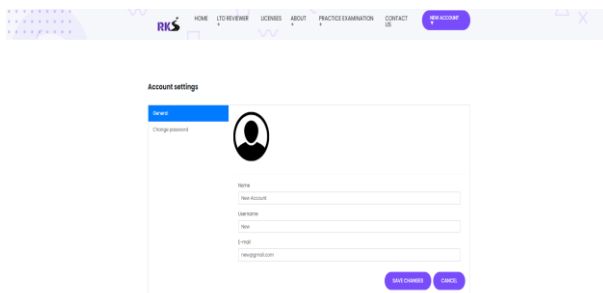


Figure 3. Account settings – Users have the ability to view and update their profiles

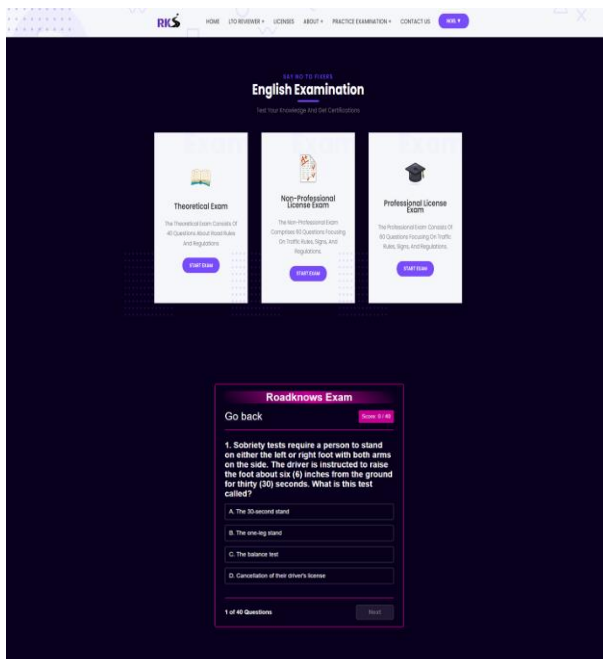


Figure 4. Practice Examination page – Users can take the examination in this page



Figure 5. License Information Page - Users will learn about the requirements and qualifications for different licenses

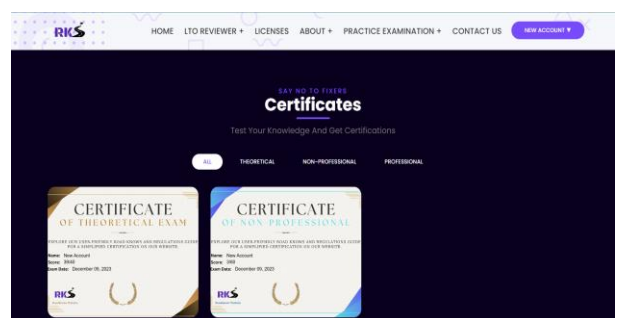


Figure 6. Certification page – Users can view all the certificates for the exams that they've completed

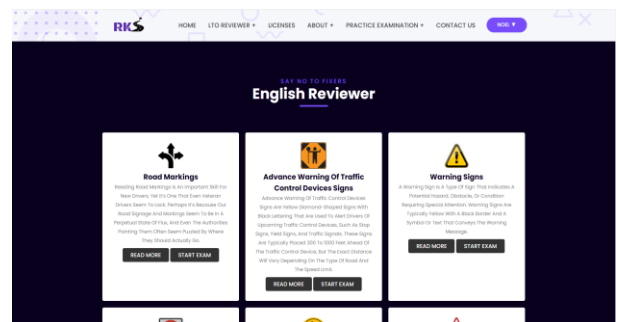


Figure 7. Reviewer Page - Users have the option to select between reviewing or taking exams for specific signage categories



Figure 8. English & Tagalog Reviewer Page with Video - Users can either read the content or watch videos related to various signages

Evaluation Results

This section shows the evaluation result and the interpretation of the derived result from the respondent. Researchers used the software quality standard in ISO 25010. The 3 IT experts respondents evaluate the criteria based on their personal experience.

Table 6. Evaluation Result for IT

Criteria	Mean	Descriptive Rating
Functional suitability	4.11	Very good
Performance efficiency	4.67	Excellent
Compatibility	3.83	Very good
Usability	4.39	Excellent
Reliability	4.25	Excellent
Security	3.80	Very good
Maintainability	3.93	Very good
Portability	3.56	Very good
Total	4.07	Very good

The Functional suitability got the result of 4.11 describe as Very good which means that the website Roadknows functions covers all the specified tasks that provides the correct results with the needed degree of precision and facilitate the accomplishment of objectives.

The Performance efficiency got the result of 4.67 that describe as Excellent. The website Roadknows meet the requirements for the response and processing time when performing functions that has the amounts and types of resources used by the system.

The Compatibility got the result of 3.83 that describe as Very good. the website Roadknows perform its required function efferently while sharing a common resource without impact on any other product.

The Usability got the result of 4.39 that describe as Excellent. The website Roadknows has the system that appropriate for the users' needs too achieved their specified goals of learning. has the information to make the website easy to control and protect user makings errors.

The Reliability got the result of 4.25 that describe as Excellent. The website Roadknows components meets the needs for reliability under normal operation and it is accessible when required to use.

The Security got the result of 3.80 that describe as Very good. The website Roadknows ensures that data are accessible only to those authorized to have access.

The Maintainability got the result of 3.93 that describe as Very good. The website Roadknows is composed of discrete components such that a change to one component has minimal impact on other components.

The Portability got the result of 3.56 that describe as Very good. The website Roadknows can effectively and efficiently be adapted for different or evolving hardware, software or other operational or usage environments.

The overall evaluation for the criteria of the IT expert user got the result of 4.07 describe as a Very good, means that the website Roadknows satisfies the IT expert's software quality standard.

The table shows below is the evaluation result and the interpretation of the derived result from the respondent. Researchers used the software quality standard in ISO 25010. The 50 Non-IT user respondents evaluate the criteria based on how the website works including the content in the system.

Table 7. Evaluation Result for Non-IT

Criteria	Mean	Descriptive Rating
Functional suitability	4.26	Excellent
Performance efficiency	4.16	Very good
Compatibility	4.12	Very good
Usability	4.21	Excellent
Reliability	4.30	Excellent
Total	4.21	Excellent

The Functional suitability got the result of 4.26 describe as Excellent which means that the website Roadknows functions covers all the specified tasks that provides the correct results with the needed degree of precision and facilitate the accomplishment of objectives.

The Performance efficiency got the result of 4.16 that describe as Very good. The Roadknows website is processing time perform its required functions within required response times.

The Compatibility got the result of 4.12 that describe as Very good. The Roadknows website can run properly while sharing a common resource with other part of system.

The Usability got the result of 4.21 that describe as Excellent. Roadknows website has a content that can recognize its appropriateness for the user needs. Roadknows is easy to navigate with the help of the information displayed that help achieve the user specified goals to learn with the use of system with satisfaction.

The Reliability got the result of 4.30 that describe as Excellent. The Roadknows website has the information of facts and reliable context. Accessible in require use and it's working fine.

The overall evaluation for the criteria of the non-IT expert user got the result of 4.21 describe as an Excellent, means that the website Roadknows satisfies the non-IT user.

DISCUSSION

This chapter consist of the discussions of summary of findings, conclusion and also list of

recommendations of the researcher to give the future researcher who could possibly improve this study.

Summary of findings

The aim of this website, Roadknows, is to provide information to users of the website regarding road signage, rules, and regulations. Give the user an idea of what kind of exams they are going to take in the actual exam by providing practice examinations. The first-time users who want to access the website Roadknows. The user can view the website only, but in order to get full access, which means if the user wants to take the practice exams, they'll need to sign up first to access the exams. The sign-up page contains the following information: name, user name, email, and password. The user's name and email need to be unique. If the email or user name already exists, the user needs to input other information. Passwords are secured and should contain at least 8-characters long, combinations of letters, numbers and special characters. If one of the details needed on the sign-up page is invalid, the user needs to input the necessary information again to sign up successfully.

The website Roadknows is compatible with both mobile phones and computers. If the user already has the certificates, they will not be able to access the examinations to that specific license category in both Tagalog and English. Exams are not automatically stored; therefore, if a user started taking the exam and their device or internet connection cuts out in the middle of the exam, they will not be able to save their answers and will have to repeat again all questions from the start.

Conclusion

In conclusion, anyone looking to improve their knowledge of safe and legal driving practices will greatly benefit from the website intended to provide through information about traffic laws and regulations. The platform helps to promote road safety, reduce accident rates, provide the facts and reliable information also encourage responsible driving by providing easily comprehensible content. This website plays an important role in helping both beginner and experienced drivers to drive with assurance, helping to create a more

secure and effective transportation system for everybody.

Recommendations

This section of the study focuses on the researcher's list of suggestions, which may help future researchers enhance the progress of the system. The following are suggestions for the further improvement of the website entitled 'ROADKNOWS: WEB-BASED DRIVING COURSES AND PRACTICE EXAMINATIONS.

1. Add session timeout to enhance security measures and protect the account and sensitive information from unauthorized access, especially if the user is utilizing a shared computer or a public device.
2. "OAuth" (Open Authorization) or "social login." To make easier the user's registration.
3. Expiration date for certificates to provide a mechanism for regularly refreshing and compliance with new standards if there's any update.
4. Save User Progress for a Better Experience. To enhance the user experience on our exam platform, we suggest adding a feature that saves user data, so they don't lose their work if they accidentally close the browser or face interruptions. This way, users can easily pick up where they left off when they return to the exam.
5. Enhancing Language Clarity: Making Sure Tagalog Translations are Accurate. Alongside improving the technical features of our exam platform, it's important to pay attention to how well our questions and instructions are translated into Tagalog. This is critical to make sure all users can easily understand and follow them. To make this happen, we advise collaborating with language experts or educators who are skilled in both languages to guarantee precision and cultural appropriateness.

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