

Mobile assisted learning for new and existing car owners

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ABSTRACT

Context/Background: The number of cars on Britain's roads are ever increasing. This combined with the rising cost of living has made the concept of home vehicle repair a necessity for many. By combining this knowledge with a gaming philosophy, it has the potential to reach a greater audience than contemporary alternatives.

Aim: To implement a mobile application, coupled with web resources, that intends to teach car repair and maintenance via the gamification of said tasks.

Method: Using the Android platform an application will be created and distributed to a userbase of automotive first timers as well as an experienced few. Feedback will be taken and adjusted accordingly.

Results: The effectiveness of the application will be judged mainly on the individual user's level within the application, as well as their contributions in the forms of quizzes and topics added and completed.

Conclusion: The project's goal is to assess the impact had by educational applications on the maintenance and preservation of motor vehicles.

Keywords

Gamification, Smartphones, Cars, Maintenance, Web Design

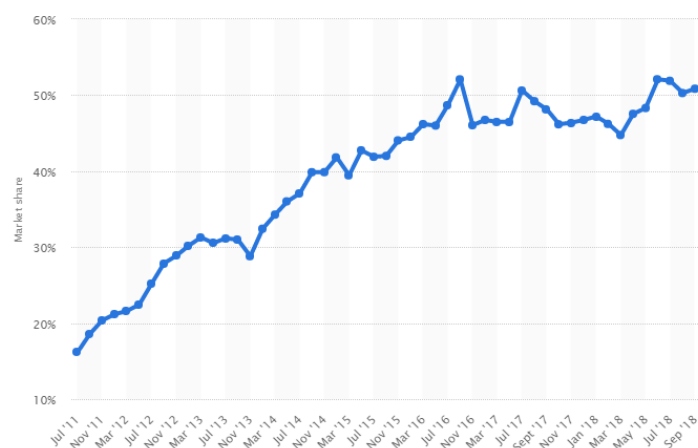
1. INTRODUCTION

Cars are a necessity in modern society, with over 37.3 million cars on the UK's roads, and with 3.3 million being added to that number in 2016 alone (DVLA 2017) it is safe to say they are a mainstay in the world we live in. Keeping these cars on the roads is a difficult task to say the least, with the average cost of a new mid-sized car tipping the scales at around £18,000 and costing on average £388 per vehicle. Given that the average life span of a new car in the UK is around 14 years (SMMT 2018) this means that over its lifetime the average vehicle will cost its owner £83184 including initial purchasing. Recent advancements in the auto industry have yielded improvements to vehicle driving ease and comfort, at the cost of ease of maintenance. More technology in cars has improved their day to day functionality, however has made them difficult or even impossible to work on privately, necessitating lengthy and expensive dealership visits. This has lead people to seek out cheaper means of repair, however access to this information can be difficult and cumbersome.

One of the greatest hurdles in keeping a car in good health is finding easy to read and comprehensive information on maintenance and repairs. There are many sources online that have resources of use, however finding them can be a time-consuming endeavor. A solution to this problem may be to introduce an Android platform mobile application aimed at providing a hub for servicing information. The three main hurdles of auto repair are as follows:

1. Are parts available
2. Are tutorials available
3. Are tools available

Two out of these three could be addressed via a mobile application. Parts availability could be remedied by providing a hub for links to part providers, thereby allowing the user to narrow their search. Secondly, an Android application could provide detailed tutorials the user could reference anywhere, anytime. With the rise in smartphone ownership in the past decade increasing rapidly the mobile phone has become a contender in the E-Learning space. With their compact size and an ease of use they are a viable option for various age ranges, this combined with their anywhere, anytime learning potential affords them a greater practical feasibility in a more mobile society.



Market share of Android in the United Kingdom

As shown in the graph above Android devices account of just over a 76% market share (Statcounter 2018) in the mobile space, this combined with the ease of development for Android and the lack of an entry fee for platform development make it an ideal candidate for this endeavor.

This project aims to create a functional, easy to use Android application with the goal of gamifying servicing and maintenance of vehicles.

This project aims to do complete the following tasks:

- Read and review current literature regarding M-Learning with the goal of gaining a clear understanding of the subject matter.
- Identifying the needs of regular vehicle owners as well as enthusiasts to determine required content
- Build an application that meets the predefined needs and requirements
- Release a completed app to the desired demographic for testing purposes
- Review feedback for application
- Enact any and all alterations suggested

2. BACKGROUND

With current statistics indicating that there are in excess 41 million people in the UK have access to a smart phone, with just over half being an Android device (Deloitte 2017). With the dropping in price of the average mobile phone, combined with the ease of access and younger age of introduction the mobile phone seems like the ideal platform to develop for. E-Learning is becoming a more viable and easier to distribute tool for education with each passing year. E-Learning is the name given to any and all electronic device used to access educational material. With all the benefits listed it would indicate that an E-Learning Android application would be an appropriate and effective solution for combatting many of the difficulties found with vehicle maintenance.

With plans to distribute the application to such a wide demographic encompassing the technically savvy to quite possibly the technically inept. With such a large spread a quantitative approach to evaluation will be necessitated. The aim is to have the users, depending on technical prowess, surveyed via distribution means in regards to the applications usability, effectiveness as well as overall stability. All collected information will be displayed on the projects accompanying website. The accompanying questions will need to be general enough to coerce the most relevant information as well as being understood by the non tech savvy users, with a separate questioning for any technical difficulties.

2.1 M-Learning Overview

M-Learning has been around in various forms since the late 80s (Hashemi et al., 2011). A variation of E-Learning, M-Learning focuses solely on mobile learning. With an aim of providing portable and easy to access education anytime, anywhere. Due to limitations in technology it took several decades for the medium to gain a foothold in education, however now with the vast increases in mobile processing and storage it sees mobile learning becoming an established part of day to day life. In John Traxler's report 'Defining mobile learning' (2005) he discusses the concepts surrounding M-Learning and its relationship with the banner E-Learning. He goes on to discuss the idea that assessing your curriculum via the perspective of the student allows you

to better understand the difficulties in teaching and understanding the information.

Accessibility is the key to the popularity of M-Learning. It's ability to be accessed without the need of a classroom or even a bulky desktop (Hashemi et al., 2011). This gives the medium a much greater appeal and usability compared to the blanket E-Learning. This allows not only the user to learn where ever and whenever but allows them to learn at their own pace or when necessary for progression. With over 41 million people in the UK having access to a smart phone (Deloitte 2017) this creates a much larger platform on which to provide people with easy to access, fun and educational content to keep them informed and up to date.

From E-Learning to M-Learning

	Classroom	E-Learning	M-Learning
Access	Limited	24/7	24/7
Quality	Varied	Consistent	Consistent, Progressive
Metrics	Difficult	Difficult	Formal and Informal, Automatic, Anytime
Retention	Varied	Varied	High Retention, Personalized Learning.
Relative Cost	High	High	Currently Mid-Range, Decreasing.

Adapted From: "While I Live, I Learn," Mobile Learning, March 2008

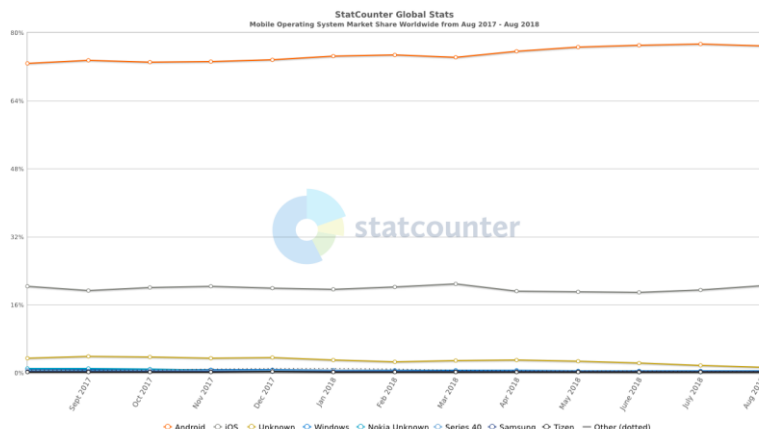
(Jeanne Meister 2009 'From E-Learning To M-Learning')

Jeanne Meister provides the above chart and discusses more in a more succinct fashion the benefits and draw backs of Classroom, E-Learning and M-Learning. This chart clearly shows the limitations of traditional forms of learning such as in classroom learning and to an extent E-Learning. It also hits on the cost associated with each form of learning showing that the cost of M-Learning is decreasing with the advancements in technology whereas the associated costs with both other options still remains high. With smartphones being available for less than £100 and continues advancements driving down the retail costs M-Learning is becoming more viable as time goes on.

2.2 Android vs iOS

The greatest issue with M-Learning is the divide between Google's Android operating system and Apple's iOS. Android made its debut on HTC Dream/T-Mobile G1 on the 22nd of October 2008 (German, 2011). iOS first appeared on the Apple iPhone in June of 2007. This edge to market of the iPhone did win favor for the iOS platform, combined with its sleek and simplified user interface. Most reports regarding M-Learning discuss iOS usage on tablets such as the iPad, however due to the high cost of these devices mobile phones are the preferred choice. Android benefits from its ease of development as all development tools are free and easy to access, this combined with a vast array of devices from phones to car stereos that use the software as their operating system.

As listed prior M-Learning studies tend to focus on tablets running iOS, due to the inhibiting cost associated with not only the purchase of the hardware but the programming as Apple charges for the iOS development software. Mobile phones being more portable and far more plentiful than tablets earns them the title of preferred development hardware, with Android being the chosen operating system due to lack of an entry fee to develop for as well as the current 76% market share held (Statcounter 2018).



(Statcounter 2018 Mobile Operating System Market Share Worldwide)

3. METHOD

The practical application proposed aims to create an android mobile application and accompanying website with the goal assisting in the servicing and preservation of motor vehicles via gamification of tasks. These tasks will score the user based on their maintenance record, servicing and vehicle testing scores. These scores will be displayed on the application as well as countdowns till servicing and testing. This application will be developed in android studio using the Java programming language. The web portion of the project will be developed on Notepad++ using a combination of HTML and PHP programming languages.

3.1 Approach

To ease and reduce development time the SEAT Altea has been chosen as the vehicle to demonstrate the application. This vehicle was chosen due to great personal knowledge as well as the vehicles age and breadth of available literature. This application will cover three important fields within vehicle maintenance;

Servicing: This field will require the user to enter their vehicles year, engine type (Petrol/Diesel), last service and MOT and miles on the odometer. Once the information is entered the user will be given a screen showing “Miles till next service”, “Timing belt life” and “Days till MOT”. The user will also have the option to add additional information such as “Break life” and “Wiper life”. All information entered will be assigned a score, the user will be scored initially the age of the vehicle, older gaining more points than newer and mileage, higher mileage earning more points.

Points will then be earned by via continued maintenance within the displayed schedules.

Maintenance: This category will be used to aid in basic repairs with the vehicle; such as replacing filters, removing wheels, jacking points, fluid levels, infotainment assist and other basic jobs that would be benefitable for the average motorist to know. Points can be earned by completing these tasks and taking a photo of the completed job.

Testing: This field covers the MOT test, it will be used to keep note of previous test results as well as a reminder of the vehicles next test due date. Gamification will involve points being awarded for how well the vehicle does in a test as well as if the test is completed on or before the test due date.

As well as the proposed mobile application there will be an accompanying website used to aggregate links to external sources for further information as well as to part suppliers. The website will also house the development blog and contact details for application testers to submit enquires and notes.

3.2 Testing

Testing of this mobile application will be divided into two specific fields;

Stage 1 will consist of developmental testing, otherwise known as ‘Blackbox testing’ this method tests for any errors in coding or implementation during development, ensuring a smoother and more reliable launch application.

Stage 2 will consist of people in the SEAT community, owners and users of the ‘seatcupra.net’ forums. Users will be provided with a link to the application and will be asked to trial it before filling out a small anonyms supplementary questionnaire. This questionnaire will ask the user about the applications ease of use as well as its functionality, usefulness and to list any bugs that may have been found.

Any and all testing notes and updates will be released via the projects accompanying website.

3.3 Evaluation

Once the application has been distributed and any maintenance has taken place users will be polled via a combination of form posts, private messages and face to face conversations to determine the effectiveness of the application. All notes will be taken and formatted for viewing on the projects website. This information will allow the review the application and gauge if it adequately met the goal stated.

4. Summary

The project that has been proposed would gamify servicing and maintenance of vehicles there by helping owners keep their cars on the road for longer. This would not only benefit the individual user as it would help decrease their vehicle running costs by eliminating factors such as garage bills and excess fuel usage due to unserviced vehicles, but it would help reduce the number newer cars needing to be purchased, thereby reducing the carbon footprint of vehicle owners.

Mobile learning brings a more convenient platform for people to learn and game on the go. The use of this platform attempts to cast a wider net for the auto user allowing for easier access to fun and useful information at a far cheaper cost than previous and alternative methods

If the project is deemed successful it will show that mobile devices are a viable option for educational purposes, across several user and age groups. This would provide an excellent basis to expand the scope of the application and even transplant its method onto other subjects and situations.

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