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26 August 2022

S.E.—The Parable of the Axe

OR, it's not what you *don't* know that's the problem…

Stakeholders—introduced to SE, back in the day, by a management consultancy. Knew lots about management. Rather less, perhaps, about Systems Design—as ever, at the *heart* of systems engineering…

Stakeholders may be helpful in finding out "what's needed"—*in their opinion.* Often, however, the most useful stakeholders are those who *don't want the project to succeed*—they ***can*** offer invaluable insight…

Meanwhile, budding systems engineering experts, have been inculcated with requirements *elicitation* from stakeholders. And see no other way of working…

Which is why they might find interest in

…the Parable of the Axe…

The Parable of the Axe.

An aging system engineer (ASE) was strolling through the woods. Tiring, he sat down and soon nodded off.

He awoke in a medieval blacksmith's forge, surrounded by shields, armor, swords, maces, lances, and all the paraphernalia of Arthurian Legend. Right on cue, Merlin appeared:

"*About time!* Problem here at Camelot. We have this *Siège Perilous*—an empty seat at the Round Table—waiting for a knight so pure in heart that he alone can *quest the Holy Grail.*

"King Arthur is keen to prepare. This *Sir Pure-in-Heart* will need the very best equipment, tactics and training if he is to become the Ultimate Weapon System ready to take on all comers…

"So, that's why I sent for you: to equip *Sir Pure-in-Heart* with all he needs to pursue the Quest, defeating any and all who challenge him along the way."

The ASE pondered. "So, I am to create the ultimate knightly weapon system for an as-yet-unknown knight?"

"Yes—and then I shall return you to your own beleaguered, post-human culture."

Ignoring the comments, the ASE started, as always, by exploring the ***Customer's Problem***. King Arthur dreamed of finding the Holy Grail. But, he didn't have a suitable knight to fill la Siège Perilous, thence to pursue Arthur's Chivalric Quest.

So, perhaps creating the "Ultimate Knightly Weapon System" (UKWS) was less about the UKWS *per se*, more about *publicity* and *attracting the right knight* to fill the post. In which case, security was less of an issue.

Au contraire, the ASE could/should publicize his efforts and the UKWS should be ***innovative,*** stylish, even overwhelming! Highly Effective in extreme combat? Perhaps not so vital, but—if only for his personal pride—the ASE couldn't

do a less-than-superb job… *must observe the System Engineer's Code: Integrity at all times…even mythical ones.*

A UKWS ***Future Vision*** started to form in the ASE's mind, of a fair-haired, almost-cherubic knight-in-white-armor, on a pawing white stallion with flowing tail & mane, shield-with-a-red-cross, and lance balanced on one stirrup. The lance was gilded, symbolizing pure perfection…Mmm…all it needed was a sparkle from his excessively white teeth. Ah! There it was…

Next in the ASE's customary procedure was to conceive ***a Variety of Whole-system Solutions*** that could be compared, contrasted, evaluated, operationally researched, etc.

His mind wandered, however, to the range of weapons that *Sir Pure-in-Heart* would carry. There were lances, maces with knobs, and swords:—

- Lances 'punched' the opposition off their mount. No use unless both parties were mounted.
- Maces were for battering.
- Swords were the staple weapon, as they could thrust, cut and parry.

But, surely there was a weapon missing—one that could cut and thrust through armor.

The obvious answer, within the contemporary technology, was a battle-axe. But, these were very large, often two-bladed, two-handed beasts, which could cut through just about anything—if you were strong enough to wield one. No use on a horse and zero ability to thrust.

The ASE hit upon a different kind of axe. One with a cutting edge, and an opposing spike for bringing down sharply on someone's helm.

That thought was master to the need for tactics in its use in combat. *Swing in one direction to cut, and in the reverse direction to spike…? Maybe…*

This innovative knight's one-handed axe would have to be short, relatively light, and versatile…but more of that later. Meanwhile, ***keep your mind on the procedure***—back to the ***Whole System Solutions…***

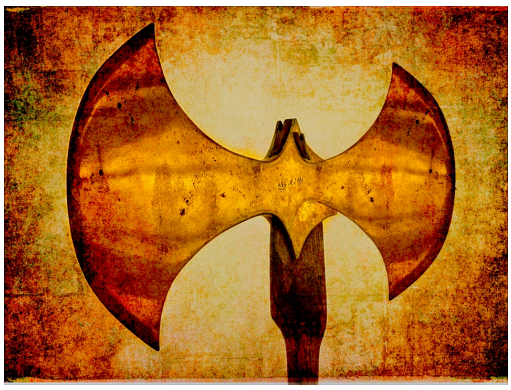
Thinking through the ***Variety of Whole System Solutions***, the ASE considered that one of the options should include a squire in support of the Knight. And another

solution should consider two squires…these were to carry the knight's lances, groom horses, mend armor, sharpen & polish weapons, bivouac, forage & feed the knightly group. Remembering long-past projects, the ASE smiled to himself: 'Needs a ***turnkey-systems solution.'***

The ASE had, by now, conceived a ***Variety of Whole System Solutions***, from:

A. the lone knight with limited weapons and no support, thru…
B. ..the knight with limited weapons and one squire, to…
C. ..the knight with enhanced weapons, two mounted squires and comprehensive backup—a veritable *team!*

Comparing, the ASE deduced that only Solution C provided an ***Autonomous Viable System.*** *One that could follow whatever path was presented; was Survivable–could defend itself, could repair damage, live off the land. And, consequently, would be the most complex and expensive. "Pays yer money, takes yer choice," grinned the ASE: "It always costs to do things right."*



There remained the axe, untested, unproven. *Would it enhance the whole weapon system solution?* Or, would it prove a flop in combat, a confusing complication to *Sir Pure-in-Heart*

The ASE came up with just four gilded axeheads, all shown above.

Top left, (1) was the most basic axe[1], with a light head, a sharp blade, extended at the bottom, opposing a moderate spike. This seemed tactically proficient, enabling the Knight to use the two different faces on forward and return strokes as needed.

[1] Based on an original farrier's axe.

Top right, (2) a lighter axe, with a crinkly-edged blade designed to better penetrate armor, less likely to skid off. The opposing spike was longer and also kinked, to look more dangerous.

Bottom left, (3) a Janus axe, with two opposing blades, one smaller, to access smaller (underarm?) crevices…

Finally, bottom right, (4) the ASE's favorite… another two-faced, Janus axe, but this time with a spike emerging between the blades, enabling the knight to *thrust* as well as slice & spike. This seems to offer another dimension, one unavailable using the mace, for instance.

However, the ASE had never been in knightly combat, and had no real idea of how effective these various axes might be, either as solo weapons or as one of a basic arsenal of different weapons.

Time for some ***Operations Research,*** essential to determine the best axe-head in practice, and importantly, the optimum length of the haft, or handle, of the axe. Too long and it would be unwieldy. Too short and it would not deliver a heavy-enough cutting blow.

So, the ASE forged a variety of “axe options,” with the four axe heads mixed with hafts of different lengths.

With Merlin’s help, he then organized a series of combat sessions among the knights-in-training. The knights chose their axe by swinging it around to “get the feel.” Most knights tried several axes with different hafts before being satisfied. And so to combat practice…which occurred for 6 hours every day—and on each day they chose a different axe option.

At the end of a week, Merlin gathered the group of knights together and asked them how they had found the various weapon configurations:

- None liked the second axe (2) with the crinkly edge and crinkly spike—too light, and easily caught up in the opponents armor.

- Many favored the last axe, (4) the Janus with the spike, although the head was heavier and could be swung freely only with a shorter haft, which ‘limited thrust opportunities…’

• Most favored was the basic axe, (1) the first one, with a single blade and an opposing spike, but with a longer haft. Why? *Because of the extended lower edge to the blade…*

Unexpectedly, the knights had found they could hook the bottom of the axe head over the top of their opponent's shield, pulling it forward to expose their opponent to the spike on the return stroke—which, they found, could be directed towards the opponent's now-exposed armpit, an armor weak spot.

That ruse worked against an opponent armed with axe, mace or sword. And, besides, with practice, it became easy to swing, chop and slice. It was a game changer…

Sir Galahad, the ASE mused, would need practice, practice, practice–and tailored armor–before leading out on the Grail Quest. The ASE thus completed the full set of requirements…

Merlin was satisfied. King Arthur was, apparently, delighted with Merlin who, as expected, had presented the ASE's work as his own…

As to what the ASE thought…? History does not record…

Lessons from the Parable of the Axe?

A. Customers can be too close to their own problem.

B. Man-made systems have *humans* at their focus. Technology *enables* the humans. *Together,* they make the system!

C. Innovation requires Systems Design/Redesign. *Always.*

D. Finding the optimum calls for Operations Research.

E. Optimum for the *whole* requires Compromise for the *part*…

F. View the part as 'functioning in the operating whole.'

G. Systems Design creates a full, matched set of design requirements for the complete Viable System…

P.S. Stakeholders? What Stakeholders?