MYP Personal Project 2017/2018

MARYAM AHLI
Uptown School
Grade 10

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Section A - Investigating

Introduction

My goal was to develop a detailed instructional guide to improve performance in show jumping applying a knowledge of physics concepts related to the sport. I chose this goal is because I am extremely passionate about the sport of show jumping and physics is my favorite subject. It occured to me to pair the two fields together during a physics class, when I found a connection between Newton's Laws and the movement of the horse's legs. Show jumping is my favorite sport because when you're jumping, you get the same feeling as you do on a rollercoaster and get a glimpse of what it feels like to fly. When starting this project, I was extremely intrigued to learn how my favorite sport and favorite subject are closely related. This was a highly challenging goal because it required rigorous research on physics concepts which are only taught at DP level. This required me to learn the concepts by myself in order to explain them in my book. I had to develop a number of ATL skills in order to overcome this challenge. It was necessary to develop my organizational skills to meet deadlines and to structure all the information in a coherent manner. I also had to improve my communication skills because the individual reading my book must be able to benefit from the advice and information. Therefore, I had to communicate highly complex concepts in a clear way for the reader to understand and make it clearly applicable to the sport.

Global Context

The global context relating to this project is scientific and technical innovation, although I considered other global contexts such as identities and relationships. I train in showjumping on a daily basis and been involved in the sport for the past 9 years. Therefore, it is a big part of my own personal identity. However, I chose scientific and technical innovation because it had more relevance to my project. It is relevant because scientific knowledge relating to the physics of showjumping can be used to improve performance in the sport. I explored 13 physics concepts in my book, from forces to projectile motion. Technical innovation is related to my project because my product required me to use a new and innovative software to create the book. Additionally, there have been many technical innovations, discussed in my book, involving the equipment used in show jumping, such as developing lighter and more durable materials.

Prior Learning

There are numerous concepts taught in MYP physics, which I have incorporated into my book.

1. Forces
2. Newton's Laws: Newton's first law
3. Newton's second law
4. Newton's 3rd law
5. Momentum

Research and New Information

I conducted my research through my action plan, allocating research questions that should be done in order which enabled me to research systematically (see Appendix 1). Appendix 1.

Beginning my research, I interviewed showjumpers regarding the content of the book. When I interviewed Zoe Williams**,** an accomplished showjumper, she informed me that she would like to see pictures and information on how to train the horse to enhance athleticism. She is a reliable source because she is a British Championship team bronze medalist with over twenty years of experience in the equestrian field. I was able to investigate theories first hand in a riding lesson with her, making information more credible. Appendix 2. I also interviewed a physics teacher, Mr. Svar. He gave me ideas on topics I could extend on, such as the biomechanics and projectile motion of show jumping. He helped me understand further how the forces cause a horse to move in addition to the separation of vertical and horizontal forces in a projectile. Appendix 3 He is a reliable source because he has a Masters degree in physics from London University and teaches higher level DP physics.

When researching secondary sources, I used websites such as BBC bitesize, which is constantly recommended by my physics teacher. I learned about how energy transformations occur, eg. chemical energy released from food to kinetic energy. Horses can become more athletic through increasing proteins and carbohydrates. BBC is a reliable source because it is regulated by ofcom, the U.K's communication regulator. However, there were few sources deemed unreliable, such as wikipedia or yahoo because they could have been written by anyone regardless of their educational credibility. Another reliable source was an article written by Arthur Stinner on "Quantifying Equestrian Show Jumping". It helped me to overcome the obstacles faced in understanding projectile motion, a DP level topic, and how it relates to the horse's motion over a jump. I learned the importance of determining launch angels because the smaller the angle, the greater the horizontal distance covered; the greater the angle, the greater the vertical distance. The article is a reliable source as he was a science education professor at the Faculty of Education, University of Manitoba and taught physics for over 20 years.

Section B - Planning

The four strands I have chosen to evaluate the success of my product on are the benefit to the reader, presentation, scientific information and communication. I then designed a set of criteria under which each of those strands could be assessed.

Outcome	Level descriptors
i. Benefit to the reader	**L1-2: Some** advice which **has limited effect** on performance. **L3-4: Adequate** amount of **relevant** advice which **could** improve performance. **L5-6: Adequate** amount of **specific** and **relevant** advice which **should** improve performance. **L7-8:** S**ubstantial** amount of **specific**, **detailed**, **highly relevant** advice which **would** improve performance.
ii. Presentation	**L1-2: Incoherent structure** communicates information in a way that is **unappealing**. **L3-4: Mostly coherent** s**tructure** that communicates information. **Images** are **relevant**. **L5-6: Mostly** c**oherent structure** that communicates information **clearly**. I**mages** are **relevant** and of **high quality**. **L7-8:** C**onsistently coherent structure**, communicates information **clearly**, **precisely** and **appealingly**. I**mages** are **highly relevant** and of **high quality**.
iii. Scientific information	**L1-2:** Scientific information is **not accurate**. Concepts discussed are **irrelevant** to showjumping. **L3-4:** Scientific information is **accurate**. Concepts are **somewhat relevant** to show jumping. **L5-6:** Scientific information is **extensive** and **accurate**. Concepts are **mostly relevant** to show jumping. **L7-8:** Scientific information is **extensive, completely accurate** and **complex**. Concepts discussed are **highly relevant** to show jumping.
Iv. Communication	**L1-2:** R**arely** communicates information in a way that is **understandable** to the reader. **Many** grammar and spelling mistakes. **L3-4:** Communicates information **clearly** in a way that is **mostly understandable** to the reader. S**ome** grammar and spelling mistakes. **L5-6:** U**sually** communicates information **clearly** and **precisely** in a way that is **understable** to the reader. F**ew** grammar or spelling mistakes.

	L7-8: C**onsistently** communicates information **clearly** and **precisely** in a way that is **easily understandable** to the reader. **No** grammar or spelling mistakes.

I have chosen these strands because they assess my product's development and success rigorously. The reader must be able to benefit from the book because, if they didn't, the purpose of the product would be defeated. The development of the product can be seen through these criteria because it requires extensive research of scientific information in order to be able to give advice competently. Secondly, presentation is important because it enables the reader to understand information clearly and keeps them interested. The development of the product can be seen through this criterion because it requires many high quality, highly relevant images and a consistently coherent structure that communicates information clearly and precisely in a way that is appealing to the reader. It will demonstrate the development of my product because it requires a lot of research on scientific formulas and solving them. I have chosen communication as a strand because it is important for the reader to understand what they are reading about. This will not be possible if grammar, spelling are incorrect and sentences do not communicate ideas well.

Initially, a criterion strand I chose to assess my product on was affordability. However, this was changed due to the inability to assess this strand effectively without actually publishing and selling the book to the public. Affordability would also depend on the demand and without selling it, the demand cannot be assessed. Therefore, I decided to use communication, as a book cannot be successful without communicating information clearly.

In order to assess the success of strands (i). and (ii). I formulated a survey for show jumpers and they were asked to assess the book under the following criteria:

i.

- Amount
- Specificity
- Detail
- Relevance of information
- Benefit for performance

ii.

- Coherence
- Clarity
- Relevance of images
- Visual appeal
- Quality of image

In order to assess strand iii. and iv. I asked my physics teacher to evaluate the scientific information using the grade descriptors above for strand iii and asked my uncle's secretary, a qualified english teacher, to assess the communication using the grade descriptors for strand iv. Appendix 4.

Through the ATL skills developed, such as time management, research and thinking skills, I was able to create the action plan shown in Appendix 1. Reflecting on my time management skills when beginning the project, I was not very organized with my time. I only had a brain storm and a simple checklist, but as I started working I realized that it was futile. I ended up moving at a slow pace without clear goals or aims and hence, created the action plan. Appendix 1 This enabled me to spread the workload in a realistic manner, leaving little room for error and disorganization. Using an awareness of my strengths, such as my ability to work productively under little stress, I decided to manage my time accordingly. I also used an awareness of my limitations, such as the fact that I am not usually very organized with my time or the fact that I am not productive during times of assessments. These factors were highly considered when implementing deadlines for the project. For example, the action plan was there to manage my time generally, but also I used it to allocate less work during times of stress and assessments. This enabled me to complete my project in a very effective manner.

Section C - Taking Action

After, carrying out my research and creating my action plan, I began working on my goal to create an instructional guide book. I included a variety of physics concepts based on my research as outlined in section A above. This is linked to the global context, scientific and technical innovation because of all the 13 scientific concepts included. I realized that my conceptual understanding was not enough to achieve my outcome of including complex information which would be beneficial to the reader. I had to apply my knowledge of the concepts by solving problems and practicing exam questions based on the concept until my conceptual understanding was complete. I also synthesized information in order to make it more accessible to the reader. This was done through more rigorous contextual research of the concepts, which enabled me to gain a greater understanding and helped me think critically in order to simplify information for the reader.

When I started, I had limited communication and social skills which improved throughout the completion of the project. I became better at communicating with individuals by interviewing a number of people from the showjumping community. For my first interview, I called my dad's friend Musaab Windawi, a polo player, and asked him about accomplished showjumpers. He then mentioned the name Zoe Williams and offered me her contact details. I interviewed her about the content of my book and practiced first hand with her on some of my riding theories. When I searched up some of the most successful Emirati women show jumpers, the name Maitha al Hajri came up. I found her contact details and then messaged with a few questions regarding the content of my book. Appendix 2 I formulated the questions based on the context and layout of my book. Showjumpers are meant to benefit from my book and therefore, it seemed smart to allow them to contribute as to what exactly they would like to see in the book.

I also went to the physics teacher in my school and scheduled several interviews with him. He gave me great suggestions on topics I could expand on and explained complex topics to me. Appendix 3 I previously would not have thought I would be able to interact with complete strangers, let alone adults, because I was extremely timid and lacked communication skills. Through the process of primary research, this project has encouraged me to come out of my comfort zone and become more confident in my communication skills. Additionally, I developed my social skills by learning how to make new connections with individuals based on shared interests.

After developing my understanding further, the next thing I had to do was think about how to structure these concepts. Initially, the book was structured in a very incoherent manner because I didn't think from the perspective of the reader or the context in which the information was provided. This forced me to think from multiple perspectives about how to structure the information. For example, from the perspective of a showjumper who was not widely educated on physics, or from the perspective of an individual who is only beginning

to learn showjumping. Doing this allowed me to develop my critical thinking skills because I analyzed my product from different points of view in order to critically assess my own work and improve my product in order to achieve my outcome. For each concept, I followed the same format. First, I explained the physics and outlined the relevance to showjumping. Then, I gave advice on how a knowledge of this concept would improve showjumping. The basic concepts were described first and the more complex were described later because a knowledge of the fundamental concepts, such as force, are required in order to understand the more complex topics. I shared my new thinking skills with my peers who needed more practice. I encouraged them to not only think of one area of their product, but rather multiple perspectives in order to achieve the best outcome. For example, my friend was making a business plan and so I helped her by advising her to look at specific layouts of business plans.

Next, I had to pick a software to create the design and layout of the book. Initially, I thought of using Microsoft Word. However, I realized that it did not contain professional book layouts so, I researched alternative softwares. I decided to utilize the innovative software 'BookWright' because it was the most suitable, professional and user friendly. This is linked to the global context of scientific and technical innovation because it involves utilizing innovative technology. Additionally, I had to learn how to use a professional canon camera in order to take sports images. It was important because the reader needs to understand the context in which this information is useful. This was achieved by including images that show what stage in showjumping the concept could be applied. I hoped that these would also help to achieve the aim of making the book more appealing to the reader.

Initially, my thinking skills were very limited. I only thought of the information included in the book. However, my thinking skills improved and I realized that information is not only what makes up a book. I began thinking in many areas, such as websites and applications to use in addition to the layout, design, structure and images. From the way in which my time management improved, it is evident that I developed my thinking skills to work in a more efficient way. I faced a lot of challenges in understanding the concept of projectile motion. I had to think of many solutions. Firstly, I interviewed a former DP physics student Hend bamatraf, I understood some of the laws but not completely. Then, I watched a few videos on Chris Doner's IB physics youtube channel and understood the motion. However, explaining its relevance was the most difficult, therefore, I interviewed my physics teacher in order to ensure I have fully grasped the concept. Appendix 5 My interactions with others helped to to build a sense of community in the development of the product because the process gathered multiple individuals into contributing to a single outcome. Not only did it involve show jumpers from multiple countries, but also a physics teacher, a former English teacher and my personal project mentor. It combined the world of physics and showjumping into one community.

Section D - Reflecting

I collected primary data to help me assess the success of my product. Firstly, the interviews with professional show jumpers allowed me to identify the components that made my book successful as well as areas for improvement. I have also created a survey for show jumpers which investigates whether they have benefited from the book as this was one of my criteria for success. I would give my product a level 7-8 when in terms of the benefit to the reader because, in the survey taken by showjumpers, 12/14 stated that they have benefited. Therefore, it is not an 8, but a 7 because most showjumpers (86.7%), but not all, have gained benefit. Appendix

When evaluating presentation, the structure is coherent, font size does not change and the images are taken by specific sport settings on a professional camera. Each image is highly relevant to the topic. For example, in push and pull forces, there is an image of pull forces on the reins causing the horse to move. The show jumpers that I interviewed stated that they would like to see equal amounts of information and images. For presentation I would award my book was an 8 because it included an adequate amount of high quality, relevant images to complement the information.

The book contains extensive highly relevant scientific information as there are 13 different physics topics included including example calculations of associated formulas. Zoe Williams, Maitha Al Hajri and the rest of the show jumpers stated that they would like to see how horse care can be used to improve performance. These components would significantly improve the book if I was making a second edition. I interviewed my physics teacher after finalizing my product in order to assess the scientific information. He stated that….Appendix I would give the product a 7 as opposed to an 8 for scientific information because I only included one DP level topic, although it was highly complex.

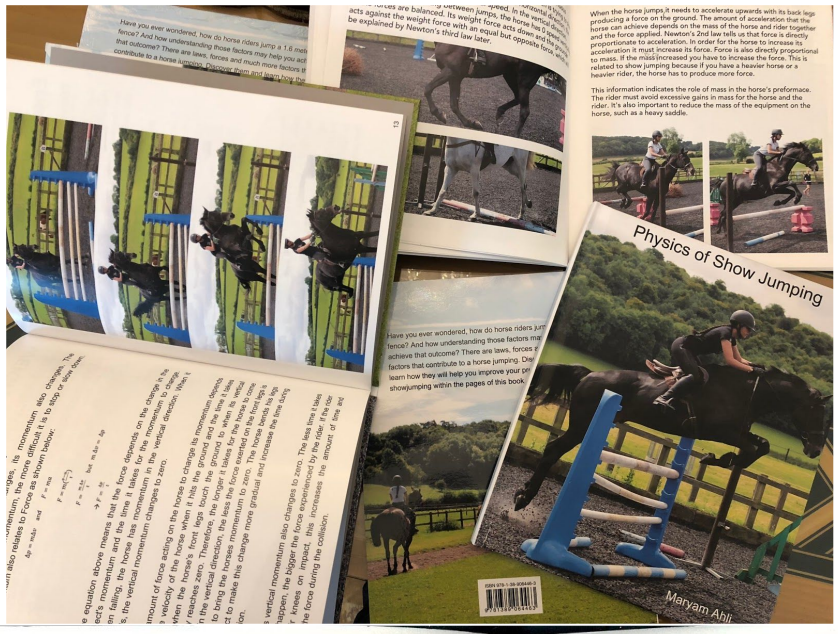
As 12/14 showjumpers stated that they benefited from the book, this would not be possible without communicating information and ideas clearly. The book has been peer assessed, using my criteria, by a qualified previous English teacher. She has confirmed the information was communicated clearly, was easy to understand and that there are no spelling or grammar mistakes. Appendix 5 Therefore based on my success criteria, the communication strand is a level 7.

Overall, I would assess my product as a level 7 because the mean of all four criteria is a 7. However, an area of improvement could be extending further on formulas and calculations, as there were not many of them. This would help the reader to further understand the context of the information. Additionally, extending further on DP level topics would make the book more extensive and informative, leaving even more room for advice and reader benefit.

An obstacle I faced was understanding some of the more complex and extensive topics, such as projectile motion. Projectile motion is taught in year 12, therefore, it was well above my level of knowledge. I found it very frustrating and difficult to understand, let alone describe its relevance to showjumping. I read a lot of articles to understand some basic rules, however, I did not understand the context of the information or how the forces changed during the process. Therefore, I decided to watch some youtube videos from sources, such as Chirs Doner's IB Physics, which clarified things further. I decided to interview my physics teacher, Mr. Svar, who explained to me using diagrams how the horse reaches zero velocity at the top of a jump. He also explained how the greater the angle at which a projectile is launched affects the horizontal and vertical distances. Through my understanding I was able to explain projectile motion, discuss its relevance to showjumping and give advice accurately on how projectile motion can aid the rider in choosing the right launch distances for each jump. Appendix

During the process of this project, I learned about many Physics topics such as forces, energy transformations and projectile motion. Creating the book not only enabled me to learn about the topics, but required me to have a deep understanding in order to give advice in the context of showjumping. I gained a much deeper understanding of the global context, scientific and technical innovation, because I learned that science is apparent everyday life. Through researching about the physics behind showjumping, I learned that it is not just one topic but that there are countless ways in which it is related to simple everyday movements. New innovative technology can assist individuals in everything they do from creating books to taking photographs and improving athletic performance.

Through completing the project, I developed numerous IB learner profile traits that I did not possess previously. I developed my thinking skills because of situations that forced to me to look at issues from multiple perspectives. I developed the skill of being balanced due to having a heavy workload. I constantly had to organize my time time in an effective manner to meet deadlines. I became more knowledgeable of all the scientific information by learning new concepts that I did not understand previously. This also improved my traits as an inquirer because I had to seek out and develop an understanding of information myself, as opposed to learning from a teacher. I developed my communication skills significantly by completing the project. The book required information and images to be structured in a coherent and clear manner where the reader would understand it. I also had to verbally communicate directly with other individuals in order to obtain information and conduct primary research, which I would have been able to do prior to the project.



Insert evidence from process journal showing some of the things I learned, a picture of projectile diagram showing vertical and horizontal velocities would be nice.

PRIMARY SOURCE

My phone broke so I asked Zoe to take screenshot of the chat

vodafone UK 4G 15:06 77%

Maryam Ahli
last seen today at 15:06

10:12

Fri 27 Oct

Hi Maryam, hope you're well? How did the project go? 1. Pictures and diagrams to explain the physics 2. Does your project link into the training? How you train to develop the horse physically to enhance ability and athleticism? 3. I think both- informative with visual aids to enhance explanations. I'd love to see the project once your down? Hope you are getting some good riding in! Xxx
15:29

Sun 29 Oct

Thank you ❤️❤️ I'll send you a copy once I'm done

11 Maitha
tap here for contact info

could answer a few questions please that would be great.
1. What type of advice do you want to see in the book?
2. Are there any specific physics topics you'd like to see?
3. Would you like the book to be more visual or more informative?

Thank you!
7:05 PM

1. What type of advice do you want to see in the book?
Some general horse care, exercises & their benefits.
2. Are there any specific physics topics you'd like to see?
Course building & specific exercises.
3. Would you like the book to be more visual or more informative?
Both visual and informative, some drawings explains the exercises.

I hope that's enough x
11:57 PM

5 Abdulla Al Marri
online

Hi abdulla,
My name is Maryam and I am making a book about the physics behind show jumping. As a professional, your advice would greatly benefit my book. If you could answer a few questions please that would be great.
1. What type of advice do you want to see in the book?
2. Are there any specific physics topics you'd like to see?
3. Would you like the book to be more visual or more informative?
7:04 PM

Hello Maryam, this sounds very interesting,
1. Advice about feed, equipment and position in relation to physics.
2. I do not have a big knowledge on physics, but the projection of a horse.
3. Both.
Good luck
7:06 PM

This was my lesson with Zoe Williams in the U.K. near Heathrow when I experimented and tested my theories.

ACTION PLAN

Task	Due date	Completed/Not completed. Were you successful? Why or why not.
Research on how to take sport images	July 1	Completed and successful, found a couple options settings on camera such as the shutter setting, but then found that sports mode was more appropriate. https://www.canon.co.uk/youconnect/learn/tutorials/capturing-motion/dslr/
Re-research/refresh knowledge on previous topics.	July 1	Completed and successful, I found a lot from my last year notebook and textbook. Used BBC bitesize to extend further. https://www.bbc.co.uk/education/guides/zttfyrd/revision
Research center of gravity	July 7	Completed but is was a bit more challenging because it was not covered greatly in previous lessons. Therefore, I had to research more on it myself. https://www.grc.nasa.gov/www/k-12/airplane/cg.html
Teach Renalyn to take images, after experimenting yourself	July 7	Completed successfully, once I showed her the sports mode and demonstrated a few examples on how to take a good picture, she learned really quickly. The pictures turned out very professional and of high quality.
Refresh previous knowledge on topic of Newton's Laws of Motion.	July 14	Completed successfully, when I researched each law, it was mostly a refreshment of previously knowledge. However, there were a couple facts I did not know previously that I learnt. https://www.grc.nasa.gov/www/k-12/airplane/newton.html http://teachertech.rice.edu/Participants/louviere/Newton/
Research on weight forces in physics.	July 21	Not completed on time. I had a lot of assessments and therefore it was hard to manage my time. However, I got it done later. http://www.bbc.co.uk/schools/gcsebitesize/science/add_aqa_pre_2011/forces/weightfrictionrev1.shtml
Research on momentum	July 28	Not completed on time because previous task was not completed on time. Therefore, it got in the way of this one. I finished it on July 30.
Create tittle page	October 17	Completed successfully. It took a while to understand the application, but once I did it was quite easy.
Create back cover page including Blurb	October 19	Completed successfully. The blurb required a bit of imagination and I was not sure what to write at first However, after writing multiple drafts it was more clear.
Create table of contents	October 20	Not completed on time. I left this for the end because it is easier to do it after all the information is inserted so then I know what's on each page.
Insert text into pages	October 25	Completed on time. I found a systematic way of doing it. Initially it was unorganized, but then I did it in order of the explanation of the physics concept, its relevance to showjumping and then the advice.
Insert images into pages	October 28	Completed successfully, was done in an organized way where relevant images were placed in consideration to each concept.
Organize all pages in a way that is appealing and	November 15	Completed successfully because I ensured that information is structured orderly, all text is in the same size and images are relevant to physics concepts explained.

Challenges faced with Projectile Motion

there were many challenges I faced, when researching. Firstly, I have chosen to mention projectile motion, which is something I have not learned in school yet. I have not learned it yet because it is a topic that is taught in year 12. Initially it was extremely difficult for me to grasp the concept. I found it extremely difficult and confusing, especially with the concept of vertical and horizontal forces being seperate. In addition, many websites contained difficult and advanced physics vocabulary. However, I watched a few youtube videos and began to develop a new understanding of the topic. It was still difficult to comprehend, so I decided to call my friend Hend Bamatraf because she's taking physics in grade 12. After briefly understanding the topic better, I began researching more, slowly understanding the topic more, bit by bit.

Images

For my book, I needed pictures of me show jumping. Over the summer, I brought my camera with me to London. In order to have good quality pictures, I researched how to properly use the camera and the various setting within the camera. After a long process of trial and error, I found that the sports setting on the camera works best. I taught my housekeeper how to use the camera with the sports mode, after asking if she would help. the images turned out great and had amazing quality. they were perfect for book.