



CubeMatch

Powering Change

```
mirror_object: to mirror_
mirror_mod.mirror_object
operation == "MIRROR_X":
mirror_mod.use_x = True
mirror_mod.use_y = False
mirror_mod.use_z = False
operation == "MIRROR_Y":
mirror_mod.use_x = False
mirror_mod.use_y = True
mirror_mod.use_z = False
operation == "MIRROR_Z":
mirror_mod.use_x = False
mirror_mod.use_y = False
mirror_mod.use_z = True
```

```
selection at the end -add
mirror_ob.select=1
modifier_ob.select=1
context.scene.objects.active
("Selected" + str(modifier
mirror_ob.select = 0
 bpy.context.selected_ob
 data.objects[one.name].sel
print("please select exact)
CLASSES -----
```

Quality is never an Accident! Opinion Paper

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INTRODUCTION

“Quality is never an accident. It is always the result of intelligent effort”(Ruskin, 2017)

Attributed to John Ruskin, a noted thinker, author and art critic in the 19th century, the above quote is particularly relevant in the world of Quality Assurance (QA) & Software Testing, today. Persistent software failures, as outlined later in this paper, support this view.

If we look at these two elements (QA & Testing) as primary drivers of quality via Prevention & Detection, it becomes clear that significant **intelligent effort** is therefore necessary from the outset of testing projects in order to **prevent failure** as much as possible up front.

Where bugs transcend deeper into the software development life cycle, they are then **detected** before making their way into a production setting and manifesting therein, as increasingly costly issues.

This paper looks at the importance of quality in software testing, the impact of software failures and how then, quality can be introduced early and become a natural organic construct in testing projects.

QA & TESTING – THE POOR RELATION OF SOFTWARE DEVELOPMENT

Historically, when it comes to the ever-present squeeze on time, resources or budgets in software development, QA & Testing is often perceived as an area of opportunity in order to resolve these project challenges. This, quite often, is achieved by reducing the time and/or effort associated with testing in order to meet pre-defined timelines. Planning backwards, rather than forwards, exacerbates this situation.

As such, the risk to embedded quality intensifies as corners are cut and test suites are modified to align to shorter execution cycles. Whilst this can be mitigated somewhat by way of prioritising the test cases based on business risk, the opportunity to introduce failure by being selective, nevertheless grows. So, is there a solution to this quality v time v budget paradox? The answer is yes.

START AT THE BEGINNING

In order to mitigate the risk to testing timelines, effort, or budget (which almost inevitably happens), it is necessary to pre-empt issues and the impact of such, by introducing quality rigour at the outset of a project. This can be achieved in a number of ways.

Define what quality means:

- Quality means different things to different people, and this is no different when it comes to software projects. All stakeholders need to establish what success looks like from their perspectives, along with what is acceptable or otherwise and how this can be achieved in delivering the software solution. These views can be documented in a Quality Plan which acts as a blueprint for delivery and is used then to measure success via a Lessons Learned exercise post-delivery. Buy-in and acceptance of the plan is critical.
- A Quality plan also helps to introduce consistency of approach and expectations and how they may be achieved.

Set standards & measure:

- Quality can be proven where it can be measured. An organisation must ensure that quality metrics and expectations are documented, agreed and delivered upon. Such metrics may include implicit and explicit components such as customer perception of products/applications or can exist at a more granular level in relation to software quality. For example, measuring the number of defects per release, per test phase, code quality, coverage, and issue leakage between test levels etc. “Hot-spots” or areas of concern can be identified in this way and can be addressed in subsequent releases

with a view to gaining future quality improvements.

- As quality approaches become embedded in software testing & delivery, these metrics where issues are monitored, should present in a steady downward trend as the quality ethos grows organically from project to project.

Know what you are expected to test and deliver:

- The old adage of “garbage in, garbage out”, still applies in today’s fast-paced world of software development & testing. In order to reduce the chance of issues being introduced or leaking into the latter stages of a project and becoming more costly as they do, ensuring that all business requirements accurately reflect the need, are unambiguous and importantly, are testable, is an essential part of embedding quality at the outset. This can be achieved by having the right people with the right skills in place to interpret and interrogate requirements before they are signed off and reflected in a solution. In effect, this analysis is the first key step to successful efficient and effective testing.

Utilise the right people & tooling:

- Embedding the use of tooling to create efficiencies embellishes the quality of deliverables. Choosing the right tool/s though, to suit the need, as part of a quality approach, is essential to achieving quality targets.
- Tooling will not work unless the right people with the right skills are employed to install and properly utilise across the life-cycle of a project. This means embedding quality champions who can positively influence the culture and practical deliverables within a project and who understand the benefits and effects of such tooling in pivotal positions.

Engage in continuous improvement:

- Quality planning demands a continuous improvement mentality. Just because one project may have been successful does not mean subsequent ones will. The Lessons Learned exercise, mentioned previously, is paramount when it comes to embedding and integrating quality thinking and approaches in an organisation. As a result of improving quality processes, improved products and applications will follow.
- Many organisations in the Finance industry already employ quality approaches such as Plan, Do, Check, Act (PDCA), Six Sigma or Lean Methodologies borrowed from the manufacturing industries and whilst these are known to work once the above considerations are effected at a minimum, it can be quite often siloed. This, for example, can occur at Project Manager level where formal project delivery approaches such as PMBOK (Project Management Body of Knowledge) are employed, but it is not always the case that this transcends across the whole project life-cycle in business analysis and testing, where the greater improvements and efficiencies can be gained.

These areas then operate independently so a coordinated quality approach and the benefits of same, becomes unachievable.

- “Quality has never mattered more” in most industries, according to Srinivasan & Kurey (2014). They posit that there are “four factors that drive quality as a cultural value: leadership emphasis, message credibility, peer involvement, and employee ownership of quality issues”. These factors, though critical if fulfilled, do not exist in a vacuum and are not a panacea for all quality ills.
- For it to be successful, the quality ethos needs to be adopted in full by departments or organisations and this includes fulfilling such pre-requisites as highlighted earlier. Approaches to quality must exist in a culture that champions continuous improvement by ensuring the perfect blend of people, tools, processes and methodologies are employed and embedded at the outset of projects.

CONSEQUENCES OF FAILURE

The natural consequence or result of not embedding quality in a project, early or late, is quite often apparent. Quality failures can manifest in many manners across multiple industries and can severely affect organisations and individuals in differing but nonetheless, detrimental ways.

Recent examples in the Financial Services industry show that quality issues in applications and products are ever-present. In 2023, DBS encountered “five significant outages, with **four attributed to bugs or software issues** causing access problems for customers utilizing internet and mobile banking, electronic payment, and ATM services” (SES, 2023).

In addition, one only has to look at the Horizon IT failures in the UK, where **software bugs** in its Post Office application led to more than 900 sub postmasters being convicted (Peachey, 2024), to demonstrate the continuing existence of quality issues in applications and products globally. Such failures are not restricted to financial or reputational damage impacts. The human cost in this case was also greatly significant as one person committed suicide following a review that showed his account was missing £100,000, whilst the health of a number of people involved reportedly deteriorated as a result.

Meanwhile, in probably the highest profile of all, in the summer of 2024 at CrowdStrike, who produce security software solutions to protect against cyberattacks, distributed a faulty update to over 8.5 million of its Windows customers which led to a total shutdown in July 2024 of multiple industries including airlines, banks, hotels, and hospitals to name a few. An internal review concluded that **insufficient basic quality checks** had been at fault (Warren, 2024) - costing Fortune 500 customers an estimated \$5.4 billion in damages (Gorelick & Bloomberg, 2024). CrowdStrike have committed, albeit after the event, to enhance software quality processes including improved internal testing to ensure such a catastrophe never happens again (Hodgson, 2024).

The above examples continue to present as a reminder that where quality fails, serious consequences follow - and this continues to occur across many industries year after year.

CONCLUSION

The above examples are just that - examples! These serve though, as notice that whilst the rapid pace of technological change continues exponentially, the need for quality checks never diminishes and in fact, grows even more-so as society become more and more dependent on such innovation.

Whilst the holy grail of completely bug-free software will continue to elude, pre-empting failures such as the above, as much as possible by embedding quality processes, people and tools at the outset of projects, is key to averting or at least, mitigating the human, reputational and financial costs of such disasters.

HOW CUBEMATCH CAN HELP

Founded in **2002**, CubeMatch is a **global change and transformation consultancy**, specialising in **Financial Services** and selected as the **chosen partner** for some of the largest and most demanding transformation projects within the Financial Services sector.

CubeMatch is an international brand continuously expanding with **six offices** worldwide : **Dublin, London, Utrecht, Frankfurt, Singapore and Chennai**. Combining our world class expertise in Financial Services with our rich capabilities in all aspects of change and transformation, we apply a **Multiplier Effect**, helping clients to be more effective today while creating value for tomorrow.

We are **Banking Native**; it runs through our **DNA**. Unlike more general change consultancies, this banking intimacy means we deliver change and transformation programmes that stick, against a backdrop of complex regulations and continuous disruption.

Over the years, we have successfully built a global firm that is uniquely equipped to deliver pragmatic and business-focused results. We have over **400 staff and multi-million euro revenue**. And through our **strategic partnerships** we apply innovation to help organisations operate, compete and deliver at scale. Blending our powerful change capabilities with next generation technology, we deliver **innovation and business agility** to help businesses thrive.

OUR GLOBAL SERVICES



Strategic Change
and Programme Delivery



Regulatory, Risk
and Compliance



Digital Transformation
and Innovation



Data and AI



Quality Assurance
and Automation



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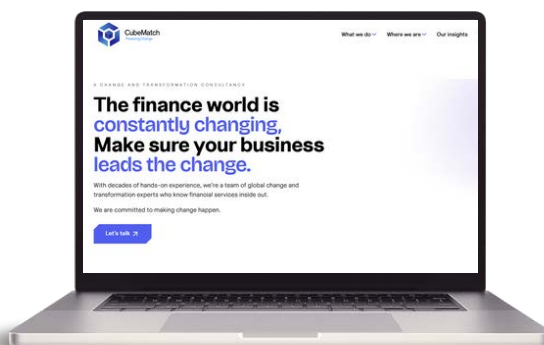
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