

Differentiated Assessment for Chris Jenkins – SE Design Assignment (50%)

When I marked the assignment I used a spreadsheet to measure the degree of understanding of the systems thinking process. These questions follow that marking rationale. Chris had begun his assignment by taking an existing domestic toaster design and "beefing it up" to cope with the stresses of commercial applications. We verbally went through the design process using the questions as a guide and I marked Chris against the marking grid I used for the assignments submitted by the other candidates.

1. What device have you chosen and what are its irritating properties?
 - Started with a toaster....
 - How do you take a domestic design and get it up to industrial standards. To be used in a canteen or hotel / bed and breakfast.
 - Need to "ruggedise" the design.
2. What requirements is it not meeting?
 - Current Model didn't performed well when used multiple times
 - Failures of mechanism and electronics. Two different systems needed to get at the answers.
 - Use had gone up.
 - Conditions more "hostile".
3. How would you establish noncompliance with these requirements?
 - Put together a survey.
 - Hotel owners, B&B, factories.
 - Gemba visit Interviews and questions led to more requirements.
 - Specifications (Even toasting all 4 across the slots.)
 - 45 to 60 seconds toasting.
 - Need to be more even toasting and more be more reliable.
 - Space / footprint.
 - Outer casing cool.
 - Audible noise to allow operators to know when finished.
 - Easy to clean.
 - Cost.
 - Legislative stuff. (Food catering standards steel, three pin plug,)
 - Sturdy.
4. How can we complete the requirements set? What tools can we use? Which do you prefer and why?
 - Looked at spoken and unspoken requirements.
 - Need to assess stakeholders Can construct a stakeholder map...couldn't remember the name.
 - Knew how to look at requirements from different stakeholders and prioritise them.
 - Look at customer complaints.
 - Derive a league table of complaints.
 - NFS, NFP. NFL. "Operational requirements" required prompting.

5. What is meant by "Functional requirements". How can we use functionality to eliminate design issues?
 - Need a story format, list of operations in sequence, how the thing is used.
 - Verb noun relationship identified and emphasised.
6. How do we establish critical functionality?
 - QFD 1
 - Well explained. Understood the process of comparison and prioritisation.
 - Understood how to develop performance targets from the QFD 1 process.
 - Use of QFD 1 to identify missing functions missed.
7. How can we propose better design solutions?
 - QFD 2.
 - Function means analysis.
 - Pugh matrices.
 - Used fault tree and DFMEA in his design assessment in addition to the recommended methods.
 - Design targets for solutions specified. This is important.
 - Use Pugh matrices to develop better concepts.
 - Measure against shifting requirements.
 - Chris included FFMEA and fault trees. Something not taught on the course but used in the work environment
8. How do we know they are better?
 - Analyse back against requirements.
 - Change priorities of requirements.
 - What If? Look for changes in priorities.
 - p-Diagrams understood and understands the concept of noise and its effects on the design
9. All parameters are subject to variance. What are the two main types of variance and what are the implications for design and testing?
 - Understands variance is important but struggled with random v assignable variances. Emergence definitions, Understood but not "spot on".
10. How do we establish what the critical phases of production are and how can we ensure process control?
 - QFD 4 and process control part of his "day job" so understood the link between critical design features and the control MEASURES we have to put in place. Described the work currently being done by BAE and Yunghans using the process.

Topic	Chris
SE need to left shift, do analysis before design	8
Get requirements right and early on in design and we will design the thing right	8
Need to engage with stake holders to obtain requirements	10
Methods for engaging with stakeholders	10
Analysing requirements, Functional and non-functional sets correctly defined	8
Functional requirements. Crossing the functional bridge. Noun verb relationship	10
Functional analysis v use case	7
Emergence	5
QFD1 Requirement v function. Can derive test methods. What do we need to do with this function to pass to meet this requirement?	7
Important functions? What's missing?	6
How do we achieve the functions? Function means analysis	8
Selection of the best design, Pugh matrices etc.	10
QFD2, Map of important features	8
Variance. What in the design is subject to variance? Noise? (What type of variance) P- diagram and what why.	7
Selection of the production method	10
Requirements process repeat with manufacturing stakeholders	7
Process flow to get functions	7
Function means analysis to decide how we are going to do it	8
FMEA do failure analysis on functions to investigate failure mechanism versus failure cause	8
QFD3 matches manufacturing method against key features	5
P- diagram and what why. How do we control the process	5
QFD4 what measures do we put in place	10
Summary, Multifunctional team, tool kit , not a process, early analysis	10

Chris has demonstrated a sound working knowledge of the principles of Systems Engineering, both in the set assignment and in the workplace. Overall mark was 79%. On a par with the best in class, which I'd expect from his exam result.

79/100

A handwritten signature in black ink, appearing to be 'Dave Holley', written over the text '79/100'.

Dave Holley 27/02/23