

Dissertation

by Conor Loughlin

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Conor Loughlin

Motorsport Events Management

M6X01296

P150184

Introduction to my Dissertation

Do consumers believe that the usage of Formula E will help with the development of the electric car?

This final year dissertation will be an investigation into if Formula E is helping with the development of electric cars and if the consumers believe this is the answer.



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1.0 Introduction

With the news of the ban of selling new petrol and diesel cars by 2040 in Britain and France, electric cars are becoming more increasingly important for the future of the automotive vehicles, such as cars and vans. In order to achieve this goal, Britain and other countries that have automotive makers will need to increase the importance of different substitutes to petrol and diesel, with electric cars presumed to be the main alternative. ^{Citation Needed} tance becoming more critical as time progresses, finding the best way to develop these electric cars will help in the quicker progression of electric cars. The automotive industry needs to find ways of developing electric cars more quickly and progressively, and one of the most popular themes is using motorsport. ^{Citation Needed} The automotive industry in the past has developed the petrol and diesel engine cars using motorsports and other ways, but motorsports seems to be the most well known theme. The automakers such as BMW and Jaguar have started to enter Formula E, which is a full electric race series and the first ever all electric motorsport focused on increasing sustainability in motorsport. Formula E would be seen as a massive benefit to the automakers that are trying to find the best solutions to help with developing the electric car more quickly and more efficiently. The question is, if Formula E does actually help in the development of the electric car right now so it can help benefit the consumers of the electric car in the future, are the consumers right now aware of this or not. Also if consumers believe that Formula E and Electric Vehicles are indeed to the answer to the future of transportation. The importance of the electric car to the consumer concerns mainly european countries as well as Britain. Development of the electric car includes fixing all the issues electric cars are prone to having. Electric Vehicles are also described as a more eco friendly alternative to petrol and diesel, which can also be described as a false claim. With the growing reliance and importance for the electric car in the future, it is important to ask this question to see if people believe that Formula E does help with the development of the electric cars and helps in fixing the faults for the consumers. This is building on previous work and expand scholarly knowledge of Formula E and the development of the electric vehicle and how they can be connected. The value of this research is extremely high. This research will help to give a clearer understanding of what some people are aware and believe that Formula E does bring benefits to the electric vehicle and consumers for the future.

The ³ aims and objectives of this dissertation include:

- Explaining why car manufacturers believe that by using Formula E it will help with developing there EVs
- Discussing the potential of the Electric car and Formula E
- Explaining what types of research I will be conducting and using ^{1st person}
- Seeing if consumers agree and are aware with the car manufacturers that Formula E does help
- Discussing if consumers believe that Evs are the right solution

The Review of Literature

Formatting

4 The Introduction

1.1 Background

Not everyone will be aware of the advantages electric cars can provide them and how Formula E has helped with improvements to the electric car. Formula E has become one of the pivotal events for car manufactures in their understanding of electric car development. Motorsport itself has repeatedly proved to be the place for different car manufacturers to test their latest developments, resulting in technologies suitable for road cars that will impact on daily life (Miller. A, 2016). Hybrid cars are also being developed through Formula 1 by different manufacturers, such as Mercedes and Porsche. Porsche for example entered the Le Mans race in a hybrid, and proved very successful with three straight victories, before stopping in 2017 to focus its attention on Formula E (Johnathan M.Giltin, 2017). Formula E promises that this will help the development of electric cars will benefit manufactures in the future, and in doing so benefit future consumers of the product. Damian Carrington (2014) suggests the possibility that Formula E was designed to also encourage the younger generation into motorsport, or to attract the generation who 'know more about an Xbox than a petrol engine'.



1.2 The aims of this literature review are to.

- Show how motorsport has helped the automotive industry previously
- History and importance of electric cars
- Advantages and disadvantages of electric cars
- What Formula E is and how this impacts on electric car development



7 Motorsports improvements to automotive cars already

2.1 Examples within the industry

Previously motorsports have helped with design, manufacture and improvements for road cars. The technological overspill of motorsports is incredibly important, since these improvements become part of the road car industry. For example, in F1 Mercedes and Ferrari take advantage of their motorsport technology and put it in their road cars (Santander, 2015). There are many examples illustrating how motorsport technology helps improve road cars. Some examples might not be even noticed but are used every time a road car is driving. One of these examples are the tyre. According to Jamie Page Deaton, a very well respected executive editor for transportation, the grooves on the tyre itself has been innovated and developed by motorsport. Additionally, the grooves allow the tyre to traverse tough conditions such as snow, slush or rain. Alternatively less grooves on a tyre allow more contact with the road and therefore greater stability is achieved, this demonstrates how motorsport has helped to improve the quality of the tyres (Deaton. J.P, 2018). Further examples of how motorsport improves road cars are improvement in safety. Safety is a priority to both industries the ability to make continuous improvements it is beneficial. The automotive industry follows the research made by either its own motorsport cars or acquiring ideas from competitor's motorsports cars. 'Motor racing demands extreme safety for its extreme performances' (Deaton.J.P, 2018). There are several examples indicating improvements motorsport has made to safety. One example is that IndyCar and Formula 1 use carbon fibre to make their bodies because the material is very strong, albeit very expensive (Deaton.J.P, 2018). Another example is that NASCAR use roll cages, which help

to protect the driver during an accident. In production cars, roll cages are hidden in different areas of the car, which include beneath the carpet and even the door trims (Deaton.J.P, 2018).

The motorsport industry has helped in the development and improvement of the automotive industries cars before Formula E was created. There are other examples than illustrated in this literature review. As shown, there are more examples than just Formula E, to prove the importance of motorsport to the automotive industry. The inventions of motorsport that found their way onto normal everyday road cars include the tyres, the safety and brakes which have already been mentioned. A team called Xtrac, and managing director of the team Peter Digby, said during an energy efficient motorsport conference, that motorsport is uniquely placed to help transfer its advanced components into automotive road cars, and that using alternative fuels is a good area for motorsport which will be beneficial to the automotive industry. (Digby.P 2007). With these examples of how the technological overspill has transferred to the automotive industry, it is hardly surprising that formula E is the latest to help the automotive industry in its electric efficiency. However, electric cars existed long before Formula E began, so developers were developing technologies prior to the advancements available through the motorsport industry in particular Formula E.



3.0 History and the importance of the electric car



Electric cars are slowly becoming more important to the motoring world. The importance of electric vehicles is accelerating at a faster pace now since its invention, more than it has since electric cars were first invented. The electric car was first invented by different innovators of the 1800s, one of the most popular being William Morrison in 1890. However, with the invention of crude oil in the 1920s, petrol became the predominant fuel quickly petrol stations started to exist all over the world, creating a decline in the electric car's development (Matulka.R, 2014) Companies such as Tesla and Rimac have indicated that electric cars can be successful and that with continued development could prove a sustainable alternative to fossil fuels. The use of hybrids has helped consumers identify electric cars as good alternatives to fossil fuel vehicles. Production of electric cars ceased in the 1920s because of a number of factors, including 'not being a commercial product, desire for longer distance vehicles, their lack of horsepower, and the ready availability of gasoline' (pbs.org, 2009). Another issue for the electric car was that Henry Ford introduced the first mass produced car in 1908 called the Ford Model T, which proved to 'have a massive effect on the U.S. automobile market' (pbs.org, 2009). Electric cars were not important to society or the public until California passed the 'Zero Emission Vehicle (ZEV) Mandate' (pbs.org, 2009) in 1990, which required two percent of the US states cars to have no emissions rising to 10 percent in 2003. This was the beginning of the importance of the electric car.



4.0 The advantages and disadvantages of electric cars



4.1 Advantages

Electric cars bring a range of benefits in its armour. These advantages are slowly turning people away from petrol and diesel cars. One of the benefits include then being a cheaper method of refuelling, although there are many further benefits. This means the user will be able to avoid all the other expensive commodities that usually burden the car owner (Shah.S, 2018), such as taxation and servicing. Also, being more efficient helps with prices of electricity being cheaper to buy (Dredge.R, 2017). In some areas of the world electric cars are 25-30% cheaper to run than petrol driven vehicles (Shah.S, 2018). The Government hope by 2040 to have banned the use of fossil fuel cars therefore it makes sense in the future to invest in electric cars today. The ban on fossil fuels is to reduce

emissions, making the zero emissions goal more achievable in the UK (Smith.L.J, 2018). This is an advantage that electric cars bring. Electric cars are also very good at improving the air quality (Dredge.R, 2017). Electric cars help with the reduction of noise pollution, by having much fewer moving parts compared to an internally combusted run car (Shah.S, 2018). Another possible reason for the potential of the banning certain new fossil fuels is the energy security issues. This is the cost that Britain incurs importing fuel, resulting in high prices. With electric cars, this will help reduce the import costs which would make Britain potentially more energy secure for the future (Shah.S, 2018). Some of these advantages would not have been possible without the input of Formula E.  13

4.2 Disadvantages

However, there are also disadvantages that electric cars can bring. One of the main and most well-known problems is that the range is usually limited. (Dredge.R, 2017). This means is that electric cars usually run of electricity quicker than petrol or diesel cars run out of their fuels. People are very sceptical about making long journeys in electric cars. There is also a lack of charging points for electric cars and the time it takes to charge is a major disadvantage. In order to make a proper claim for electric cars, it would be necessary for more charging points to be added for electric cars (Shah.S, 2018). With more than 1 million electric cars now in Europe, and with that number expected to increase by about 1.35 million by the end of this year, also with sales of electric cars being more than 40% in the first half of 2018 alone.  14 It is important to plan for more charging points (Vaughan.A, 2018). Batteries are expensive, despite the prices of batteries being expected to drop in the future (Shah.S, 2018). The main issues for the electric car are the batteries and the development of the electric cars themselves. Automakers use lithium ion batteries, which are lighter and can store a charge longer, but they are much more expensive to buy (Geib.C, 2018). The belief is that electric cars will always be expensive. For example, 'EVs that are between 90 to 100kWh battery packs, the cell cost will be \$17,000 to \$25,000' (Smith.L.J, 2018). There are 3 problems that automakers are trying to overcome. The first is development costs. For automakers, it would be much less expensive to develop a internal combustion engine and gearbox needed to maintain the motor within its most efficient torque range (Gaton.B, 2018). The second issue is the material supply chain. No battery pack production is anyway near the levels needed to replace the fossil fuel supply chain (Gaton.B, 2018). The third is the economies of scale. Battery raw materials and manufacturing are built in low numbers compared to an internal combustion engine (Gaton.B, 2018). Another problem is how environmentally friendly electric cars actually are. Despite being seen as the way to cut down on emissions and reducing global warming, there are still questions of the electric cars green credentials (Bomford.A, 2013). A study by scientists in Norway found that electric cars have a greater impact on global warming than conventional cars (Bomford.A, 2013). The raw materials and energy needed to build the lithium batteries is one of the reasons. (Bomford.A, 2013). The production of an average production car which involve emissions is 5.6 tonnes, whilst for an electric car it is 8.8 tonnes and nearly half the reason for that is the battery (Clarke.S, 2017). Electricity that helps to run electric cars is from non-renewable resources and that can have a negative impact on 'our health and environment' (Bater.E, 2018). Batteries may not emit exhaust fumes but do emit toxic fumes  17 (Bater.E, 2018). These batteries rely on environmentally hazardous materials to mine, which leaves the dilemma of either minimizing the carbon footprint by running an electric car but knowing this has caused human suffering and environmental damage in the process (Geib.C, 2018).  18

5.0 Formula E

5.1 Formula E is the world's first all-electric motoring street racing series. The Motorsport Industry Association are very open to the idea of efficiency in motorsport, in doing so, remain important to the automotive industry. Their mission statement alone fully demonstrates the objectives they wish

to accomplish for the present and the future. Their mission statement is too 'maximise the life of fossil fuels', so they can focus on more efficient fuel to work with and improve. (MIA, 2002). Also, the EEMS is also showcasing technology such as the use of alternative fuels and hybrid power trains. Motorsport ¹⁹ its because the manufactures and advertisers ²⁰ require the needs to gain their own brand exposure, meaning in a competitive advantage against rivals and good media coverage. (MIA, 2002) So, it seems appropriate that formula E is helping the development and improvements of electric cars on the roads for the future. The definition of efficiency is 'the difference between the amount of energy that is put into a machine in a form of fuel and the amount that comes out of it' ²¹ (Cambridge dictionary, 2018). Formula E first started in September 2014. (Simpson.J, 2018). Since then, its mission has been to increase sustainability in the motorsport and to explore and pioneer new ways of sustainable motoring. Since it first started, it's gone on to become a success in the motoring industry. ²²

5.2 However, Formula E is also important for other reasons. One of the positive reasons is that Formula E will inspire the younger generation because 'it taps in to their way of living, such as learning about cleaner engineering solutions (Smith.S, 2016). The use of the FanBoost ²³ and having races set in locations within capital cities will help to create a bigger fan base for the younger generation (Carrington.D, 2014). The sport continues to grow as it begins to get ready for the next season. The fans in Formula E are different compared to the fans of Formula 1 ²⁴. Formula E fans are usually young, new to motorsport generally and very active on social media, such as Facebook and Snapchat, whereas Formula 1 fans are less active on social media, have different age groups watching and probably watch more motorsport than just a specific genre (team-sport.co.uk, 2014). In Formula E, teams can now develop their own powertrain, increasing the development of powertrains for electric cars (Gibbs.N, 2018). According to Nick Gibbs (2018), to do well in Formula E, efficiency techniques are a must because that will have an impact on the success and failures of road going electric cars. Formula 1 is aimed at an older audience, with the advertising brands for Formula 1 as an example. They brand Heineken and Rolex (Luke Smith.L, 2018), whereas the brands advertised in Formula E include Snapchat, which is a social media platform for the younger generation. ²⁵

6.0 How Formula E has impacted the automotive electric car ²⁶

6.1 With the potential banning of selling new petrol and diesel cars, the Government will be looking for ways to improve the electric cars infrastructure (Smith.L.J, 2018). There will need to be different ways to help improve the electric cars for the future. With major cities setting emission targets, electric cars have become an essential item. Not only London, but also cities like Paris, Madrid and Oslo ²⁷ are set to ban cars from there city centres in order to produce less pollution (Ed Maylon, 2018). One of the ways car manufacturers will want to use to help improve their electric cars is by motorsport. Formula E is built as the future of motorsport racing by being the first all-electric motorsport series (Simpson.J, 2019). Teams such as Jaguar, Nissan, Porsche and Mercedes are getting themselves involved with Formula E. According to the Jaguar racing team Principal, James Barclay, the reason for this is because formula E focuses on the technologies to be used in road cars and to help innovate and improve their products. For example, they develop their own e motors and gearboxes so that manufacturers can have a better understanding of the electric motors and how to improve them (Maylon.E, 2018). Jaguar are also the first manufacturer to be in formula E that will sell a full electric car to its consumers ²⁸ (J, 2018). James Barclay himself said that Formula E has helped in the development of one of their latest electric road cars, the Jaguar I Pace. According to James Barclay, because of their Formula E experience, they've taught more about the way they package materials, the weight, how to maximise efficiency through software and the control systems

and how to fully optimize the powertrain (Trop.J, 2018). All this to produce Jaguar's road cars is very good, because if this is achieved, then the consumers can have a much more improved electric car experience. However, not many of its future customers will realise or probably won't care how this car was developed. According to Stephen Edelstein (2016), the lessons learned that the car manufacturers have had in how to optimize the race car's performance and packaging of all its components, eventually end up in the automotive industries' road cars. Despite this, this adds improvements, meaning in the possibility of higher sales in the future. A car called the Renault Trezor uses a derived motor and the regenerative braking system came from Formula E itself, despite Renault not being in Formula E (Edelstein.S, 2016).

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6.2 According to the FIA themselves, Formula E will be used to show how electricity will 'revolutionise everyday transportation' and to have a 'positive impact on the people and environment' (FIA, 2018). Formula E will help in the research and development of electric cars for the future and to provide a solution to air pollution in cities, (FIA, 2018) such as London and Paris. By using Formula E, the major cities will benefit in the future by having less noise pollution and cleaner air. Before, Formula 1 was where most of the innovation came from, and usually are the reason why normal production cars are innovated very soon. Formula E is a good long-term impact of car manufacturers showcasing their new technologies and showcasing how impressive they could be (Andrews.C, 2018).

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6.3 According to Jess Shanahan (2016), since Formula E began in 2014, the number of electric cars sold in the UK has risen from 10,000 to nearly 85,000 cars. It's highly unlikely the reason for this is because of Formula E but more because the UK is getting more involved with the idea of the electric car. For example, there were 5,000 charging points in 2014, but in 2016 the number grew to 11,500 charging points (Shanahan.J, 2016). Whilst the number of petrol stations is still much higher, the increase of the electric charging points is a positive and shows the infrastructure in the UK for electric cars is improving and being much more convenient. Another example of how Formula E is impacting the electric car is by Audi motorsport. Formula E is like a living laboratory to test new technologies, for example Audi plans to have at least every fourth car from their assembly line from 2025 onwards will be electric, and this plan wouldn't of been possible if it wasn't for staying committed to Formula E (Shanahan.J, 2016). According to Paul McNamara, the advanced engineer for the Williams team, says that Formula E has helped with developing batteries, especially its own. Formula E massively influences to design of the developing systems for the road cars. Things such as crash testing, cooling and the flammability of the electrical systems in Formula E (McNamara.P, 2016).

7.0 Research study

1st person

7.1 After finding all this research for the review of literature, this allowed to conduct the next stage of my research. I will be doing a questionnaire survey which will be asking questions such as if they want to have an electric car and do they believe that Formula E has improved the development of the electric car. There will be a maximum of 10 questions asked in the survey. The survey questions will mainly be closed ended because this will make it simpler and less time consuming for people to complete the questionnaire. Using this type of research methodology will allow for people's opinions which will be vital for conducting this type of research.

3. Research Methodology

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1.0

This section introduces the research methodology used for this project. Mixed methods have been chosen as the most suitable methods because.....

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Research methodology serves as the backbone of a research study (Saunders et al, 2009). The main types of research methodology to use is either qualitative, quantitative or mixed methods. Research methods is a process used to collect information and data for the sole purpose of helping management to make decisions within the business. Methodology can include using publication research, surveys or interviews, along with other techniques. The research itself can include present or historical findings and information (2019, businessdictionary).

1.1 The Methodology will include....

- Show the research questions and what design I've chosen
- Explain open and closed ended surveys
- Describe qualitative, quantitative and mixed methods and show the different techniques for all three
- Explain what I've chosen to do and use,

1.2 Research Questions

This project seeks to answer the following research questions - restate the research questions from earlier in the project

This project seeks to answer the following research questions. These are the survey questions I will be using to help find my findings to see if other people think that Formula E helps with the development of the electric cars and to see if it benefits the consumers, or if they are actually aware of this. Would they buy electric cars regardless of Formula E's developmental improvement of the electric car. These questions took careful and time and consideration to think off but in the end I decided to use these questions:

1. Did you watch any Formula E seasons?

2. If yes, has Formula E's development of electric cars developed your interest in buying an electric car?
3. Have you ever wanted to own an electric car before?
4. If no, what puts you off owning an electric car?
5. Do you believe that electric cars are the future of the motorsport and automotive industries?
6. If you answered no, why?
7. If you would you want to buy an electric car in the future, what would be the reason? If you answered no in question 3, then proceed to question 8 and leave out this question.
8. Formula E technology helps with the development of road cars. Were you aware of that?
9. Do you think technology developed through Formula E is important to the development of electric cars?
10. Do you believe that Formula E can develop the electric car further?

1.4.0 Qualitative

Qualitative research uses the empirical view of the subjects, personal opinions and reflections may not be true of the whole population. A relatively small number of participants. Snap shot of reality for participants.

Qualitative methods use open-ended questions, usually only for surveys, utilising a variety of ways of collecting data interviewing, observation, document and audiovisual data (Creswell, 2014). This type of data uses different data collections such as diary accounts, documents and participant observation (McLeod, 2017). Qualitative research can also include case studies and grounded theories (John W Creswell, 2014). Qualitative research itself is usually more creative and interpretational (McLeod, 2017). According to Creswell, qualitative research honours an inductive style, which helps the complexity of the situation and to have more focus on a personal meaning (2014).

Using qualitative has strengths. These include:

A more descriptive, narrative style. This helps qualitative research users because they can rely on data to help them examine knowledge that would have been unavailable through other research methods (McLeod, 2017)

Allows more ambiguities which reflect social reality (McLeod, 2017).

Can obtain information about social phenomena through the use of interviews, case studies or observations. Qualitative research usually consists of rich descriptive data and personal accounts (Lowd, 2019)

An example of using a type of qualitative data is by using one on one interviews.

1.4.1 One to one Interviews

One to one interviews would provide rich data relating to the subject. One on one interviews is used for collecting data for health and social research (Ryan et al, 2009). This would provide a very valuable tool to use to gather insights into feelings, perceptions and experiences to significantly contribute to the picture (Ryan et al, 2009). This requires skill and understanding from the interviewer. Also, the respect between the interviewer and the interviewee is vital for collecting reliable data (Ryan et al, 2009). Interviews can be used for sensitive topics that normally people would not wish to divulge within a group setting it can also be used to investigate subject areas in more depth.

Advantages

Interviews allow for more detailed answers to questions

Interviews are less likely to be influenced by groups or peer pressure

Can usually achieve a high response

Are useful to combine a person's feelings, perceptions and personal opinions in detail.

(evaluated, 2006)

It was decided that I wouldn't want to use this form of data collection for my research because of these reasons:

One on one interviews is a very time-consuming method of gathering data. This includes time taken to set up the interviews, develop a question base, transcribe data and analyse data. It is felt that there is insufficient time available to ensure the activity can be conducted to a high standard.

Using different interviewers or interviewees may make the interview more confusing, such as a different way of asking questions or degrees of empathy between interviewer and interviewee.

(evaluated, 2006)

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One on one interviews would therefore not be beneficial to my dissertation.

Quantitative methods

Quantitative research is the opposite of using qualitative research. Quantitative research gathers data from a numerical form, which can be into different categories, in rank order or even in measurement in units (Saul McLeod, 2017). Quantitative research worries about discovering facts about social phenomena and assumes a measurable reality for its research (Minichiello et al, 1990 p.5). Quantitative research uses questionnaires, experiments and controlled observations. Quantitative research is more objective than qualitative research, the research is used to test if the hypothesis is true or false and the study usually is designed and determined before the research is began (Saul McLeod, 2017).

Strengths

- Quantitative research helps to support or reject the hypothesis, meaning there is no bias in the answer.
- Results are valid and reliable in a larger population
- Useful and advantageous for studies involving numbers, such as for medical or population studies.

(Dr Mary Lowd, 2019)

- More chance of rapid data, quicker at gaining data and being analyzed, especially with clever software tools. (Saul McLeod, 2017)

Weaknesses

- If research is taken from a non statistical researcher, quantitative data analysis can be difficult to achieve. Quantitative research relies on discipline to be properly finished is usually only used for complex issues, such as social sciences or psychology.
- Requirements of using extra resources in quantitative research. Using experiments, retesting results and refined several times for a result. This requires extra time, money and resources to refine the findings and conclusions
- There are also limited outcomes in quantitative research. If a questionnaire is used, it will require close ended questions, so that the results cannot always represent the actual occurring in a generalised format.

(Priya Chetty, 7th September 2016)

Mixed Methods

Mixed Methods is a combination of collecting and analysing quantitative data and qualitative research. This is used to help in the understanding of a research problem, rather than just using one type of research method (resourcecentre.foodrisc.org, 2016). This is best used to continuously look for research look at research questions threw different angles and to clarify any unexpected findings from the research (resourcecentre.foodrisc.org, 2016). This can be used to help build and clarify on findings from other methods (resourcecentre.foodrisc.org, 2016).

Advantages

Using mixed methods provides more strength to offset the weaknesses of just using qualitative and quantitative research.

A much better and complete understanding of a research problem than qualitative and quantitative research approaches alone.

This can help to explain the research findings more.

(resourcecentre.foodrisc.org, 2016).

However, despite these advantages to using mixed methods, I decided I wasn't going to use for my dissertation because of these reasons.



The design of the research can be complex to do and understand

Possibly even ore time consuming than using quantitative research alone to implement and plan the research findings.

This might be difficult and complex to plan, due to trying to implement one method to another method using the findings.

(resourcecentre.foodrisc.org, 2016).

What I decided to use

After analyzing all the advantages and disadvantages of using qualitative, quantitative and mixed methods data, I decided to use mixed methods because it will combine both quantitative and qualitative data and I believe that this will be a best fit my research. I'll be using more quantitative data than qualitative data in my mixed methods data research because I believe that using more quantitative data will be much more beneficial and less time consuming to analyze the data. I believe that having just one or two qualitative in certain questions will make the data easier to use and be more interesting to analyze. After deciding what type of research methodology I would be using, I

then had to decide what type of research I would be using to help gather data together. I had to find the right choice because it had to be best fitted to this research. In the end I decided to use surveys.

Surveys:

Surveys can be used for either a qualitative, quantitative or mixed methods. Survey research is described as a 'collection of information from a sample of individuals through their responses to questions.' (Check and Schutt, 2012, p. 160). Other types of surveys include open and closed surveys. The two primary methods of data collection using surveys are called census and sample surveys.

Sample surveys

Sample surveys are usually a lot less expensive to use than census surveys. A sample survey is usually defined as a collection of data from a sample of the population of interest (Office for national statistics, 2010). A sample survey only selects a few of the population, compared to nearly everyone with the census survey. This means that there is a lower burden of analysing all the data and less time consuming to complete. Despite this, the researcher can't be certain that the small population is representative of the mass population (Office for national statistics, 2010). Also, Sample surveys can be a burden over time if they are used periodically (Office for national statistics, 2010). It's usually better to use sample surveys as one-off sample survey instead.

The three different ways of using surveys for data collecting which are Questionnaires, one to one interviews and telephone interviews. The one on one and telephone interviews I decided not to involve them in this research.

Questionnaires

Questionnaires can be distributed in different ways. Questionnaires can be sent via email, mailed to participants and in paper form, or even the combination of both (Julie Ponto, 1st March 2015). There are a number of advantages and disadvantages that questionnaires can bring.

The questionnaires would be the best method of data collecting because of these reasons:

- Questionnaires are usually more practical to use
- Questionnaires can have a large number of respondents
- Questionnaires can be used for statistics and quantitative data, not just qualitative data
- If the Questionnaire is properly constructed, then it should be reliable for other studies in the future

(University of Portsmouth, 2012)

- Relatively quicker to use questionnaires as a source of collecting data
- Questionnaires are more objective than one on one interviews

(John Milne, 25th March 1999)

Disadvantages

- Questionnaires can't say what the feeling is behind the answer
- A possibility of a low response rate even lower than in an interview

(University of Portsmouth, 2012)

- Students may not be willing to answer questionnaires, the reasons possibly being they may not wish to reveal information or they feel they won't benefit from doing this.
- Questionnaires usually occur after events, adding the possibility of having participants forget about issues.

(John Milne, 25th March 1999)

Despite these disadvantages, I decided it would benefit my dissertation and be useful and easier to use my research. Using the sampling would be beneficial because the information is collected is generalized to the population of interest. I also decided I was going to use quantitative data as well.

After deciding what type of data collecting I wanted and what research methodology would benefit this dissertation, I had to decide what type of questions I could use for my research questionnaire survey.

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2. Surveys: Open or Closed

Open surveys

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Open-ended surveys consist of open-ended questions that allow someone to give a more free form answer, compared to closed-ended surveys (Susan Farrell, May 22nd, 2016). There are no predefined answers given to on the survey, meaning the participants need to apply their own answers in the survey (Sarah Mae Sincero, April 8th 2012). Open-ended surveys and questions are more suitable for qualitative research. Advantages of using open-ended surveys include the participant being able to respond to questions the way they want to answer them and the research can investigate the meaning of the answers, knowing they are more meaningful to the answers than if the researcher used close-ended surveys and questions instead (Sarah Mae Sincero, April 8th 2012). A disadvantage includes it is more time consuming to analyze all the answers fully and that responses can be difficult to code or understand, depending on what the research findings are (Sarah Mae Sincero, April 8th 2012). The best time to use open-ended surveys and questions is whilst conducting research design such as what problems to solve and who to design it for, and for exploratory studies such as qualitative research usability testing (Susan Farrell, May 22nd, 2016).

Advantages

They allow the participants to answer in detail

Open-ended surveys allow for more adequate answers to complex questions and issues

These inspire more creativity and richness of detail in the answer, much more than closed-ended surveys can do

There is no right or wrong answer, so respondents might feel more confident to answer the survey properly and truthfully

(Andre Copeland, March 2017)

I decided not to use open-ended questions because:

People can give different variations of detail in the answer, some may not give hardly any relevance

Answers can be difficult to analyze or compare

A longer amount of response time and effort is required

Questions can be too general for some participants, who may lose general focus

Likert Scales

Likert Scales are another different example of a survey form. A Likert scale, according to Lindsey Liedke, is a rating scale that helps to find 'measures of how people are feeling about something' and sometimes someone (July 3rd 2018). Likert scales are very useful for companies who want to conduct a survey about what their customers think of their customer service or how satisfied they are with the quality of the product they make and sell. A Likert scale has a set of different responses that people can choose to answer the survey. These can include:

- Strongly agree, agree, unsure, disagree, strongly disagree
- Highly satisfied, satisfied, neutral, unsatisfied, highly unsatisfied

(Lindsey Liedke, July 3rd 2018)

Advantages

Likert Scales are a universal way of data collecting, meaning that they are easy to understand.

Includes neutral or undecided people of the participants

Very easy to code and count, meaning that one number represents the participant's responses.

Quick, efficient and inexpensive to use

Can be sent through, email, internet or given in person

Have a high versatility

(Nicole LaMarca, December 5th 2011)

I decided that using Likert scales wouldn't be very beneficial to my dissertation research because:

Usually only gives between 5-7 choices of answers for the participants to use

Likely that people's choices are influenced by previous choices.

Either the participants will focus on mainly using agree or disagree and fail to use the strongly agree or strongly disagree choices.

It can fail to meet the true feelings of the participant, even with more choices of the answer to use

(Nicole LaMarca, December 5th 2011)

Closed surveys

Closed surveys are different to open surveys. Closed surveys have a limited way of answering, using usually just yes and no, although other types of closed surveys used different types of closed-ended questions.

Using Closed-ended questions will be beneficial because

Closed-ended questions can usually be good for using surveys because there will be a higher response rate because the participants do not have to put down so much information (Susan Farrell, May 22nd, 2016). Closed-ended questions are much easier to analyse statistically (Susan Farrell, May 22nd, 2016).

However, the disadvantages to consider are:

It may not have the answer the participant will exactly want.

If using other methods of closed-ended questions, the participants may be a little confused by all the choice.

The people with no opinion may just answer anyway, making the survey and findings less reliable.

Doesn't give information about if the participant hasn't understood the questions.

(Susan E. DeFranzo, 15th September 2014).

Despite these disadvantages. I decided to use close-ended questions for my questionnaire using quantitative data to analyse it.

3. What I've decided to do and the survey



I have decided to use mainly closed-ended questions in order to not spend too much time analyzing the data and getting the results easier. I've only used 1 open ended question because it will be easier to analyze all that data together. The open ended question will be a question asking why they don't believe that the electric car is the future for the automotive and motorsport industries.

The questionnaire will have the hypothesis that people are aware of Formula E and believe that Formula E does help in the development of the electric car. The data variable that will be used in this questionnaire will be the opinion of the respondents (Saunders et al, 2009, p.g 368). The data variables that can be used in a mixed methods questionnaire will be much easier because it will be less time consuming and also easier to gather the data from. Most questions will be closed ended questions with only a couple of them being open ended questions. Using only a few open ended questions will make for more interesting results and make it easier to analyze the data. I will be using a website called survey monkey in order to create and distribute the survey to the public, and the survey will either be distributed through using social media platforms such as Facebook groups, email or web links. The Facebook group will include all Logistics and some motorsport management students. Using Facebook will make it much easier in helping to advertise my survey to people more quickly. The Survey Monkey website will collect all the data together and afterwards the data will be exported to both Microsoft Excel or SPSS. The data will be stored on Excel because it will be easier to look at the data graphs that will all be stored on it.

4.0 Data Collection

I did this section by designing a questionnaire on survey monkey and asking people to help in completing and participating in it. To do this questionnaire, I asked my class room and some other people at the University, with 33 people participating in the survey altogether. The survey was sent mainly through Facebook, either in closed groups or private messages. I also used email to help with sending a few surveys to participants. I used questionnaires that mainly had closed ended questions because it would make it easier to collect the data and analyze it.

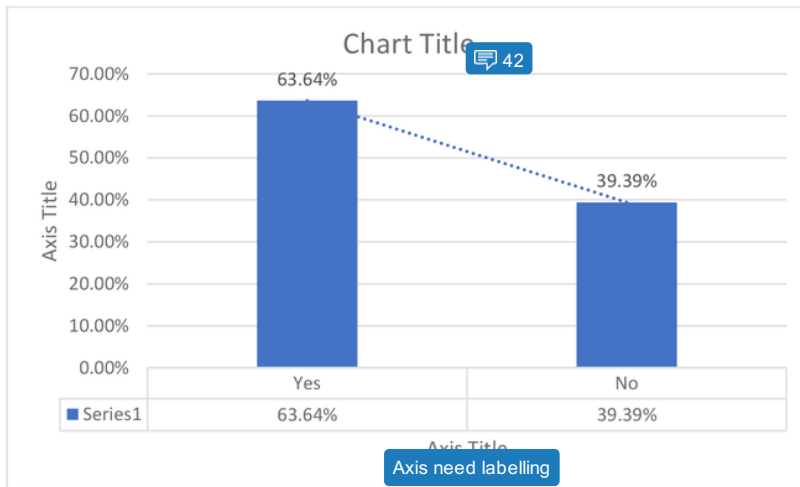


The Results

Below are the results from the respondents who decided to participate in my survey Questionnaire. The results are shown as a bar graph in order to make the results look as clear as possible. There are a few that have left out questions, but that's mainly due to the instructions set on the survey. The bar Graphs will be used for all the closed ended questions. The graphs will also contain the maximum amount of people who participated in doing this survey, the percentage that each participant used for each answer and also include the basic statistics such as the median, the average and the standard deviation. All the data will be analyzed using Microsoft Excel, using all different graphs such as a bar chart and a pie chart, in order to decide which pieces of data will fit in with each graph. The graphs do not feature in every question, as question 6 is an open ended question. All other questions feature as a bar graph.

The results of the Questionnaire:

Question 1

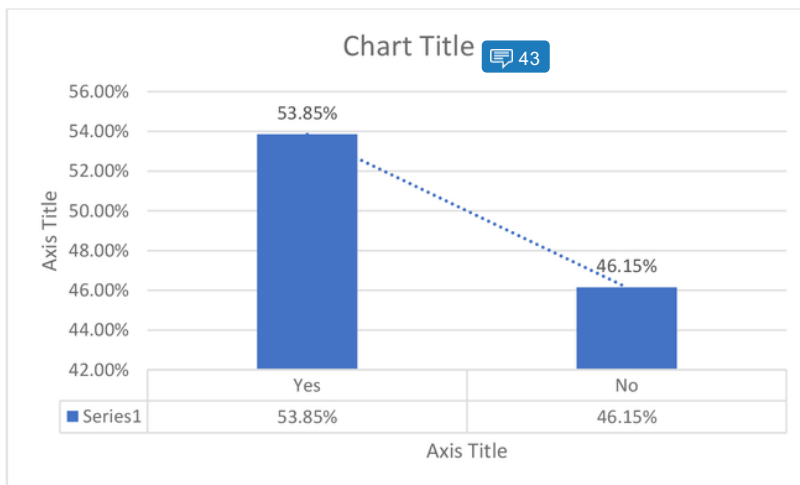


Minimum Maximum Median Mean Standard Deviation

1.00 2.00 1.00 1.38 0.49

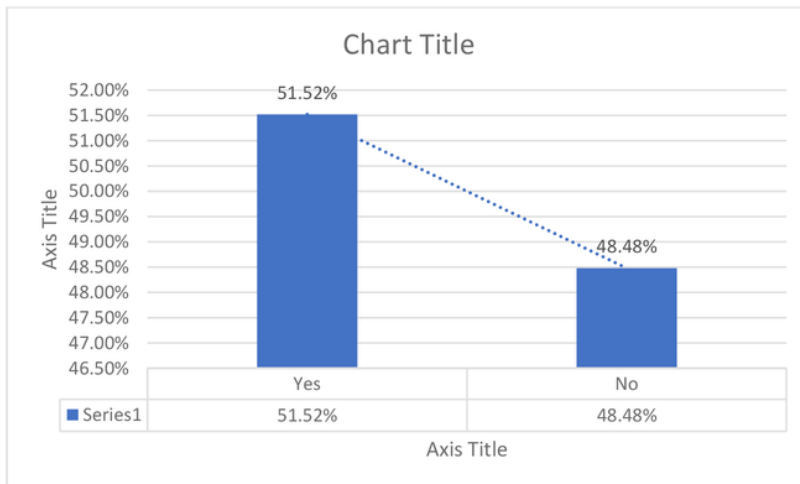
Graphical data needs labelling

Question 2



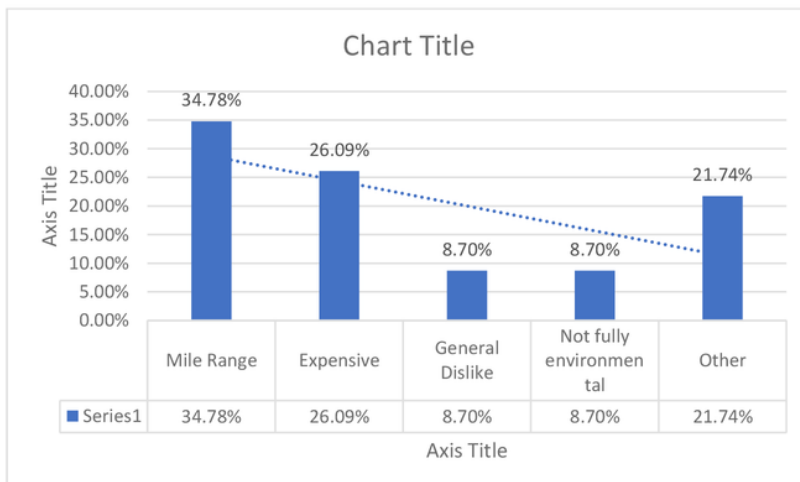
Minimum	Maximum	Median	Mean	Standard Deviation
1.00	2.00	1.00	1.46	0.50

Question 3



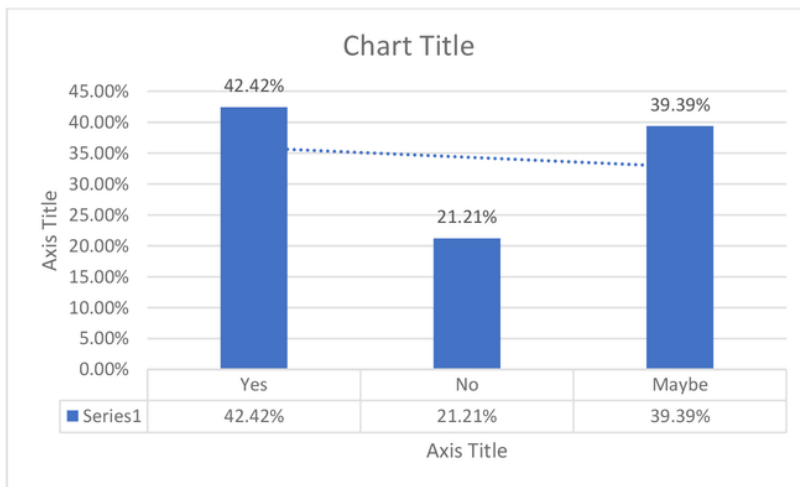
Minimum	Maximum	Median	Mean	Standard Deviation
1.00	2.00	1.00	1.48	0.50

Question 4



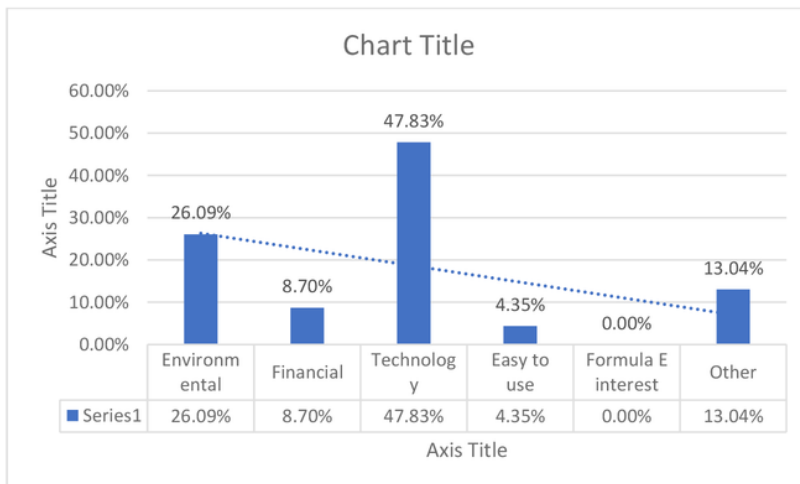
Minimum	Maximum	Median	Mean	Standard Deviation
1.00	5.00	2.00	2.57	1.56

Question 5



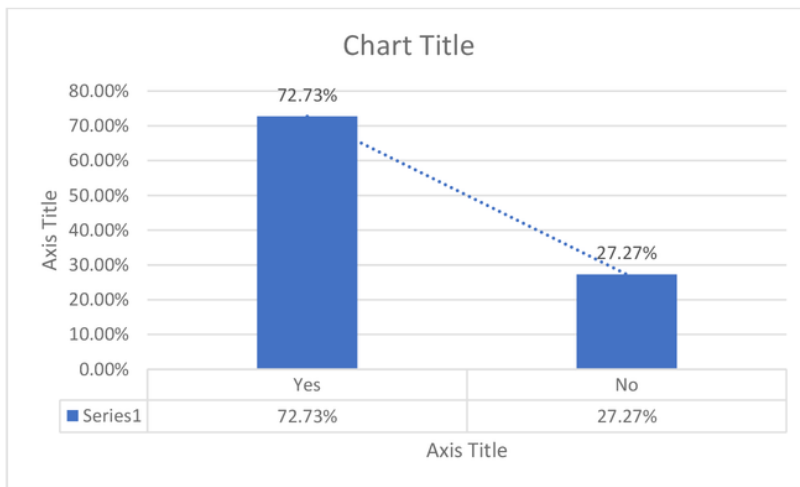
Minimum	Maximum	Median	Mean	Standard Deviation
1.00	3.00	2.00	1.97	0.89

Question 7



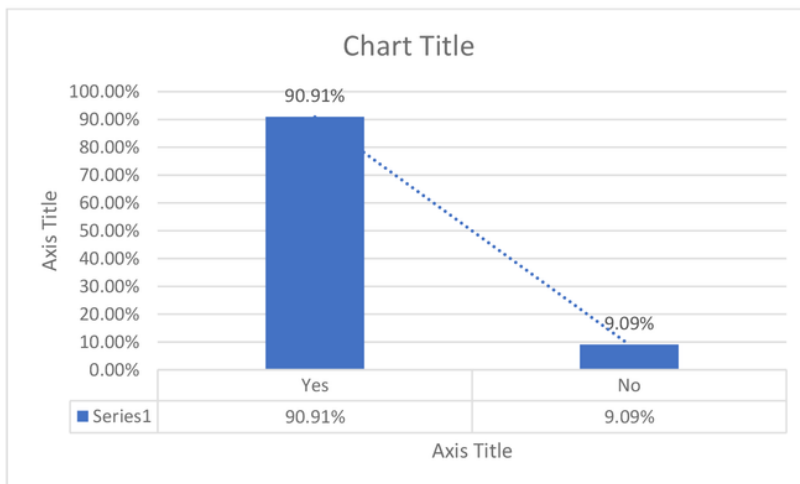
Minimum	Maximum	Median	Mean	Standard Deviation
1.00	6.00	3.00	2.83	1.52

Question 8



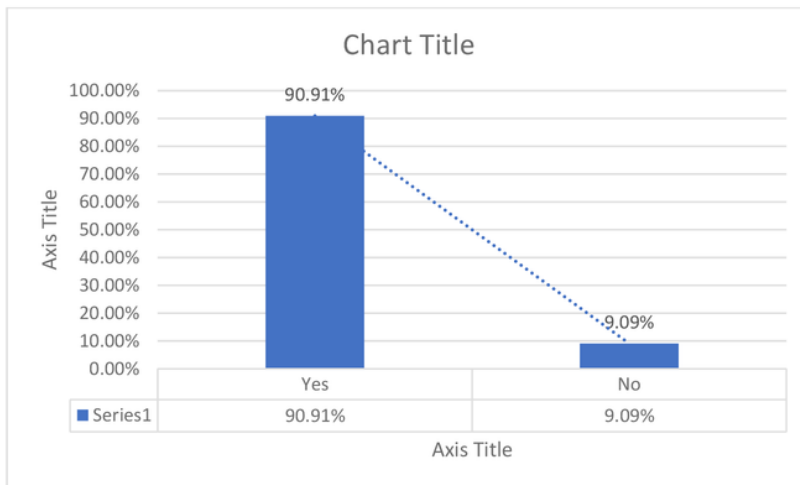
Minimum	Maximum	Median	Mean	Standard Deviation
1.00	2.00	1.00	1.27	0.45

Question 9



Minimum	Maximum	Median	Mean	Standard Deviation
1.00	2.00	1.00	1.09	0.29

Question 10

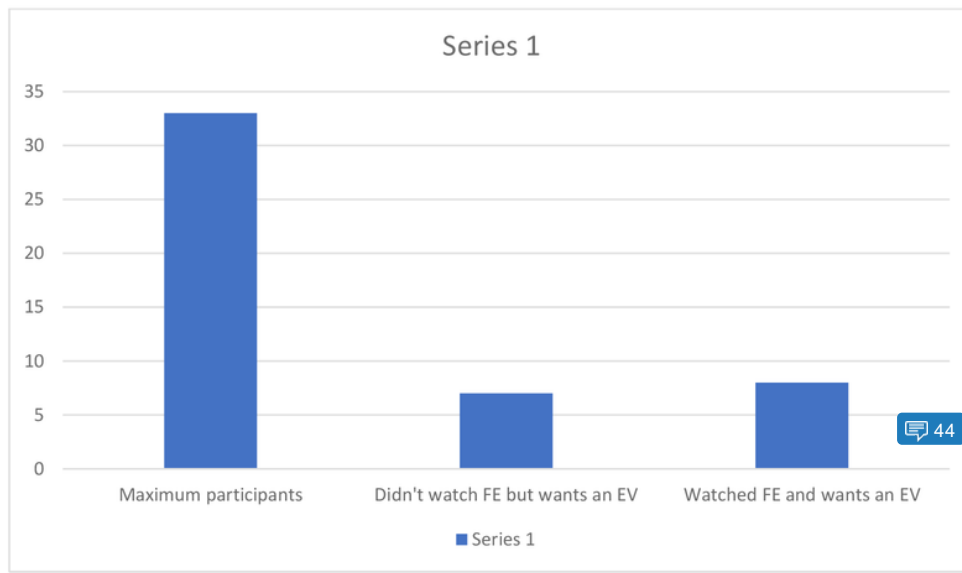


Minimum	Maximum	Median	Mean	Standard Deviation
1.00	2.00	1.00	1.09	0.29

5.0 Analysis of the Data

5.1 Closed Ended Questions Data

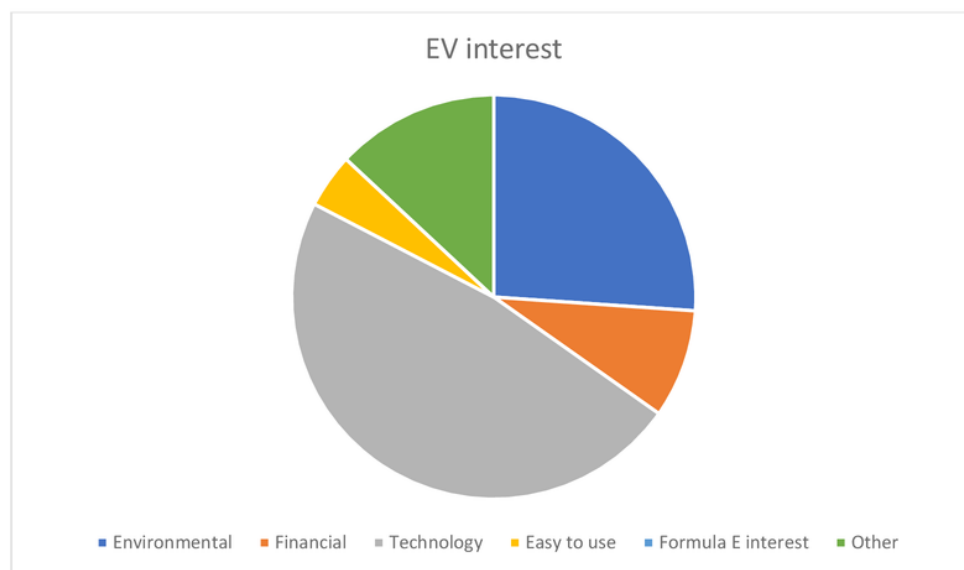
1. Question 1 and 3



This is the first bit of data that was gathered. The maximum number of participants that took part in this question was 33, meaning no one had left this question out. This will make the data more useful and easier to analyse. Question 1 asked the participants if they have ever watched Formula E before, with 21 people saying yes and 13 saying no. The 3rd question asked the participants if they ever wanted to have an electric car, with 17 people saying yes and 16 saying no. In this graph, it analyses how much people wanted an Electric Vehicle if they have or haven't watched Formula E before. Out of the 33 participants, 7 people said that they would want an Electric Vehicle despite not having watched Formula E before. However, the amount of people that have watched Formula E before and want an EV was 8, just barely making it more. Out of the 21 people who said they have watched Formula E, only 8 out of the 17 people who said they wanted to have an Electric Vehicle watched Formula E. Also, out of the 13 people that said they haven't watched Formula E, 7 people still wanted an Electric car. Nearly half of the people that said no in question 3 still wanted to own an electric vehicle. The figures are also as close for the people who said yes to question 1, with nearly half of the people who said yes to want to own an EV, only difference is that it is slightly higher. Whilst at the moment it isn't clear why the participants would want to have an Electric Vehicle, this data proves that Formula E may certainly be popular, it also certainly doesn't help the people to wanting to own an Electric Vehicle even more. In fact, this data provides that the hypothesis that Formula E helps to develop more interest in owning an Electric car is more false than true.

2. Wanted an electric car and why?

This will help to determine why the participants would want to own an Electric Vehicle, with them wanting to own an EV in the present or the future. The question that are used for analysing this data are question 3 and question 7. Question 7 asked the participants why they would want to own an electric vehicle, and gave them 6 choices to answer from. The 6 answers that could have been chosen were environmental reasons, financial savings, technology, being easy to use, came from an interest in Formula E and other. I expected the most popular out of these to be either environmental reasons or interest generated from Formula E because Formula E is also meant to advertise how impressive Electric Vehicles can be. The graph below shows why people would want to own an electric car.



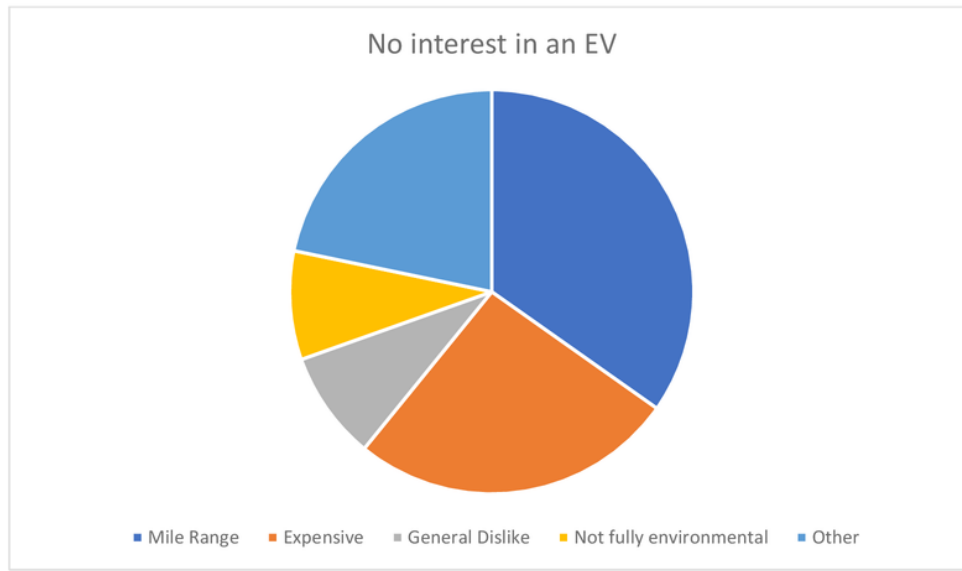
The number of participants that took part in this question was 23, which is strange considering that in question 3, only 17 people claimed they wanted to own an EV. Despite that, the data is still very useful and could mean that the people who don't want an EV are probably just expressing what they think is good about an EV, and maybe could persuade them into wanting an EV in the future. Either that or they made an error of judgement or lack of concentration. This can be an issue by using a survey to help generate data, the data may be useful and meaningful but not always reliable. The data however is still very interesting to analyse. Firstly the lack of people who said that Formula E interest is the main reason why they would want an Electric Vehicle. It was claimed that Formula E would help in advertising what Electric Vehicles can achieve and make the idea of the Electric Vehicle more appealing in motorsports, especially with the younger audiences. This piece of data claims that either Formula E aren't doing enough to promote themselves and the Evs and that there was a general interest in the idea of an Electric car before Formula E even began. Another big surprise was that technology was the most popular reason that these people wanted an electric car, with environmental reasons coming in second. Out of the 23 people

that wanted to own an electric vehicle, 11 people said that was because of the technology that electric cars can now come with. The sort of technology in EVs include improving the batteries by using the lithium-ion batteries which help the recharge capacity of the vehicle. The review of literature also mentions this and that lithium-ion batteries also helped development of electrical vehicles further. Environmental reasons only had 6 people choose it, with other, easy to use and financial benefits getting 3,1 and 2 respectively. Environmental reasons are usually perceived as the ultimate reason for buying an electric car, with advertisements and Governments highlighting their recommendations that consumers start moving from petrol or diesel to electric in order to achieve zero emission zone in their attempts of beating air pollution as an example, but it seems that consumers are more interested in finding out what new or updated technology is available on the electric car and how clever the car is before wanting to buy one. The hypothesis that people buy Electric vehicles mainly for environmental purposes, as shown in this data, is rejected and false.



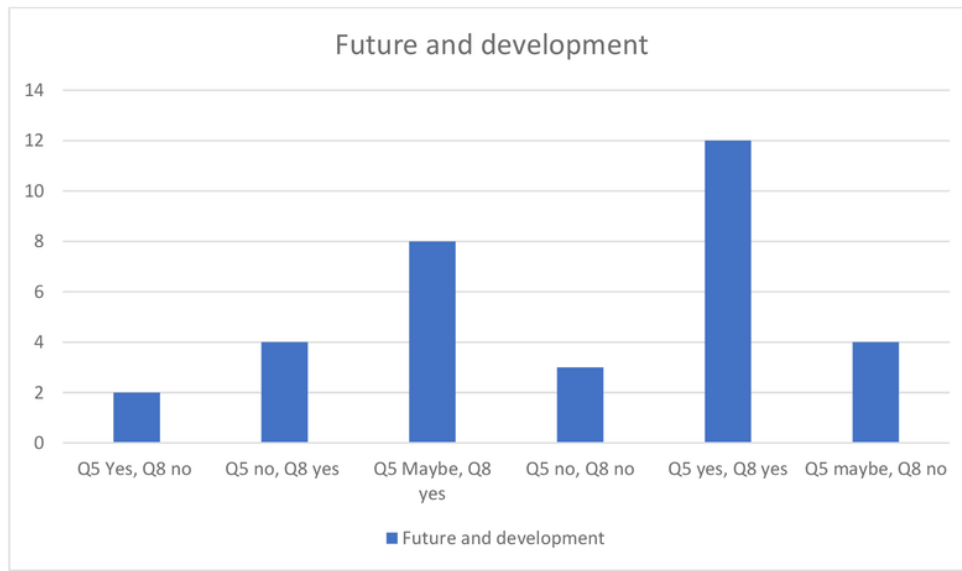
3. Didn't want an electric car and why?

To analyse this piece of data, the question that will be needed is question 4. Question 4 asks the participants why they don't want to have an Electric Vehicle. The 5 options that were included to answer this question was the mile range, expensive, a general dislike, not fully environmental and other reasons. The most popular reasons I thought were the mile range and how expensive they are to buy. The number of people who answered this question was 23, similar to question 7. Again meaning that people could have made an error of judgement or had a lack of concentration whilst doing this survey, which certainly include the people who wanted to own an EV, but they could also be highlighting what they think is the biggest problem to owning one and maybe suggesting why they haven't got one yet. The data is very interesting to analyse.



The results in this question were a bit less surprising. As expected, the mile range was what people who did this question thought was the main problem with electric vehicles, despite the mile ranges improving over periods of time. The amount of people who answered with mile range out of 23 were 8. The data here is much more closer together than in the previous data. It has been well documented of the issues that having an electric can bring to consumers, and one of the most popular seemed to be how far you can go with electricity as an alternative fuel idea. This data does support the hypothesis that the mile range is at least one of the major things that help put off consumers from buying electric vehicles. However, with the mile ranges steadily improving for electric cars, for example in Formula E cars can now go a whole race without changing into another car, it will be expected that the mile range will become less of an issue in the future. There was also no surprise that expensive was second, with 6 people choosing it. With it being said in the review of literature that electric cars will always be expensive, it looks like the issue won't be resolved easily. Maybe it's slightly surprising that more people didn't say expensive instead. A reason could be that they were unaware of the possibility of this being a long term issue. If this survey would be conducted again in maybe 10 years, they would possibly be more people saying that the price of the electric cars are the main reason why they are put off buying one, instead of the mile range. Other was third with 5 people. Other reasons could include the amount of time it takes for an electric vehicle to charge up fully or the complexity of the batteries or technology used. Not fully environmental and a general dislike in electrical vehicles both respectively had 2 people. Interestingly, despite electric cars being advertised mainly for environmental purposes, not many people seem to take much notice. Here only two people said that not being fully environmental would concern them, and only 6 people said they wanted an electrical vehicle because of environmental concerns. This seems to also show that the hypothesis that people mainly buy electric cars to be green is false and rejected by this data. It is well documented that EVs are not as environmental as it's been advertised as, so either a lack of understanding or a lack of caring are the reasons for this.

4. Do people think Formula E is the future for the Electric Vehicle and are they aware that it helps development of the electric car? Using questions 5 and 8.



These statistics can be very useful to analyze and see if people believe that Formula E can be the future of the Electric Vehicle in motorsport and the automotive industry and to see if they are aware of what Formula E does for Electric Vehicles already. Question 5 was if people believed that if Formula E is the future of the motorsport and automotive industries and question 8 was if they were aware that Formula E does help with the development of the electric car. All 33 people have answered both these questions, making it easier to analyze without any gaps in the answers, meaning data is more valuable. The amount of people who answered a particular answer include:

Question 5

Yes = 14

No = 7

Maybe = 13

Question 8

Yes = 24

No = 9

It would be expected to me that most of the participants would answer yes to both questions and to have hardly any other people put no in any of these two questions. As expected, most of the participants believe that Formula E is the future and are aware of what Formula E has done so far with 12 people saying yes to both. The most surprising was that 2 people think that Formula E is the future but are unaware of what it has done. Another reason could be that the two people who answered these two questions like that also said they never have watched Formula E before, so they might not be fully aware of what Formula E is about. Interestingly, quite a lot of people were unsure if Formula E was the future and answered either yes or no in question 8. 8 people who were unsure said they watched Formula E, whilst another 4 people said they never watched it. This makes it surprising that people who watched Formula E still aren't sure if it is the future for both the motorsports and automotive industry. The qualitative data might help in this case, to see why anyone would be unsure if Formula E is the future, despite most being aware that Formula E helps with development. The hypothesis of people thinking Formula E is the future and are aware of the work it has done for the electric car so far is retained and truthful, according to the data.

5.2 Qualitative Data

These are the comments that were made on question 6 of my survey. The amount of respondents that answered this question were 7. All the responses are very interesting and are very good to get decent data and information from.

The responses:

From respondent 23:

"The electricity still needs to be made somewhere, electricity does not have the thrill or heritage of petrol."

From respondent 21:

"When you work out the overall cost and lifetime environment impact, it's worse than efficient engines. Do the maths!! Don't come back to me with electronic cars until the maths make sense overall and there is an actual benefit! With question 8 I would debate if they actually help with developing cars for the road. Electric car development over the past 5 years has come from Tesla's pushing into the market and the bigger automotive companies responding to it, not from F.E! F.E is too restricted for the best development purposes!"

From respondent 20:

"There needs to be a massive change in infrastructure, at present most countries could not supply enough electricity to charge the vehicles if 50% swapped from ICE to electric. Another massive factor is how the electricity is produced, China has the largest percentage of electric cars in the world which they believe is cleaning there city's but 65-75% of their electricity supply comes from burning coal."

From respondent 14:

"Questions about environmental friendliness

Hydrogen cars?"

From respondent 12:

"I believe it is the way forward in the automotive industry, but not motorsport, due to inclusion of formula E there is no need for it, especially as formula 1 are making every effort to limit its environmental impact."

From respondent 4:

"Their carbon footprint is no better (in fact worse) than an ICE vehicle."

From respondent 3:

"The mile range is too low, they are too dangerous to work with in rescue situations particularly in rallying discipline. Often with rallies there are no charge points."

Analysis of content

A few responses were all slightly different. Respondent 3 focuses on the problems with the mile range, linking to question 5 in the survey. The respondent also highlights that there is a lack of charging points and are too dangerous in rescue situations. Respondent 23 says that electric cars are just not as interesting as a petrol engine, linking to having a general dislike in question 4. Respondent 12 believes that Formula E is the way forward for the automotive industry but the motorsport industry, claiming that Formula 1 are making efforts to minimizing it's environmental impact, linking this to question 5. Respondent 21 claims that Internal Combustion Engines produce less harm to the environment than the EVs. This respondent also links back to question 8 and says that is questionable to say that Formula E helps developing EVs. It is claimed to this respondent that Tesla pushing the Electric Vehicle into the market, with the automakers aiming to respond to them

with their own versions of electric cars. This respondent also says that another reason to put this as questionable is because Formula E is too restricting for developmental purposes. Respondent 14 has questioned if EVs are environmentally friendly and has even put hydrogen cars as an alternative idea. Respondent 4 also shares a similar view, even giving an example of the carbon footprint being as bad as in ICEs. Respondent 20 has said that if electric cars are going to work, there needs to be a different infrastructure in place. How electricity has been produced has been questioned with environmental concerns. The respondent even comes up with an example which is that China may have the largest number of EVs, but 65%-70% of the electricity is produced by coal, meaning that the city's are isn't clean. Also, the amount of electricity produced isn't enough. The respondent claims that if a country swapped from ICEs to EVs by 50%, there wouldn't be enough electricity to supply. Another example is Britain only produces 5% more electricity than it consumes, meaning if electric cars do become more popular than Britain would struggle with the demand of electricity needed.

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Recommendations

If I was going to do this again, I would certainly make a few changes in order to make everything easier and better.

- I would ask more than just 33 people to do a questionnaire survey because it doesn't really represent what a bigger audience might say. The numbers and answers can become bigger and more different, making it more interesting to analyze.
- Possibly use more questions in the survey. Having a few more questions can possibly make the survey more interesting to analyze, depending on what questions they are.
- Use more than just Facebook and web links to showcase my survey. In future I would use other social media platforms such as Twitter, use the UWTSD Swansea myday page to help advertise my survey to my university's home page and also maybe use more emails to help get the survey across to more individual people more quickly.

6.0 Conclusion

Electric vehicles will probably  48 me the most important fuel for the future of transportation. Electric vehicles are clearly a popular favourite to replace petrol and diesel but not everybody is a massively enthusiastic about the prospect that Electric Vehicles are the answer. Despite Electric Vehicles being advertised as the best replacement for environmental purposes, not everyone agrees with the idea that Electric Vehicles are the answer to environmental concerns, with evidence to back it up. The data collected has been a good source of information to use in answering the question. This data has proven that not everyone is aware of what formula E is doing in the development of the electric vehicle, and not everyone thinks that formula E does help with development very much.

The review of Literature concluded that Formula E in different ways that helps with the development of Electric cars. The review gave examples of how car manufacturers believe that Formula E will bring massive benefits to helping with further understanding and improving their electric vehicles. The disadvantages in the review of literature highlights what the development is needed for and areas

where car manufacturers need to improve. Using Formula E is believed to be the best way of solving the problems with electric vehicles. The review of Literature states that car manufacturers will use Formula E for the benefit of their future products, with nearly all the manufacturers starting to use and find more ways of developing electric vehicles. Formula E seems to be the most popular usage. Car manufacturers clearly feel different than some of their potential customers, because the data collection has revealed that not everyone thinks Formula E isn't the answer, in fact some even stated that electric vehicles are not the right solution and would prefer another fuel being developed, hydrogen as an example. A difference of opinion from some of the potential customers will mean that car manufacturers might have to start developing another idea as an alternative to the electric vehicle, if more people in the future start to disagree with electric car usage, or if the electric car hasn't been developed fast and good enough.



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Dissertation

GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

Instructor

57 /100

PAGE 1



Comment 1 | K & U Subject

If this is meant to be your abstract (as per the dissertation brief) then this is not sufficient.

PAGE 2



Comment 2 | Skills Prof P

These should not be included in the Contents page?

PAGE 3

PAGE 4

QM

Justify text both sides of the page | Skills Prof P

Additional Comment

Justified text is poor practice in terms of inclusivity. GO

QM

Citation Needed | Res-inf Lit

Cite Source:

Please use the link below to find links to information regarding specific citation styles:
http://www.plagiarism.org/plag_article_citation_styles.html

QM

Citation Needed | Res-inf Lit

Cite Source:

Please use the link below to find links to information regarding specific citation styles:
http://www.plagiarism.org/plag_article_citation_styles.html

Additional Comment Again, bold statements need evidence.



Comment 3 | K & U Subject

Which of these are aims and which are objectives? Do you know the difference?

QM

Sp. | Skills Prof P

Spelling error

QM

1st person | Skills Prof P

Professional Technical reports are always written in the perfect passive tense not the first person.

Additional Comment Specifically not in dissertations.

QM

Formatting | Skills Prof P

Additional Comment Chapter heading should be below.

PAGE 5



Comment 4 | Skills Prof P

This should be 2.0 Literature review.



Comment 5 | K & U Subject

Good.



Comment 6 | K & U Subject

I don't think you need another set of aims.



Comment 7 | Skills Prof P

New chapter, new page.

QM

Sp. | Skills Prof P

Spelling error

QM

Sp. | Skills Prof P

Spelling error

PAGE 6



Comment 8 | Analysis

Good, points well made here.



Comment 9 | Skills Prof P

Not really a suitable title for an academic paper. Continuation of Literature review.



Comment 10 | K & U Subject

The invention of crude oil. GO



Comment 11 | K & U Subject

The model T was not the first mass produced car and exactly how this is an 'issue' for electric cars is not clear. GO



Comment 12 | Skills Prof P

Again, inappropriate title.



Sp.

Spelling error

PAGE 7



Comment 13 | Analysis

Good. What about the benefits such a series brings to motorsport?

The claim of benefits only attributable to Formula e is nonsense. GO



Comment 14 | K & U Subject

A discussion about the introduction of lead-free fuel would have been useful here. GO



Comment 15 | K & U Subject

40% of what?



Comment 16 | Analysis

Lovely!



Comment 17 | K & U Subject

When do EV batteries emit toxic fumes? When they are being driven? GO



Comment 18 | Analysis

Good section Connor, what about the availability of the battery materials. Are they in good supply?

PAGE 8



Comment 19

FFMS?

LEVO.



Comment 20 |  Skills Prof P

manufacturers and advertisers



Comment 21 |  K & U Subject

So what? GO



Comment 22 |  Skills Prof P

What's this number about?

Report format - new paragraph although Conor struggles a bit with the correct format. GO



Comment 23 |  Analysis

FanBoost is what exactly? Do not assume knowledge.



Comment 24 |  K & U Subject

Lacks supporting evidence



Comment 25 |  K & U Subject

Nice.

The final sentences saved the day! GO



Comment 26 |  Skills Prof P

New chapter new page. Inappropriate title.



Comment 27 |  K & U Subject

Unfortunate that no mention is made of the Norwegian plan to ban the sale of similar vehicles in 2025. GO



Comment 28 |  K & U Subject

Complete nonsense. Nissan!



Comment 29 |  Skills Prof P

More weird numbering!?



Comment 30 | [K & U Subject](#)

Heated windscreens, satnav, air conditioning, winter tyres, voice control, and all tested in F1 first. Who knew? GO



Comment 31 | [Skills Prof P](#)

Is a positive what? GO



Comment 32 | [K & U Subject](#)

Poor. GO



1st person | [Skills Prof P](#)

Professional Technical reports are always written in the perfect passive tense not the first person.

PAGE 10



Comment 33 | [Skills Prof P](#)

How have you gone from chapter 7 to chapter 3?! Your chapter numbering is really letting the structure down.



Comment 34 | [Skills Prof P](#)

Incomplete sentence/paragraph!?



Comment 35 | [Skills Prof P](#)

Repeated sentences. Why didn't you send this to me for proof reading Connor?

PAGE 11

PAGE 12



Comment 36 | [K & U Subject](#)

I THINK YOU COULD HAVE SAVED YOURSELF A FEW WORDS AND JUST INCLUDED THIS AT THE START.

Agreed! GO

PAGE 13

PAGE 14



Comment 37 | [K & U Subject](#)

Again, you could have said this and just left it at that.



Comment 38 | K & U Subject

Ok, nicely research and justified, but the fact that this is all done in the first person is disappointing.



Comment 39 | K & U Subject

This should have come before your survey.



Comment 40 | Analysis

This reads like you did the survey before this research, and that your survey was not influenced by this research at all.



Comment 41 | Analysis

What is the problem with this survey sample?



Comment 42 | Analysis

So what is this question, why didn't you put it here in the title?



Axis need labelling | Analysis

Otherwise they are meaningless



Graphical data needs labelling

Graphs should be labelled 'Figure 1:Title (citation)' underneath the object and then referred to accordingly in the text.



Comment 43 | Analysis

Honestly Conor, are you expecting the reader to scroll/flip back to see what the questions are?!



Comment 44 | [Analysis](#)

Nice, not very well displayed but good.



Comment 45 | [K & U Subject](#)

Who made this claim? GO



Comment 46 | [Analysis](#)

The hypothesis was never postulated nor adequately tested. GO



Comment 47 | [Analysis](#)

Some of these responses imply that respondents are familiar or even well read in the implications of electrification, they also back up some of your previous statements.



Comment 48 | [K & U Subject](#)

You cannot use statements like this in your conclusion. It must be factual based on the findings of your work.



Comment 49 | [Analysis](#)

The literature review is good, you have demonstrated some nice objective critique. Your cross analysis of your survey questions has some nice bits to it but is poorly executed, I think you could have discussed this more and cross referenced it with your secondary research. Your structure really lets down the report, but you have a lot of well used citations throughout.



Comment 50 | [Analysis](#)

Has your primary research backed up any of your secondary research? You need to show some validation of your hypothesis and also show that you have addressed all of your aims. Very poor conclusion chapter.

RUBRIC: BACHELOR'S ASSESSMENT CRITERIA**RES-INF LIT****Excellent 70-79%**

Research-informed Literature. Extent of research and/or own reading, selection of credible sources, application of appropriate referencing conventions

OUTRIGHT FAIL 0-29%	Little or no evidence of reading. Views and findings unsupported and non-authoritative. Referencing conventions largely ignored.
UNSATISFACTORY 30-39%	Poor evidence of reading and/or of reliance on inappropriate sources, and/or indiscriminate use of sources. Referencing conventions used inconsistently.
SATISFACTORY 40-49%	References to a limited range of mostly relevant sources. Some omissions and minor errors. Referencing conventions evident though not always applied consistently.
GOOD 50-59%	Inclusion of a range of research-informed literature, including sources retrieved independently. Referencing conventions mostly consistently applied.
VERY GOOD 60-69%	Inclusion of a wide range of research-informed literature, including sources retrieved independently. Selection of relevant and credible sources. Very good use of referencing conventions, consistently applied.
EXCELLENT 70-79%	A comprehensive range of research informed literature embedded in the work. Excellent selection of relevant and credible sources. High-level referencing skills, consistently applied.
EXCEPTIONAL 80-100%	Outstanding knowledge of research-informed literature embedded in the work. Outstanding selection of relevant and credible sources. High-level referencing skills consistently and professionally applied.

SCALE 8**K & U SUBJECT****Very Good 60-69%**

Knowledge and Understanding of Subject. Extent of knowledge and understanding of concepts and underlying principles associated with the discipline.

OUTRIGHT FAIL 0-29%	Major gaps in knowledge and understanding of material at this level. Substantial inaccuracies.
UNSATISFACTORY 30-39%	Gaps in knowledge, with only superficial understanding. Some significant inaccuracies.
SATISFACTORY 40-49%	Evidence of basic knowledge and understanding of the relevant concepts and underlying principles.
GOOD 50-59%	Knowledge is accurate with a good understanding of the field of study.
VERY GOOD 60-69%	Knowledge is extensive. Exhibits understanding of the breadth and depth of established views.

EXCELLENT 70-79% Excellent knowledge and understanding of the main concepts and key theories. Clear awareness of challenges to established views and the limitations of the knowledge base.

EXCEPTIONAL 80-100% Highly detailed knowledge and understanding of the main theories/concepts, and a critical awareness of the ambiguities and limitations of knowledge.

SCALE 8

ANALYSIS

Good 50-59%

Analysis. Analysis, evaluation and synthesis; logic, argument and judgement; analytical reflection; organisation of ideas and evidence.

OUTRIGHT FAIL 0-29% Unsubstantiated generalisations, made without use of any credible evidence. Lack of logic, leading to unsupportable/ missing conclusions. Lack of any attempt to analyse, synthesise or evaluate.

UNSATISFACTORY 30-39% Some evidence of analytical intellectual skills, but for the most part descriptive. Ideas/findings sometimes illogical and contradictory. Generalised statements made with scant evidence. Conclusions lack relevance.

SATISFACTORY 40-49% Evidence of some logical, analytical thinking and some attempts to synthesise, albeit with some weaknesses. Some evidence to support findings/ views, but evidence not consistently interpreted. Some relevant conclusions and recommendations, where relevant.

GOOD 50-59% Evidence of some logical, analytical thinking and synthesis. Can analyse new and/or abstract data and situations without guidance. An emerging awareness of different stances and ability to use evidence to support the argument. Valid conclusions and recommendations, where relevant.

VERY GOOD 60-69% Sound, logical, analytical thinking; synthesis and evaluation. Ability to devise and sustain persuasive arguments, and to review the reliability, validity & significance of evidence. Ability to communicate ideas and evidence accurately and convincingly. Sound, convincing conclusions / recommendations.

EXCELLENT 70-79% Thoroughly logical work, supported by evaluated evidence. High quality analysis, developed independently or through effective collaboration. Ability to investigate contradictory information and identify reasons for contradictions. Strong, persuasive, conclusions, justifiable recommendations.

EXCEPTIONAL 80-100% Exceptional work; judiciously selected and evaluated evidence. Very high quality analysis, developed independently or through effective collaboration. Ability to investigate contradictory information and identify reasons for contradictions. Highly persuasive conclusions.

SCALE 8

PRAC APP&DEPL

Practical Application and Deployment. Effective deployment of appropriate methods, materials, tools and

techniques; extent of skill demonstrated in the application of concepts to a variety of processes and/or contexts; formulation of innovative and creative solutions to solve problems.

OUTRIGHT FAIL 0-29%	Limited or no use of methods, materials, tools and/or techniques. Little or no appreciation of the context of the application.
UNSATISFACTORY 30-39%	Rudimentary application of methods, materials, tools and/or techniques but without consideration and competence. Flawed appreciation of the context of the application.
SATISFACTORY 40-49%	An adequate awareness and mostly appropriate application of well established methods, materials, tools and/or techniques. Basic appreciation of the context of the application.
GOOD 50-59%	A good and appropriate application of standard methods, materials, tools and/or techniques. Good appreciation of the context of the application, with some use of examples, where relevant.
VERY GOOD 60-69%	A very good application of a range of methods, materials, tools and/or techniques. Very good consideration of the context of the application, with perceptive use of examples, where relevant. Evidence of some innovation and creativity.
EXCELLENT 70-79%	An advanced application of a range of methods, materials, tools and/or techniques. The context of the application is well considered, with extensive use of relevant examples. Application and deployment extend beyond established conventions. Innovation and creativity evident throughout.
EXCEPTIONAL 80-100%	Outstanding levels of application and deployment skills. Assimilation and development of cutting edge processes and techniques.

SCALE 8

SKILLS PROF P

Unsatisfactory
30-39%

Skills for Professional Practice . Demonstrates attributes expected in professional practice including: individual initiative and collaborative working; deployment of appropriate media to communicate (including written and oral); clarity and effectiveness in presentation and organisation.

OUTRIGHT FAIL 0-29%	Communication media is inappropriate or misapplied. Little or no evidence of autonomy in the completion of tasks. Work is poorly structured and/or largely incoherent.
UNSATISFACTORY 30-39%	Media is poorly designed and/or not suitable for the audience. Poor independent or collaborative initiative. Work lacks structure, organisation, and/or coherence.
SATISFACTORY 40-49%	Can communicate in a suitable format but with some room for improvement. Can work as part of a team, but with limited involvement in group activities. Work lacks coherence in places and could be better structured.
GOOD 50-59%	Can communicate effectively in a suitable format, but may have minor errors. Can work effectively as part of a team, with clear contribution to group activities. Mostly coherent work and is in a suitable structure.

- VERY GOOD 60-69% Can communicate well, confidently and consistently in a suitable format. Can work very well as part of a team, with very good contribution to group activities. Work is coherent and fluent and is well structured and organised.
- EXCELLENT 70-79% Can communicate professionally and, confidently in a suitable format. Can work professionally within a team, showing leadership skills as appropriate, managing conflict and meeting obligations. Work is coherent, very fluent and is presented professionally.
- EXCEPTIONAL 80-100% Can communicate with an exceptionally high level of professionalism. Can work exceptionally well and professionally within a team, showing advanced leadership skills. Work is exceptionally coherent, very fluent and is presented professionally.

SCALE 8