



## Topic: **Ball counter**

### Full Portfolio evidence

#### General Description:

The candidate submits a portfolio of 51 pages making it a reasonably succinct piece of work. They offer some disparate starting points but settle on the area of hockey coaching. The overall impression is that the evidence submitted appears to access the highest levels of the assessment criteria.

#### Mod Mark

<p><b>Grid 1:</b> Investigation</p> <p><b>Evidence</b></p>	<p>The candidate offers a wide range of initial trigger points for the project. (Slide 3). None of which are used to inform the final design outcome or are linked to a specific client/client need. This page is superfluous to the assessment for this section.</p> <p>The project gathers more focus and relevance on slides 5 and 6. The client is introduced as Hockey coach, and the interview alludes to a variety of design possibilities. To gain the highest assessment criterion a greater level of exploration and detail with design possibilities would be necessary. Examples could include, general club storage, issues loading unloading cars, drying facilities etc.</p> <p>The justification of the chosen problem on slide 7, could be more comprehensive, however the issue feels real and the client input reinforces the mark awarded. Overall, the identification of the possibility is effective but not comprehensive.</p>	<p>Low level 3 (7)</p>
<p><b>Grid 2:</b> Analysis / Research</p> <p><b>Evidence</b></p>	<p>The research plan on slide 8, helps justify why the research is undertaken, and links this to the clients need and wants. The research undertaken has some relevancy in terms of materials processes and existing solutions, and is not wholly textbook in style.</p> <p>Slide 11, the existing solutions are narrow in their field, and introducing an analogous solution would illustrate a broader understanding of the problem. For example, the solutions proposed, except for the crate are methods of counting, reference to a shadow board, that illustrates when items are missing, could provide an interesting twist on this scenario.</p> <p>The candidate demonstrates a good use of prime research on slide 12. Inside the annotation are perceptive links and justifications for finding this research and directly linking the findings to crucial elements of the final outcome, that are later referenced in the product specification.</p> <p>The material selection table on slide 13 has a high degree of relevance as material properties are discussed with reference to the products function and the environment in which it will be placed.</p>	<p>Mid-level 4 (13)</p>

<p><b>Grid 3:</b> Specification</p> <p><b>Evidence</b></p>	<p><b>Slide 14.</b> The specification.</p> <p>As part of the specification criterion, we are expecting to see a refined design brief resulting from the research, this can be seen at the top of this slide.</p> <p>The specification is succinct in that the candidate bullet points the requirements, some of these points are also justified. However, there is a lack of general measurability, in that we do see some simplistic numerical reference but there is a lack of reference to the research.</p> <p>For example, <b>specification point 8</b> suggests that any handle should be greater than 110 mm in 'width'. This in its self is unclear probably really meaning length, but also the justification is largely descriptive.</p> <p>The submission is certainly sound but the lack of measurability, relationship to the research and limited descriptive justifications do not evidence a perceptive approach.</p>	<p>High level 2 (6)</p>
<p><b>Grid 4:</b> Design ideas</p> <p><b>Evidence</b></p>	<p>Several different design strategies are used to good effect. <b>Slide 15</b>, shows thumbnail sketches and the source of inspiration. The annotation is largely function based, with little feedback from the clients perspective. The same sketches appear on <b>slide 17</b>, with a CAD rendering of the idea, and a stress analysis. This would have been further enhanced with a compare and contrast of different structural profiles, highlighting any benefits found. The client offers comments on this slide, however, the comments tend to be a positive endorsement, rather than a critique that could be used to forward the design proposal.</p> <p>AI is used as a trigger strategy on <b>slide 16</b> to generate a wider range of ideas. These ideas have been worked on by the candidate and so assessment credit can be given. <b>Slide 18</b>.</p> <p>The work is of a high quality, the sketches and annotation clearly show the candidates design intent. The product is very function driven; the addition of referencing aesthetics and further perceptive client engagement would have given this the highest mark in this assessment criterion.</p>	<p>Mid-level 3 (8)</p>
<p><b>Grid 5:</b> Development</p> <p><b>Evidence</b></p>	<p>The development of the product is wide and varied. <b>(Slides 22 to 30)</b>. Several strategies are used including the development of the electronics, traditional card and block modelling and CAD.</p> <p>The above is used to good effect and purpose, with the client comments considered. In this section we also see the candidate moving the proposal forward after some materials testing e.g. fence brackets, illustrating the use of technical materials knowledge and understanding.</p> <p><b>Slide 25</b>, supports an iterative approach to the project with additional prime research into the fence being used to develop the mounting system. On this slide we also see the developmental use of rapid prototyping that is to be commended as it positively influences the proposal.</p> <p>The design has been split into sub systems' electronics, mounting, catching interface etc. All of these are brought together in the exploded drawing on <b>slide 32</b>.</p> <p>It should be noted that we see numerous review statements here that will gain credit in grid 7.</p> <p>Overall, the candidate does evidence real developments and the engagement of the client, it is a pity that opportunities were missed to involve interested stakeholders in this phase, but there is enough iterative work to allow the candidate access to the highest level in this criterion.</p>	<p>High level 3 (9)</p>

<p><b>Grid 6:</b> Final design</p> <p><b>Evidence</b></p>	<p>In this section the candidate should supply enough information and technical detail to allow the manufacture of the proposed to design to be completed by a third party</p> <p>The manufacturing specification is not evident, however the flow chart , <b>Slides 39 to 42</b> , and QA/QC , , chart <b>slide 43</b> reference manufacturing processes in some detail. This coupled with dimensioned drawings, circuit diagram and exploded views would give a third party an opportunity to manufacture this product.</p> <p>The detailed parts drawings partially mitigate the assessment in terms of the comprehensive nature of the technical detail but a specification that detailed the operational requirements to manufacture each part would have helped to support the highest award. That said, the candidate does evidence most of the details required.</p>	<p>Mid-level 3 (8)</p>
<p><b>Grid 7:</b> Review</p> <p><b>Evidence</b></p>	<p>In this section the candidate should provide evidence of analysis of the product throughout the project. The analysis should include reflection from others and give balance and justification to design decisions that have taken place.</p> <p>The candidate does undertake a meaningful review throughout the development phase and using their technical knowledge and understanding make suggestions or undertake activities that move the proposal forward, such as the hopper mounted on the fence <b>Slide 25</b>, this includes some client engagement suggesting the hopper may be too small and suggesting a ‘funnel’ shape. This does demonstrate an iterative approach alongside some perceptive thinking. This theme runs throughout development and the final design.</p> <p>The initial ideas are reviewed on <b>slide 20</b>, and the developed ideas are reviewed against the specification on <b>slide 31</b>. Individual review pages are not a requirement of the A level specification; however they do highlight a compare and contrast and can be easily associated with the assessment criterion.</p>	<p>Low level 4 (10)</p>
<p><b>Grid 8:</b> Communication</p> <p><b>Evidence across portfolio</b></p>	<p>All three of the required strands are evidenced and the communication techniques are well chosen to evidence detail.</p> <p>A wide range of graphical and modelling techniques are used throughout the folder. The design intent is clear; annotation is purposeful and technical. This is a high-quality , well-presented folder.</p>	<p>High level 3 (6)</p>

<p><b>Grid 9:</b> Tools &amp; Equipment</p> <p><b>Evidence</b></p>	<p>In this section the candidate must demonstrate an accurate and skilful use of tools, equipment and techniques.</p> <p>Slides 44 to 47 show the manufacturing diary for the product. A range of skills are used to complete the final product. Some of which is made to facilitate the manufacture, the vac forming mould, the folding jig slide 45, the use of templates on page 47.</p> <p>The selection of materials can be questioned, for example the use of acrylic for the brackets, in terms of its rather brittle properties. There is some doubt also about the use of Vero board as an alternative to a manufactured PCB, but this of course may be a facilities issue. That said the candidate does offer a skilled and accurate product incorporating the electronics along with sheet metal work, plastics work and welding techniques.</p> <p>All of the components are accurately made, and the pieces assemble neatly. Dimensional accuracy is assured with marking out and the use of jigs. The candidate has highlighted their use of QA and QC by colour coding the annotation.</p> <p>Overall, the assessment is that the candidate does offer enough in terms of the use of tools and equipment to enable access to the top-level assessment.</p>	<p>Level 4 (11)</p>
<p><b>Grid 10:</b> Quality &amp; Accuracy</p> <p><b>Evidence</b></p>	<p>In this section the candidate is expected to produce a finished working prototype that meets the need of the specification. Within the manufacture the candidate can also evidence a sophisticated application of an iterative approach to the manufacture</p> <p>There is no doubt that the product has functionality and is accurately made utilising advanced level manufacturing techniques.</p> <p>The product is complex in its component parts, all of which go together accurately to produce a working final product. However, the candidate may have missed some opportunities to adopt an iterative approach using the client to better effect and developing a product that may have been modified during the manufacturing process to gain further robustness. For example, the top edge of the steel hopper could have been given some edge treatment such as a rolled or wired edge enhancing safety and rigidity</p> <p>It is a slight pity that this iterative design approach was limited with little evidence is shown where manufacturing issues were overcome.</p> <p>Overall the candidate does, however still display the characteristics of a high-level award. Slides 44-47.</p>	<p>Level 4 (17)</p>
<p><b>4.1 Testing and evaluation</b></p> <p><b>Evidence</b></p>	<p>In this section it expected that the candidates will produce an analysis of the prototype includes testing against the specification. After completing the testing, it is important to pull together the results into an evaluation summary that uses the results to inform the designer about future changes that may improve the product performance.</p> <p>The product is evaluated against the specification on slide 48. There is some evidence of specific tests being used to confirm the products suitability. For example, testing the display from distance in sunlight, using a cloth to test for blemishes, and scales to weigh.</p> <p>However, confirming that these tests would be used at the end of the process in the specification in slide 14 would have benefitted the candidate's overall assessment.</p>	<p>Mid-level (10)</p>

	<p>The client offers some quite critical comments on slide 50. However, solutions to these comments are not offered, and the further developments suggested on slide 51 are from the candidate's conclusions.</p> <p>However, the further modifications to some extent have a commercial approach to them in that the candidate does think a little about ongoing production at scale and the modification of the circuit board to a printed circuit board. This is commendable.</p> <p>The Life cycle analysis is very generic and largely descriptive and does not focus on how the product could be made to perform better environmentally.</p> <p>Overall the candidate does enough to access the high level in this assessment criterion.</p>	
<b>Total</b>		<b>A* Grade</b>