WHAT HAPPENED TO LUKE?

In this article we explore the phenomenon of Information Anxiety in the context of software testing, by telling the story of Luke, an archetypical tester whose story resonates with many in the testing community

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As software testers, we are tasked with understanding the evolving needs of multiple stakeholders, understanding the domain of the products we test, keeping up to date with testing techniques, mastering technical challenges, communicating effectively, testing new features, retesting bug fixes, and more!

Whilst the work can be interesting and rewarding, we are witnessing an increased presence of a phenomenon that occurs as a result of the cognitive demands placed on software testers: Information Anxiety. In this article we explore the phenomenon of Information Anxiety in the context of software testing by telling the story of Luke, an archetypical tester whose story resonates with many in the testing community.

LUKE'S STORY
On a cold day in November 2017, Luke, a highly experienced tester, jumps out of bed full of energy. Today is the first day of his new job at a major advertising company. After eating a healthy breakfast, Luke takes the Central Line train from Buckhurst Hill into central London and is greeted by his new line manager. Over the course of the next few days, Luke gets to know his new colleagues, familiarises himself with the company's processes, and is assigned projects to work on. Luke is happy.

When he gets a call from a recruiter asking if he's interested in a new exciting opportunity, Luke politely turns it down.

Fast-forward to November 2018 and Luke gets another call from the recruiter. This time, Luke is more receptive to the call and agrees to take a few interviews. "What has changed in just a few months?" asks the recruiter. "I'm exhausted", exclaims Luke, "simply exhausted."

So what did happen to Luke?

Luke's story, in whole or in part, is one that we hear about all too often. Indeed, most of us have experienced it ourselves in the course of our careers.

Although Luke is an experienced tester, he was not very familiar with the domain of advertising. This means that as a new employee, he had a lot to catch up on in terms of how the advertising industry functions, who the key players were, what innovations were on the horizon, and so on. For the first few weeks on the job, Luke struggled to digest these new concepts, especially since he had worked in the telecommunications industry for most of his career. Not only did he find it difficult to understand, but he found that the dynamic nature of the industry led to a situation of information overload, where he felt that the gap between what he should have known, and what he actually knew, kept growing; not shrinking as time passed and responsibilities evolved. He also found it difficult to locate the information that he needed to do his work and sometimes was also denied access to it because people were too busy to talk to him.

AN EVOLUTIONARY PERSPECTIVE
Whilst information requirements and communication technologies continue to grow at a sustained pace, the truth is that, evolutionarily speaking, the human brain is not much different to what it was a few thousand years ago when hunter-gatherer tribes roamed the earth. If Luke was alive 10,000 years ago, his job would have probably consisted of joining a group of hunters every day to track down a herd of deer, making a kill and taking the spoils back home to feed the community. Luke would probably have lived his entire life without ever meeting a single individual from a different community, meaning that his exposure to new ideas was severely limited. In fact, the rate of change in the world at this time was so slow that it was practically imperceptible for generations. It was not until the Agricultural Revolution, the advent of money, the Scientific Revolution, the Industrial Revolution and the advent of the internet, that this situation changed.

Today, we find ourselves participating in the so-called Knowledge Economy, an economy powered by knowledge workers whose job it is to create, understand, transfer and apply knowledge in order to generate wealth. Luke, like all testers, is in fact, a knowledge worker. On a daily basis, he needs to understand abstract concepts, communicate with a variety of stakeholders, deal with context switches, changing information and countless interruptions from colleagues, mobile devices and emails. The simple truth is this change to the knowledge economy has happened so fast that the human brain has not evolved in step. This has resulted in a new phenomenon, particularly affecting knowledge workers, which we know as Information Anxiety.

Information Anxiety is a term coined by Wurman in his 1989 book bearing the same name. He defines it as "stress caused by the inability to access, understand, or make use of information necessary for employees to do their job". That is to say, a situation whereby the sheer volume, velocity and variety of information that knowledge workers are expected to handle, can affect knowledge workers' job performance as well as other aspects of their well-being.

HOW DID INFORMATION ANXIETY AFFECT HIM?
As time passed, Luke's exposure to information anxiety affected his job performance, his psychological state, and his physical health.

Job Performance
As Luke found it increasingly hard to cope, he developed damage limitation strategies in which he attempted to limit the amount of sources of information he considered when carrying out his tasks. He also started purposely ignoring useful information so that he could just get on with the job.

For example, one day as he wrapped up the testing of a release, a colleague of his informed him that the way commissions were calculated for online advertising had changed and would need to be re-tested. "I haven't seen that in the Jira ticket", Luke

retorted. So, he let the release go ahead without revisiting and carrying out crucial tests.

Luke also found himself dedicating less time to contemplative activities. That is to say, activities whereby he could update his internal knowledge maps and find ways of generating innovative ways to take the organisation forward.

This had a severe impact on Luke's job performance and motivation, ultimately leaving him feeling that he was stuck in a rut and simply going through the motions.

Psychological effects
Overwhelmed, intimidated, fearful, worthless, lost, threatened, stressed, uncomfortable and timid. These are all emotions which Luke admitted to experiencing at one point or another throughout his experience at the advertising company.

Ultimately, these feelings spilled over into his personal relationships and led to him being under increased stress and ultimately seeing his level of job satisfaction dwindling.

Physical Health
As the situation got worse, Luke found himself experiencing physical health problems due to lack of sleep, fatigue and unhealthy eating habits.

The amount of sick days he took during the first year at the advertising company far exceeded what he normally needed at previous places of work.

Making sense of it all
Luke's experience is consistent with what a variety of researchers have reported when investigating Information Anxiety

across a number of sectors.

As a frame of reference, the reader is encouraged to use Maslow's *Pyramid of Human Needs and Motivation*. This model states that human beings have needs which fall into one of five categories:
1. physiological
2. safety
3. belongingness and love
4. esteem
5. self-actualisation.

Above: Maslow's *Pyramid of Human Needs and Motivation*.

Maslow posits that an individual cannot achieve higher levels in the pyramid before first achieving the lower levels. For example, one cannot feel fulfilled in one's job if she fears for her safety when at home.

At the beginning of our story, we see Luke full of energy and motivation. As an accomplished knowledge worker, his needs are probably being met at the higher levels of the pyramid. He has been offered a prestigious job at a major company and feels that he is likely to have

a direct impact on the company's success through his work. At the very least, this places his satisfied needs at Level 4 (esteem) in Maslow's pyramid.

However, as time passes, Luke starts to complain about low job satisfaction and how it feels like he is simply going through the motions without being able to build himself up, as well as reaching his goals.

Someone in this state is unlikely to have a very high level of self-esteem, at least so far as his career is concerned. Luke has now descended to Level 3 (Belongingness and Love) on Maslow's pyramid. The symptoms persist however, and Luke begins to complain that the psychological effects of his situation are spilling into his personal life and influencing personal relationships. This means that he is in real danger of dropping down to Level 2 (Security and Safety). Even then, the needs at this level are likely to be affected by the effects of Information Anxiety on Luke's physical health.

This leads to a state whereby his most basic needs are not being met and the optimism and energy that we observed in Luke on his first day at work have all but disappeared.

In this state it is no wonder that when the recruiter calls again, the exhausted and burnt out Luke agrees to take interviews with a view of making a career change. It is clear that not only has this affected Luke, but it has also affected his employer who has lost a valuable employee and must now restart the recruitment and training process again to replace him.

HOW TYPICAL IS LUKE'S EXPERIENCE?
Information Anxiety has been studied across various sectors but has not been explicitly dealt with in the realm of the tech industry, much less across software testers. Wurman's definition of information anxiety states that there are five contributors to the phenomenon. These are:
1. difficulty understanding information
2. information overload
3. not knowing whether required information exists
4. not knowing where the required information resides
5. not having access to the required information.

To this end, we carried out an experimental study with a cohort of tech workers in Malta in which we measured perceived anxiety levels on a daily basis for a month. The empirical data we collected points towards a significant presence of information anxiety

amongst testers.

In fact, when compared to other job roles in the tech industry, testers in our cohort exhibited significantly higher levels of Information Anxiety overall.

Furthermore, whereas software developers complained mostly of information overload, testers reported difficulty across all of Wurman's five contributors to information anxiety.

MITIGATING INFORMATION ANXIETY
Researchers recommend several ways for coping with information anxiety. Whilst it is impractical to discuss them all in the confines of this article, we will provide a taster of the more simple and effective methods proposed.

Wurman recommends you start with acceptance. You need to accept that there is much in your job that you might never understand or get round to. He goes on to recommend a number of actions aimed at reinforcing this fact.
These include:
1. reducing your pile of office reading
2. moderating your use of technology
3. separating material that you are genuinely interested in, from material which you think you should be interested in.

The act of accepting the fact that you will simply never be able to know it all can be surprisingly liberating. This is because you can then focus your efforts on what really matters, typically using a risk-based approach much in the same way that you carry out any other activity in software testing.

The notion of creating a safe space

where people can ask questions is also a common theme amongst researchers. People suffering from information anxiety are also likely to avoid asking questions for fear of being labelled ignorant.

Therefore, establishing an environment where one can safely ask questions without being judged or scowled at can go a long way in helping people cope.

Some researchers argue that a shift in educational paradigms is required so as to take into account the digital age. Students and workers should be taught more effective reading and filtering techniques.

Finally, the simple act of just being aware of the phenomenon and its risks should already put you in an advantageous position to notice symptoms and subsequently decide on the appropriate way of dealing with it in your particular context.

HELP US BY PARTICIPATING!
Over the past few years we have been seeking to understand and mitigate the phenomenon of information anxiety and how it relates to the software testing community.

To this end we are always looking for practitioners to share their experiences with us, participate in studies and help with the evaluation of tools that we develop as part of our ongoing research. ☉

Would you like to contribute by participating in our ongoing research? Contact us on hcitest@um.edu.mt for more information or register your interest to help at: **https://bit.ly/2VJ8xt6**