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Work Based Group Project Reflection

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Computing

Ordnance, Munitions and Explosives

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Academic integrity declaration

I declare that:

- the thesis submitted has been written by me alone.
- no animals were harmed in the writing of this essay, some humans almost were.
- the thesis submitted has not been previously submitted to this university or any other.
- that all content, including primary and/or secondary data, is true to the best of my knowledge.
- that all quotations and references have been duly acknowledged according to the requirements of academic research.

I understand that to knowingly submit work in violation of the above statement will be considered by examiners as academic misconduct.

Abstract

The author worked as part of a small team to design a specialised system within a tight timeframe using an established systems engineering methodology. Throughout the project, the author supported and collaborated with other team members to deliver a workable product, and assisted in the generation and delivery of a presentation on this product to an audience of subject matter experts.

Keywords:

OME, systems engineering, SWOT, collaboration, management, presentation

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List of Abbreviations

ALO	Apprentice Liaison Officer
APBF	Anti-Personnel Bounding Fragmentation
AT	Anti-Tank
EOD	Explosive Ordnance Disposal
FMA	Function Means Analysis
OME	Ordnance, Munitions and Explosives
SME	Subject Matter Expert
SWOT	Strengths, Weaknesses, Opportunities and Threats
T&E	Test and Evaluation

1 Introduction

The author was part of a small team tasked with designing and presenting a system for the removal of land mines according to a given brief. This system was to be designed and operated in line with the appropriate legislation, with the presentation given to an audience of Ordnance, Munitions and Explosives (OME) and systems engineering Subject Matter Experts (SME).

2 Design brief and team selection

The brief for the design project, and the composition of the teams involved, was given on the first day of the project.

The design brief can be summarised as follows:

To design a system to enable to transportation of medical supplies over desert terrain contaminated with Anti-Personnel Bounding Fragmentation (APBF) and Anti-Tank (AT) mines. For various reasons, it was not possible to use either heavy machinery or air transport for this task.

The team in which the author was placed included the following members:

- Biggs, Emma
- Claridge, Matt
- Hughes, Emma
- Ingram, Tegan
- Patel, Uwais
- Whittington, Henry ('The Author')

The members of the team were all known to one another already, having been on the course together for over two years, with some members being part of the same cohort and therefore having fully developed professional relationships.

3 Team analysis

In the initial stages of the design process, the author used the Strengths, Weaknesses, Opportunities and Threats (SWOT) method to evaluate each team member.

The SWOT method is a tool widely used within management and team building scenarios [1] to analyse the following traits of an individual:

- Strengths: Areas where the individual has a high level of competency
- Weaknesses: Areas in which the individual has limited competency
- Opportunities: Factors or scenarios which can improve individual performance
- Threats: Factors or scenarios which can limit or degrade individual performance

The full SWOT analyses performed by the author are contained within Appendix A. It should be noted that those pertaining to Emma Hughes and Uwais Patel are based on two years of personal and professional acquaintance and are expected to be more accurate than those of Emma Biggs, Matt Claridge and Tegan Ingram, for which the basis is two years of casual academic and social acquaintance, as well as the group project described within this report.

The SWOT analyses showed a theme of strong communication skills within the team. These communication skills assisted in the initial 'gelling' of the team, and continued to make group discussions and coordination effective. The atmosphere of mutual respect within the majority of the team often combined with these communication skills to 'smooth over' any periods of stress or friction.

4 Design process

The design process began on the 27th of January and continued until the 6th of March, when preparation began for the presentation element. The following were key activities conducted by the team:

- Setting of requirements
- Ranking of requirements using the Pairwise Comparison method
- Functionality
- QFD 1
- Function Means Analysis (FMA)
- Concept generation
- Pugh analysis
- Manufacturing function flow
- Manufacturing QFD 1

Table 1 below illustrates the process by which each activity was undertaken

Design step	Team activity	Author contribution
Setting of requirements	Evaluation of design brief and discussion	Research into threat articles, contributed to discussion
Ranking of requirements	Pairwise comparison, with lively discussion on rankings	Contributed to discussion, attempted to encourage contributions from all team members
Functionality	Individual function flow diagrams and group discussion	Produced a function flow diagram, assisted other group member with creation of same
QFD 1	QFD 1 spreadsheet, with energetic discussion on scorings	Contributed to discussion
FMA	Individual function means ideas, FMA spreadsheet	Individual identification of function means and contributed to group discussion
Concept generation	Group discussion with eventual agreement on concepts	Contributed to discussion, suggested concepts
Pugh analyses	Brief on Pugh matrix, example Pugh analysis on baseline concept, and identification of competing concepts	Performed a Pugh analysis on assigned concept
Manufacturing function flow	Establishment of format and requirement for function flow through group discussion	Produced a function flow diagram for the manufacturing of a drone flight subsystem
Manufacturing QFD 1	Group brief on QFD 1 for manufacturing and worked example, assignment of	Completed manufacturing QFD 1 spreadsheet for drone flight subsystem

	subsystems to individuals for independent work.	
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Table 1 - Activities undertaken by team

Table 1 illustrates that the design process was a team activity with most design steps completed as a group, as well as individual contributions being assigned and managed. Group discussions were respectful and inclusive, helped along by the strong people skills apparent in the majority of the group, first identified in the SWOT analyses. However, during the initial stages challenging behaviour was displayed by Uwais Patel, who frequently disrupted the design process through a persistent failure to produce individual work or contribute meaningfully to group discussions. A detailed analysis of this challenging behaviour is contained within Appendix B.

The Authors main individual contribution during this period was performing research on the threat articles using Metis [2], an online repository of information relating to explosive articles. This information was promulgated to the group and helped to inform the generation of concepts.

Between university blocks, and during the third week, most of the group did independent work according to their role in the team in addition to the work undertaken as a group. For the author, in the Trial and Evaluation (T&E) role, this included research into T&E processes and testing standards.

The Author also made contact with SME in the Explosive Ordnance Disposal (EOD) and counter-mobility fields to clarify details on the threat articles and discuss mine clearance methods. These discussions were written up as notes for the team (see Figure 1) and contributed to key design decisions.



Henry Whittington (2313464) 09/02 18:53

Conversation with SME

I had a conversation today with the mine guy (serving Royal Engineers officer) and the EOD guy (serving ATO) at work today and ran them through the situation and our idea. A couple of things came out of it:

While remote dropping of plastic explosive is a thing for mine clearance, it apparently comes with a couple of concerns:

1. Big holes in the ground
2. What if it fails to detonate and you just accidentally added another mine?

An alternative is to drop something like thermite, which will burn hot enough to melt the mine until its no longer a mine without leaving a massive crater.

Shooting was considered but you need something really big and punchy (.50 or a shotgun slug) which may destroy the mine, may not destroy it, or may occasionally bounce off and go fuck up something 2km away.

You could use lasers but they're not very useful for anything buried (like a mine)

Not saying we need to change our concept but some things to think about for our presentation/reports.
[see less](#)

Figure 1 - Notes from SME discussion

4.1 After action review – design process

Table 2 below contains a summary of areas of the design process that went well, areas which did not go well, and things that could have been done differently to make the design process more effective.

After action report – design process	
What went well	Team cohesion and communication
	Idea generation
	Assignment of roles
What did not go well	Management of challenging behaviour
	Idea formalisation
What could have been done differently	Generation of minutes
	Supervision of challenging element

Table 2 - After action review (design process)

4.1.1 What went well

4.1.1.1 Team cohesion and communication

From the first stages of the project it was apparent that the majority of the team naturally got along well. This created an atmosphere in which the majority of the team was clearly comfortable with sharing ideas and receiving criticism of these ideas.

The team was proactive in setting up channels of communication, including a WhatsApp group and an MS Teams area in which to coordinate efforts and store work. Examples of coordination via the WhatsApp group are contained within Appendix C.

4.1.1.2 Idea generation

Due in part to the atmosphere described above, and in part to the personalities involved, the generation of ideas within the team was rapid and fluent. This greatly sped up the creation of concepts and solutions, enabling the team to enter the run-up to the presentation with a defined idea.

4.1.1.3 Assignment of roles

The roles chosen during the design process largely reflected the professional competencies of the team members involved. These members were able to contribute to their roles very effectively and provide support to less experienced team members.

4.1.2 What did not go well

4.1.2.1 Management of challenging behaviour

The challenging behaviour described earlier created serious and persistent issues within the team which affected the ability of the team to deliver quality output.

While this behaviour was initially challenged by some group members, when it became clear that the issues were persisting the team as a whole adopted a hands-off approach, attempting to work around the problem rather than attempting to correct matters. While this avoided unpleasant confrontations and

prevented an open falling-out, it enabled the challenging behaviour to continue, leading to reduced output and contributing significantly to very serious design flaws.

4.1.2.2 Idea formalisation

As mentioned previously, the team was able to produce workable ideas (especially concepts) fluently and cohesively. However, there were several occasions where, an idea having been generated, multiple members of the group went away with differing ideas on what had been agreed.

4.1.3 What could have been done differently

4.1.3.1 Generation of minutes

While summaries of meetings and tasks agreed upon were often communicated in the group chat, formal minutes of meetings were not kept. The generation of minutes at meetings, and their circulation to the group, would have gone a long way to both formalising conclusions and reinforcing instructions.

4.1.3.2 Management of challenging element

Due to time constraints, it was not practical to address the challenging behaviour displayed by Uwais Patel fully and in a way which may have turned him into a productive member of the team. This behaviour could have been addressed more radically in one of the following ways:

- One team member could have taken responsibility for Uwais and 'hand held' him through the project, ensuring that he was up to date on his learning and his individual work.
- The team could have escalated Uwais' behaviour through university channels. While this was done semi-formally through Apprentice Liaison Officer (ALO) meetings, Uwais behaviour did not warrant a formal complaint at this stage.

A more in-depth analysis of Uwais Patels behaviour and output during the project is contained within Appendix B.

5 Presentation

The presentation took place on the 11th of March 2026 and covered the initial brief and the design produced by the team. The team divided the slides to ensure an even distribution of presentation time, with each individual taking turns to present slides related to their area of involvement.

Preparation for the presentation began on the 6th of March. Individual team members produced slides on their own topic, with the only restriction being that said slides must match the format agreed upon by the group in order to keep the slideshow cohesive. The author attended each practice session and produced slides relating to Trials and Evaluation as per the authors role, as well as slides covering the threat articles.

In addition, the author produced a simple spreadsheet to analyse practice sessions as shown below:

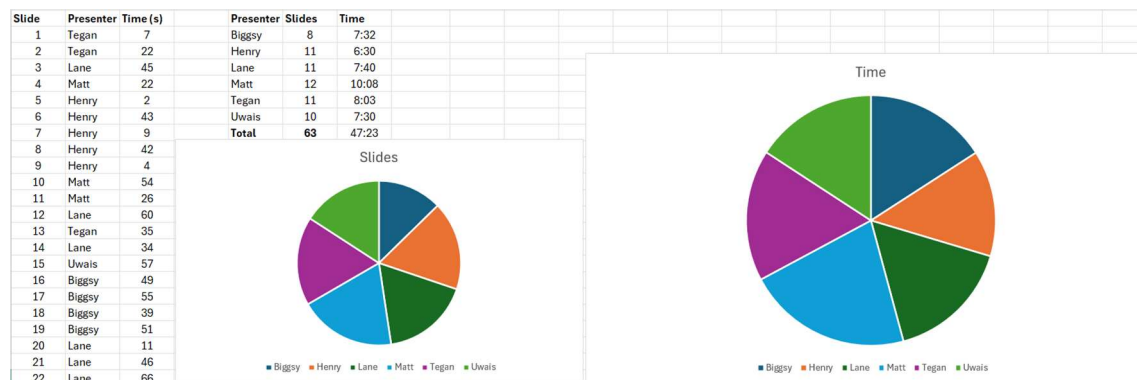


Figure 2 - Presentation timings spreadsheet

The spreadsheet allows for each slide in the presentation to be assigned an owner and, during the practice sessions, the time spent on the slide was recorded. This data was translated into a table, which was graphed to show the distributions of both number of slides per group member, and total presenting time of each group member. This enabled the group to ensure that each individual was participating to roughly the same level.

The presentation was delivered to an audience of SME in the OME field, as well as UWTSD staff.

5.1 After action review – presentation

Table 3 below contains a summary of areas of the presentation which went well, areas which did not go well, and things that, if done differently, may have increased the quality of the presentation.

After action report – presentation	
What went well	Team cohesion and communication Handling of questions
What did not go well	Timing R&D (thermite)
What could have been done differently	Addition practice sessions Each slide conceived by group

Table 3 - After action review (presentation)

5.1.1 What went well

5.1.1.1 Team cohesion and communication

As with the design process, the majority of the team collaborated naturally and effectively on the production of the slideshow and was in general supportive and encouraging. Feedback was given generously during practice sessions, and as a rule the team navigated the division of slides and time well. Individual needs were catered for, and certain slides were assigned according to individual strengths or wishes.

For example, Emma Lane experiences significant anxiety with presentations. To help her start this presentation strongly, she asked to be assigned the initial team introduction slide, which was accepted by the group.

While giving the presentation the team worked well as a group, was respectful of each other's timings, and responded well to unexpected timing issues. Immediately before the presentation the group were supportive of each other, with the more confident members making an effort to help the more nervous members.

5.1.1.2 Handling of questions

Following the presentation, audience members were invited to ask questions. In answering these questions, the majority of the group coordinated well without the need for formal assignment of roles to answer the questions that came up. More than once, group members supported a peer who was struggling to form a complete answer.

On occasions where the questions began to take an accusative tone, the group came together and at no point became argumentative or attempted to assign blame to one another.

Feedback from audience members also highlighted this as a group strength.

5.1.2 What did not go well

5.1.2.1 Timings

As mentioned in section 5.1, timings were measured during practice sessions to ensure that each group member spoke for a roughly equal amount of time and that the entire presentation was within the 40 minute time limit.

The presentation delivered was significantly over time. The author believes that this was due to two factors:

- Only two full practice sessions were undertaken prior to delivering the final presentation.
- The representative for R&D (thermite) completed his slides the morning of the final presentation. Lack of familiarity with these slides likely led to him going significantly over the time allotted to his section.
- The lack of a visible clock in the room meant that the team was unaware of how much time had passed since the beginning of the presentation, and were therefore unable to adjust their timings to accommodate disruptions in the schedule.

The timing issues were highlighted in feedback from audience members.

5.1.2.2 R&D (thermite)

The section of the presentation which concerned the R&D aspect of the thermite device lacked key information, resulting in questions and vocal criticism from audience members. The representative for R&D (thermite) was unable to answer

any of the questions or provide any clarification on the design. These failures led to other members of the group receiving negative feedback, which caused significant friction within the group.

Further details on this can be found in Appendix B.

5.1.3 What could have been done differently

5.1.3.1 Additional practice sessions

The limited amount of time for in-person group work has already been highlighted. A result of this was that the group was not prepared for a full presentation practice until roughly two days before the day of the presentation. Even at this stage, the slides for R&D (Thermite) were not suitable for the presentation and had to be redone multiple times, preventing full run throughs.

It may have been possible for the other members of the group to practice without the R&D (Thermite) slides, simply adding the time allotted to that section to their final time to make sure that the other sections were still within their time limits. This would have helped the rest of the team to refine their sections, practice receiving questions, and build confidence.

5.1.3.2 Each slide conceived by group

An alternative to each individual producing slides on their area of responsibility could have been to produce each slide together as a group, ensuring cohesion and that all slides were suitable and contained the relevant information. This would have avoided the need for the R&D (Thermite) slides to be repeatedly redone and possibly improved team cohesion.

However, as highlighted above, team cohesion was (generally) not an issue. This approach may have resulted in a viable slide pack being produced earlier, but could also have reduced individuals confidence in their own slides. The author questions whether the additional practice time would have made up for this lack of confidence.

6 Conclusion

The author was part of a team which was challenged to produce a robust solution to a complex problem within a tight timeframe, using systems engineering tools to achieve this. They then presented this solution to an audience of SME in the OME field and, when challenged on design features, handled questions professionally.

In the creation of the design, the team demonstrated commitment and professionalism, and worked together well to move the project at pace. A failure to formalise discussions and produce meeting minutes led to occasional confusion and an inefficient use of time, and if the project were restarted the author would suggest improvements to remedy this.

The team was made up of several individuals from different backgrounds and organisations who, as a rule, collaborated effectively. However, challenging elements within the group were not handled as well as they might have been, due to a lack of formal management within the group and the limited time available for the project. This failure to address the challenging behaviour allowed it to continue, resulting in significant design flaws in the final product.

The group was professional, proactive and supportive of one another, and individual members overcame anxieties to deliver an effective presentation. It is the opinion of the author that the team performed well given the short timeframe and demonstrated a sound understanding of systems engineering and OME concepts.

2557 words

References

- [1] D. Leigh, Handbook of Improving Performance in the Workplace, 2009.
- [2] Fenix Insight, "METIS: Munitions, Events and Technical Information System," [Online]. Available: <https://www.fenixinsight.com/products-and-services/metis>. [Accessed 20 03 2026].

Appendix A – SWOT Analyses

Name	Emma Biggs
Strengths	• Developed understanding of Systems Engineering • Practical experience within the OME industry • Receptive and accepting of ideas
Weaknesses	• Basic knowledge of landmine technology • First time undertaking a Systems Engineering project at this level, many concepts are new
Opportunities	• Open and friendly discourse within team reassures her of equality with older peers, encouraging idea sharing • Independent work allows for development of ideas beyond that usually explored in group sessions
Threats	• High energy output can lead to fatigue, especially over the course of a full day • Youngest member of the group, may defer to older members even when they're wrong

Table 4 - Emma Biggs SWOT Analysis

Name	Emma Hughes
Strengths	• Excellent social skills, encourages team discourse • Imaginative approach to problem solving - lives outside the box • Highly creative • High stress tolerance
Weaknesses	• Lacks confidence with both academic writing and presentations • Time management issues can lead to stress
Opportunities	• 'Blue sky' thinking gives her an opportunity to exercise creativity • Discourse within team meetings can help keep her creativity focused, making her an idea machine.
Threats	• Presentations are a major source of stress, even weeks in advance. • Responsibilities at home can derail her productivity, exacerbating time management issues.

Table 5 - Emma Hughes SWOT analysis

Name	Henry Whittington
Strengths	• Sound knowledge and understanding of OME and landmines • Extensive experience of working within a small team at pace • Extensive presenting experience
Weaknesses	• New Systems Engineering concepts can lead to confusion • Overly optimistic ('Everything will be fine') • Struggles with complex issues, prone to 'switching off'
Opportunities	• Individual learning allows time to absorb complex concepts at own pace • Team environment gives sense of purpose, encouraging learning in order to better support others
Threats	• Desire for harmony prevents him from having difficult conversations • Not good at being told what to do, will sometimes push back out of sheer bloody-mindedness

Table 6 - Henry Whittington SWOT analysis

Name	Matt Claridge
Strengths	• Wide experience in the OME industry • Experience of working within a small team • Strong interpersonal skills, can get along with anyone
Weaknesses	• First time undertaking a Systems Engineering project at this level, many concepts are new • MOD-think can 'blinker' idea development
Opportunities	• Team discourse encourages idea sharing and engagement • Keen to share experience; areas of high competence from professional experience will shine through when relevant to the project
Threats	• Social obligations will occasionally distract him from work. • Responsibilities at home can interrupt work.

Table 7 - Matt Claridge SWOT analysis

Name	Tegan Ingram
Strengths	• High self-confidence, not afraid to share ideas or thoughts • Experience of OME manufacturing is crucial to team • Dedicated and committed to project, gets the job done • Interpersonal skills add significantly to group discourse
Weaknesses	• Prone to taking over a conversation or discussion, interrupts frequently • Can get lost in the details and ignore the bigger picture
Opportunities	• A leading role can encourage her to structure her thoughts and take a more methodical approach • Rises very well to a challenge
Threats	• Lack of performance by another group member can frustrate her • Unwilling to fit into another person's framework; this can also cause frustration • When frustrated people skills suffer and weaknesses are exacerbated, which can cause friction and lead to a downward spiral.

Table 8 - Tegan Ingram SWOT analysis

Name	Uwais Patel
Strengths	• Intelligence is evident when he takes time to use it • Very strong interpersonal skills and charisma, can be everyone's friend
Weaknesses	• Limited knowledge of landmine and mine clearance technology • Significant time management issues • May lack confidence with fast-paced group discussions • Relies entirely on charisma during presentations and does not prepare
Opportunities	• Personal engagement can encourage contributions • Personal friendships with group members can encourage effort and contributions
Threats	• Personal animosity with group members can override good sense and professional conduct • Does not respond well to challenge or criticism; will push back or shut down • Easily distracted by literally anything • Prone to taking the path of least resistance (and therefore least development), hindering understanding

Table 9 - Uwais Patel SWOT analysis

Appendix B – Uwais Patel

B.1 Introduction

This appendix will explore the behaviour of Uwais Patel during the group project, the reaction of other members of the group to this behaviour, and the results regarding group output. It will also explore contributory factors to that behaviour and what actions could have been taken by the group to mitigate those factors.

The author has known Uwais Patel on a personal, academic and professional basis since summer 2023. While this acquaintanceship allows the author to make more informed judgements regarding Uwais, this appendix will focus on the period of the UWTSD work based group project. The content of this appendix is based entirely on the authors observations.

B.2 Background

Uwais Patel has been a member of the DNO OME apprenticeship since 2023 and has attended multiple placements within the MoD; these placements have been undertaken in professional settings and supervised by MoD line managers. He has been a student at UWTSD within the same timeframe and through passing the various exams and assignments issued during that time has shown an ability to perform academically at level four.

Uwais has therefore demonstrated that he is capable of meeting academic deadlines, following instructions, and working independently. It can also be assumed that Uwais is aware of the need for professional conduct and academic integrity, as well as the concepts of teamwork and collaboration.

B.3 Background knowledge

This section will explore Uwais' background knowledge coming into the project, the development of his knowledge during the course of the project, and those gaps in awareness which may have contributed to the serious flaws in the design produced by the team.

B.3.1 Landmines

Unlike the majority of OME apprentices, Uwais has never displayed a personal interest in OME or associated systems. It is the opinion of the author that this lack of interest or passion led to Uwais entering the group project with a very basic awareness of land mines and no in depth knowledge of the workings of these systems. The author believes that this lack of awareness extended to mine clearance systems, an opinion based on the following event, which occurred a week after the concept of a mine plough had been extensively assessed during a lecture:

Event 1: In the middle of the second week of the project, the group assembled to discuss competing concepts for a mine clearance system. These concepts were to be based on the function means analysis performed by the group the previous day. Each group member took turns to present their concept.

Uwais Patel read from his phone to present a concept which was contradictory, unclear and incomplete. He was unable to clarify details when asked. The author shares with other group members the belief that this concept was generated using AI.

Throughout the group project, Uwais made no visible attempt to improve his OME knowledge despite information on land mines and mine clearance systems being shared within the group, both via teams and WhatsApp.

B.3.2 Systems engineering concepts

Like every other member of the group, Uwais Patel has completed the UWTSD level four systems engineering module. This suggests that he would have a working knowledge of such level four systems engineering concepts as requirements setting, pairwise comparison, the QFD process, the Pugh matrix, P-diagrams and noise, etc.

Throughout the group project, Uwais repeatedly showed ignorance of these concepts and was unable to make significant contributions to group systems

engineering outputs. However, it is difficult to gauge the full extent of his knowledge as very little of the work assigned to him was completed.

B.4 Failure to contribute

B.4.1 Group discussion

The limited time available for group work meant that the group assembled daily when attending university to catch up on the project and make decisions. These meetings took place in study rooms in the library, and the time and location were communicated via the team WhatsApp group in each instance.

These discussions in these meetings ranged from informal idea-sharing and exploration of systems engineering concepts to formal decision making. During these meetings, Uwais consistently failed to volunteer thoughts or opinions and was frequently using his phone.

Event 2: During the group discussion in QFT 1 spreadsheet scorings, Uwais' opinion on these scorings was repeatedly sought; the author has no recollection of Uwais volunteering a strong or contrary opinion during these discussions, generally agreeing with the last person who spoke or expressing disinterest.

During meetings, attempts were made to encourage contributions from each group member, including nomination of people to suggest opinions, and taking turns to chair discussions. These failed to elicit any significant contribution from Uwais.

Between meetings, individual group members would occasionally hold informal discussions to clarify points and explore unformed ideas. Uwais did not engage with other group members outside of classrooms or meetings, either in person or through the group WhatsApp.

B.4.2 Individual work

During the course of the group project, individual work was generally set for evenings and weekends¹ in order to expedite the design process. This work was communicated through the group WhatsApp chat to ensure that every member was aware of the tasks and deadlines. In the case of systems engineering work, such as spreadsheets or diagrams, examples were available in the group Teams area.

Uwais repeatedly failed to complete the work set to him, and if completed it was of very low quality (see Event 1). The most significant work Uwais completed individually was the production of his slides for the presentation. The difference between the level of detail of the notes of these slides and Uwais' contribution to group discussions on thermite leads the author to suspect that the slides were not produced independently.

Uwais accepted the role of researching and developing the thermite device within the system created during the group project. The content of Uwais' slides, specifically that relating to thermite and the thermite device, was lacking in critical information and design details. This, coupled with Uwais' inability to answer any questions on the topic, suggests a total failure to do in-depth independent research.

Event 3: During a whole-group practice of the presentation the day prior to its delivery, Uwais spoke haltingly and repeatedly used phrases such as "I'll know how to say it when we do it." Uwais' slides were still incomplete at this point.

Event three illustrates Uwais' attitude both to the group output and the quality of his own work. Other group members had been practicing their material in private for several days prior and had written extensive notes. Uwais' behaviour during

¹ As lectures ended at roughly midday on Friday and began on Tuesday morning, group members had Friday afternoon and Monday to study independently.

the run through suggests a complete lack of individual practice or even the most basic research. This further supports the authors suspicions that Uwais did not produce the slides himself.

It is a matter of note that during the presentation, Uwais did not attempt to answer any questions regarding his area of research and, when nominated to do so, was not able to.

B.5 Behaviour towards other group members

Uwais' behaviour, both during lectures and in group meetings, quickly became a source of friction within the group. What follows are a selection of events which illustrate this behaviour:

Event 4: At the end of week one, each group member was instructed to use the time over the weekend and on Monday to brainstorm ideas for function means, to be discussed during a function means analysis at the beginning of week 2.

When the time came to do the function means analysis on the following Tuesday, Uwais revealed that he had not done the individual work and therefore had nothing to contribute. When challenged on this, he became defensive, stating: "My weekend is my weekend." When reminded that he had also had all of Friday and Monday to do the work, he did not reply.

During this exchange Uwais was unapologetic and confrontational. At no point following the exchange did he offer an explanation or apology for either his lack of work or behaviour when challenged.

Event 4 illustrates Uwais' failure to do individual work, as well as his attitude towards other team members. The confrontational attitude represents a complete failure of professionalism, while the lack of apology or explanation (beyond "It's my weekend") shows a lack of respect for the group and a failure to take accountability for his own output.

Event 5: The day before the presentation, Uwais showed other group members the slides that he had created. These were inconsistent, incorrect and contained a great deal of irrelevant information. When he was told these needed to be remade, Uwais became sullen and did not seek advice or clarification.

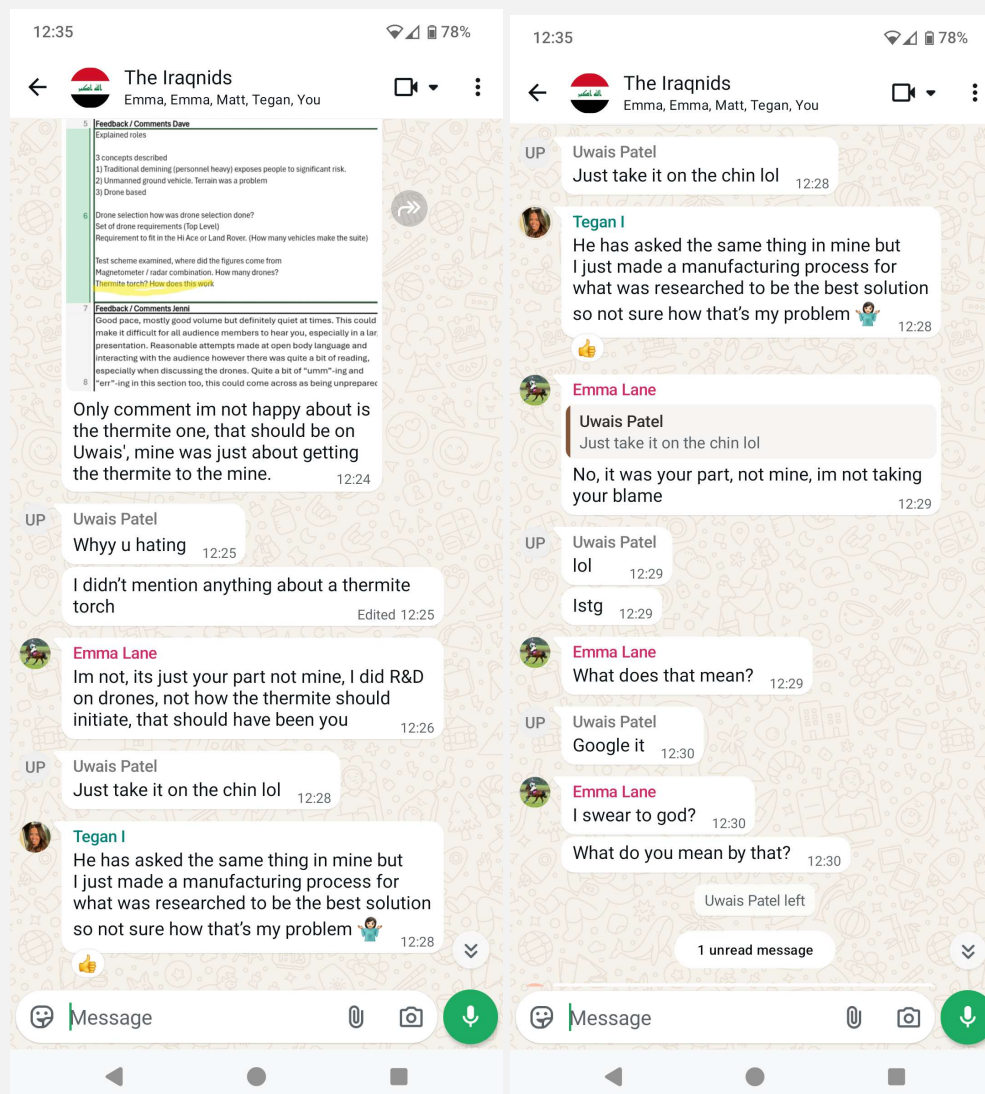
As illustrated in section B.3.2 above, it is highly likely that Uwais had not done any independent research on the topic his slides were to address. Section B.2.1 supports the belief that Uwais had very little knowledge of the concepts with which he was working. His failure to seek clarification, advice or support on this topic the day before the presentation illustrates his failure to collaborate, as well as his lack of interest in the quality of the final product.

Event six below further illustrates Uwais' lack of accountability for his own performance, respect for other group members, or concern for the quality of his work, even when it could potentially influence somebody else's grades. The comment "Just take it on the chin" suggests that Uwais is content for other people to suffer the consequences of his own failure to deliver quality work – or indeed make any attempt to do so.

Since leaving the group chat, Uwais has not offered any apology or explanation for this behaviour nor engaged with any group members.

Event 6: Following the presentation, each group member was provided with personal feedback from UWTSD staff. Emma L received feedback regarding the thermite device, which she felt was unfair when she had not been responsible for the thermite.

Emma L posted a screenshot of this feedback in the group WhatsApp chat with a comment about how it should have been Uwais' job. The full exchange is illustrated below:



B.6 Discussion

Uwais entered the project from a position of ignorance regarding land mines and mine clearance, and made no effort to remedy this through either independent study or seeking guidance from other group members. Although extensive materials were provided in the group teams area, Uwais apparently did not engage with these.

A possible remedy for this would have been for a member of the group with a developed understanding of the threat articles in question to provide a short, half-hour brief to the whole group to bring everyone onto the same level of knowledge. While this solution assumes that Uwais would provide a degree of attention, and retain the knowledge imparted, it would have been a good way to provide a solid grounding.

Such a brief was not provided due to time constraints (detailed research on the threat articles was not possible until the end of the first week), and because the need for such a brief was not apparent until later on in the project. It is also possible that group members made an assumption that anyone lacking knowledge of the threat articles which the entire design was being created to defeat would make an effort to supplement this knowledge, especially after sufficient information was made available in the teams area.

A similar approach could have been taken to address Uwais' apparent lack of knowledge regarding systems engineering. Different members often expressed trouble understanding, or remembering, concepts from either the level four work or the newer and more advanced concepts. These problems were generally dealt with 'on the fly' during meetings to bring each group member up to speed and enable everybody to contribute.

The author has no recollection of Uwais expressing ignorance or a lack of understanding, nor directly asking for help. It is likely that, in the absence of this, the group assumed that Uwais either understood the concepts being dealt with or was uninterested. And again, the limited time available meant that the group

focus was generally on making progress with the project rather than slowing down to ensure that everybody was completely up to speed.

The author is confident that if any member of the team had directly expressed ignorance or a lack of understanding, either of the OME concepts being dealt with or the systems engineering work, the rest of the team would have taken time and made effort to support them, as happened multiple times during the project. As mentioned earlier in this appendix, the group had reason to believe that Uwais had a grounding in systems engineering, and an awareness of the concepts of collaboration and mutual support within a team. It was not unreasonable for the group to expect Uwais to ask for help if he needed it.

Uwais' behaviour, both his active confrontations and lack of individual output, was also likely a significant factor in the failure of the wider group to ensure his understanding. His confrontational behaviour rapidly alienated multiple group members and discouraged them from checking his understanding regularly, while the lack of individual output, coupled with his lateness, lack of attention and occasional absence, was taken generally as laziness rather than ignorance.

No member of the group had a dedicated management role, and therefore nobody was directly responsible for ensuring the contributions and professional behaviour of other team members. The behaviour displayed by Uwais, and his attitude towards the group and the project, could have been addressed given a formal management structure to properly motivate him and set expectations, and a significant period of time to bring him up to speed with the relevant concepts and processes. The lack of a formal management role within the team meant that this did not occur.

B.7 Conclusion

The group project was concerned with using systems engineering concepts to design a system to deal with a land mine threat in novel surroundings. Uwais entered the group project from a position of ignorance regarding land mines - in which he was content to remain - and demonstrated very little systems engineering knowledge. Throughout what was referred to explicitly as a group

project, Uwais failed to collaborate or communicate effectively, and consistently failed to contribute to discussions or produce individual outputs to the group.

Uwais' lack of knowledge was not immediately apparent due to his low output to the group, which made identification of knowledge gaps difficult. His confrontational behaviour and negative response to criticism (illustrated by events one and six) then discouraged group members from checking his understanding regularly, or calling attention to his persistent lack of performance.

The limited time available for in-person group work also contributed to the situation. The group as a whole felt under pressure to produce a design within a tight time frame, and it was much easier to ignore Uwais' lack of effort or contribution than to stop work to address it. Again, Uwais' poor attitude towards feedback likely contributed to this as some group members may have felt uncomfortable raising it to him as an issue.

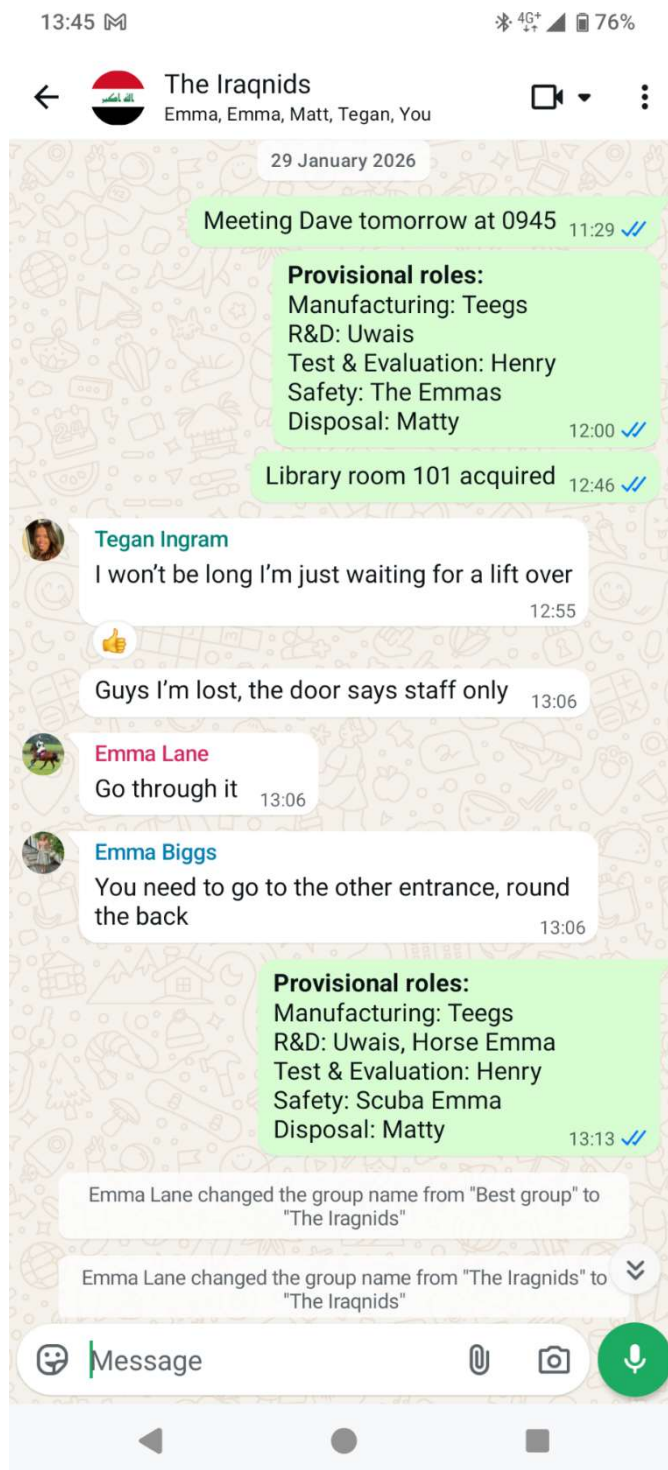
Within the time available, the team could still have taken a firmer line with Uwais, or made personal representations to him which may have encouraged him to perform. His unenthusiastic and confrontational attitude went a long way to preventing this, and the group dynamic, as well as the work output, suffered as a consequence.

It is the authors opinion that for the majority of the group project Uwais did not make, or attempt to make, any significant contribution to the group whatsoever. His contribution to the presentation during the final week was low quality and badly researched. He failed to demonstrate a knowledge of systems engineering or OME, and his interactions with the rest of the group were infrequent and often unprofessional.

The group also failed by not ensuring the understanding, ability, and contribution of each member to ensure a good quality product. This was due to time pressure, the lack of a formal management structure, and a reluctance to ask the difficult questions – or have the difficult conversations - until it was too late.

Appendix C – Key Group Chat Moments

What follows are a selection of group chat screenshots which illustrate the teams use of the WhatsApp group chat to coordinate tasks and meetings. These screenshots are intended as an illustration only and are not exhaustive.



13:46 M

4G+ 76%



The Iraqids

Emma, Emma, Matt, Tegan, You



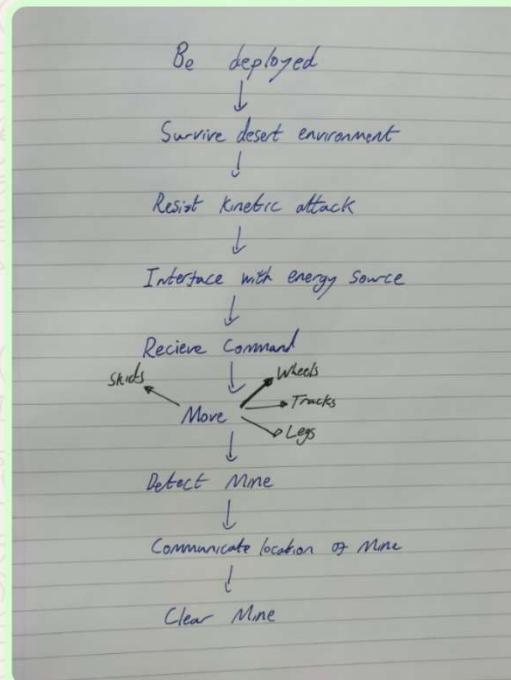
30 January 2026



Tegan Ingram

@Uwais Patel are you coming?

09:28



Function flow diagram

10:35 ✓✓

If we can all brainstorm a couple of solutions for each function (like we have for move) we'll discuss on Tuesday

10:37 ✓✓



Have a good weekend all

10:37 ✓✓

New folder in the teams area if anyone wants to learn more about landmines

18:36 ✓✓



1 February 2026



Message



13:47

75%



The Iraqids

Emma, Emma, Matt, Tegan, You



4 February 2026

So overnight/this evening, look over our final FML and come up with a concept based on what we selected. When we get together tomorrow afternoon, we'll come up with a final concept

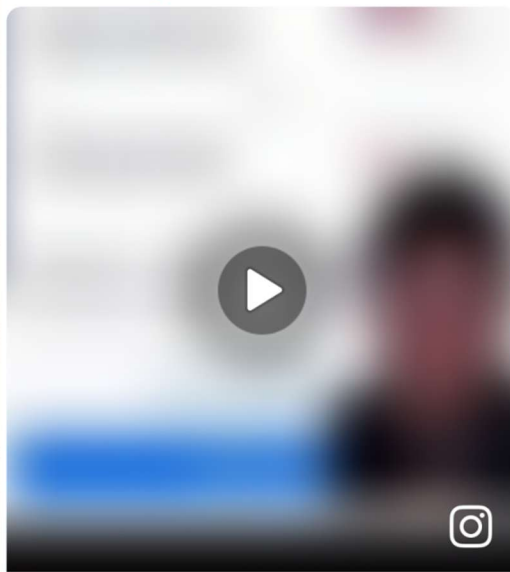
15:09



2

MC

Matt Claridge



instagram.com

20:49

View on Instagram

5 February 2026

MC

Matt Claridge

11:27



Message



13:47

75%



The Iraqids

Emma, Emma, Matt, Tegan, You



Couple mins l'it 6 February 2026

We're upstairs 09:45 ✓✓

FAP incoming 10:24 ✓✓



All:

- P diagrams as in workbook
- What why table to accompany P diagram
- individual FFMEA for system to compare on return

Research:

- @Emma Lane UN demining standards, military drone operations.
- @Emma Biggs Drone capability, robotics (grabby hand)
- @Tegan Ingram Explosive stuff
- Henry: Trials stuff, drone 'current affairs'
- @Uwais Patel Research & development
- @Matt Claridge Disposal pathways

Edited 10:32 ✓✓



3

7 February 2026

MC

Matt Claridge

[Redacted text]

15:55

[Redacted text]

15:56

[Redacted text]

15:58

MC

Matt Claridge



Message



13:48 M

75%



The Iraqnids

Emma, Emma, Matt, Tegan, You



9 February 2026

So I had a chat to the mine guy at work 13:49 ✓✓

Apparently disruption via shaped charge is possible, but you can also just drop some plastic explosive next to it and blow it the fuck up

13:50 ✓✓



Emma Lane

13:51

Less need to worry about aiming etc, and reading indicates that the M15 at least sympathetically detonates very eagerly

13:51 ✓✓

I don't see our little Bounding Boi doing much better.

13:51 ✓✓



Emma Biggs

2409.16181.pdf

6 pages • 5.0 MB • PDF

Someone has actually made our spider 🤔🤔 <https://arxiv.org/pdf/2409.16181>

13:52



Emma Lane

Emma Biggs



Message





Emma, Emma, Matt, Tegan, You



4 March 2026

11:17 ✓✓



Emma Biggs

Awesome work on manufacturing QFD 1 for thermite :)

Process map, QFD 1 and QFD2s to do independently by 10th March:

GPR - Tegan

Magnetometer - Emma B

Grabber - Matt

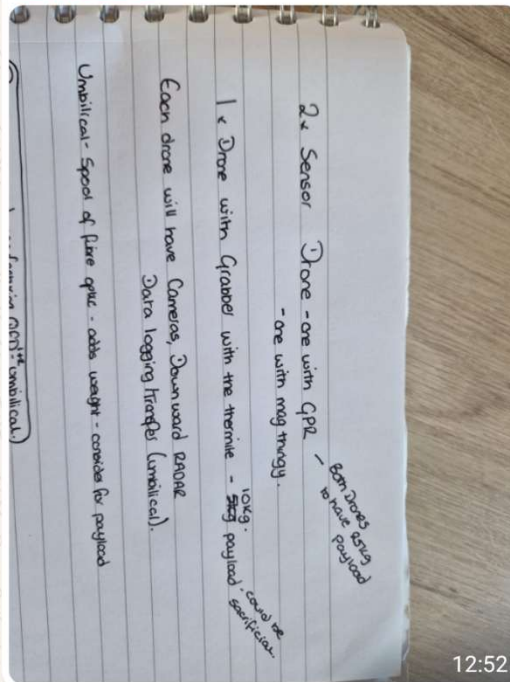
Umbilical - Emma L

Camera vision system - Uwais

Edited 12:48



Emma Lane



12:52



Emma Biggs

Upcoming Deadlines

5th March - Presentstion slides complete,
leave gap for manufacturing QFD



Message



13:49 M

75%



The Iraqnids

Emma, Emma, Matt, Tegan, You



4 March 2026



Emma Biggs

Upcoming Deadlines

5th March - Presentstion slides complete,
leave gap for manufacturing QFD

10th March - Individual Manufacturing
process map QFD1 + 2 complete, integrate
into presentation, presentation run through

12:53



13:50 M

75%



The Iraqnids

Emma, Emma, Matt, Tegan, You



2

5 March 2026



Emma Lane

Decided, going to take this afternoon to do presentation work. If all slides can be completed by noon Tuesday, Tuesday afternoon then will be slight tweaks, run through for timings, then Wednesday morning proper run through

11:28

Emma Biggs

Upcoming Deadlines

5th March - Presentstion slides complete, leave gap for manufacturing QFD...

Presentation slides to include how our role brings the thermite charge into/out of production, for example:

R&D: what composition?

Manufacturing: how do you make it?

Test & Evaluation: verification/validation

Safety: How do you make it safe?

Disposal: How do you get rid of it?

This should give us all a theme to stick to and anchor the presentation a bit

11:49 ✓✓

6 March 2026

Have a good weekend everyone, remember your smart clothes next week 😊

13:30 ✓✓

UP

Uwais Patel

What's with the wink face 😜

14:08

Which face would you prefer? 😊

14:09 ✓✓

9 March 2026



Message



13:51

74%



The Iraqids

Emma, Emma, Matt, Tegan, You



We'll be there s 10 March 2026

12:38



Emma Lane

9am tomorrow morning room 101 (booked from 9am-1pm) for proper run through.. try and finish early so we can all chill before x

15:42



11 March 2026

MC

Matt Claridge

Should be there about 9.15

08:54

UP

Uwais Patel

Same

08:54



UP

Uwais Patel

R we at room 101

09:15



No one's here

09:15



Emma Lane

In the library

09:15



Message

