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‘Just around the Vend’ – Human Factors and Usability of Vending Machines

As a human factors and usability consultant I talk about usability a lot, unfortunately - but also understandably - most people do not share my enthusiasm; that is, until I apply it to something they find absolutely infuriating. This can range from tin openers to a local council website, whatever it may be it puts the problem in context. There’s one particular product that I find most people have a problem with, a product that irritates me so much that I will join in any conversation involving it. Admittedly there aren’t very many of these conversations, but they’re almost always focused on the criticism of usability; let’s see if you agree.

Here at PDD we are equipped with a robust Human-Centred and risk managed Human Factors & Usability capability. The reason for this is that we are compliant with the regulatory rigours of the Medical/Pharma sector; one of the world’s most regulated. We’d say that puts us at the forefront in human factors & usability, but not all sectors are as rigorous and usability is often an oversight or afterthought. This is surprising given the value it can add; in fact many sectors have the potential for improved usability which could put products and services well ahead of their competitors.

The beauty of our human factors & usability process is that it can be stripped back to its core - the bare usability bones if you will - then built back up to tailor to individual sectors that may vary with respect to regulatory compliance. The word ‘process’ here is key, human factors isn’t something you can whisk in at the end then tick a box, it should be considered right from the beginning of a project and applied interactively throughout.

It’s frustrating to see products and services that could be improved vastly by focusing on the user or users throughout the design process. From fiddly food packaging to car park flows to medical gas compressors, the examples are endless. However, there is one product that springs to mind when I think of awkward and nonsensical; the vending machine.
Vending machines are a great example of a product with usability potential and the need for human factors to be considered early in the design process. By and large the vending machines I see on a day to day basis look something like these:

![Traditional vending machines. Image credit L-R: PDD, vendtrade.co.uk](image)

The example on the right is a typical design I have had my fair share of frustration with. My experiences can be roughly summed up in this flow chart:

![Steph's Vending Journeys](image)

* Vending machines kill four times more people each year than sharks do. Ref: omgfacts.com. Image credit: PDD

Of course snacks are not the only output of a vending machine, and the example I've provided is by no means the only type, merely an illustration for my point. There is a large variety that can dispense hot food and drinks, sanitary and contraceptive products, umbrellas and even live crabs, but none appear to have really addressed the lack of usability that seems so apparent. That is, until I turned to Tokyo.
Japan boasts the highest number of vending machines per capita in the world, in 2011 it had one vending machine for every 25 people; bear in mind that the population had almost reached 128 million, that’s a lot of vending machines. That’s also a lot of competition, so it seems only natural that vending manufacturers began investing time and money for their machines to stand out from the crowd. One manufacturer in particular - JR East Water - came up with this:

The ‘acure’ vending machine. Image credit: designboom.com

The ‘acure’ was designed by Japanese industrial designer Fumie Shibata who clearly considered both usability and the user experience. This digital vending machine features a whopping 47” touch screen display, camera, 4 different payment methods, and the ability to serve both hot and cold drinks. Initially installed in August 2010 at Shinagawa Station (Tokyo), in a 6 month period it reported to sell around twice the amount of the surrounding vending machines. Why?

Simply, the overall experience seems to be preferred by users. The ‘acure’ has an interactive and friendly user interface; all drinks that are available are presented clearly and visually on the screen (those that are sold out aren’t shown). They can then be selected for further information and purchased using cash or card, the Japanese metro card, or using NFC technology available on most Japanese smartphones. The collection bin is located higher than on most machines negating the need for the ‘vending stoop’ pictured below, and the large screen replaces those letter-number panels with tiny digital displays.

The ‘acure’ has technology to recognise gender and estimate age which leads it to recommend certain beverages to the customer. Lastly, once a transaction is complete it says ‘Thank You’ - a simple but human gesture. Even when not in use, it displays advertising depending on the time of day, temperature and season; for example it may show a steaming hot coffee on a cold winter morning.

From an overall usability perspective it takes into account maintenance and restocking, the ‘acure’ is linked to a central server which is updated in real-time so daily stock deliveries are optimised. This purchasing data (combined with sex and estimated age) is fed back and used to provide valuable user insights for the company which can fine-tune design modifications or marketing strategies. Also, it can be instructed to provide free beverages in emergency situations. What a machine!

With products such as these focusing on user needs and completely changing the game with respect to the vending user interface, other designs are no longer cutting the mustard. Vending needs to be brought up to date; the technology, materials and manufacturing methods are there, but the design is not. A fresh, iterative, user-centred approach, using a human factors & usability process is needed to create machines which are appealing, provide a great experience and are easy to use. Check out our website for more details on how we approach Human Factors & Usability at PDD.
Languages spoken: Global.
The last thing that inspired me: Design and Innovation.
My dream project: A project that makes a difference in the world.
My obsession: Develop successful, award-winning and world-first products and experiences.