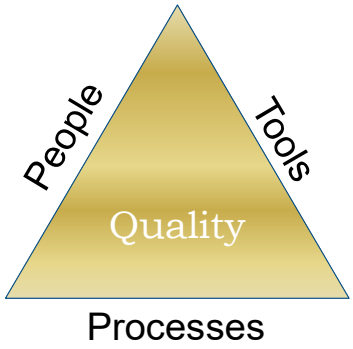
The Quality Triangle



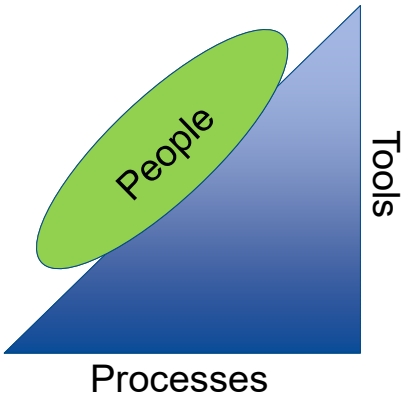
There are three things that we have control over that can lead to quality software: People, Processes, and Tools.

If we invest in any one (or all) of them, we should see increased software quality.

I've depicted this relationship as a triangle. The area inside the triangle represents quality. The lengths of the sides of the triangle represent the amount of investment we have placed in people, processes and tools.

We can increase the area inside the triangle by making any of the sides longer.

People



Let's start with People.

Software is a labor-intensive operation. It is difficult to automate, although we have been trying to figure that one out since the mid 70's.

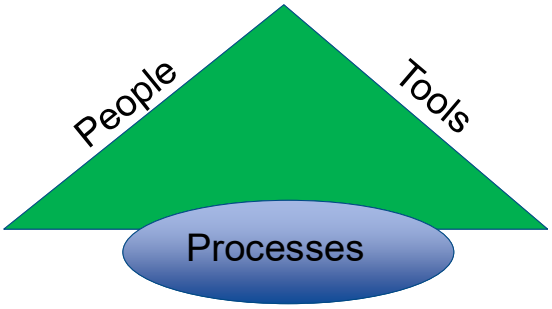
- If we invest in our people, we will enjoy higher software quality.
  - Hire good people.
  - Retain good people.
  - Train your staff to keep their skills up to date.
- These things come with a cost, but they should lead to a positive return on investment (ROI).

Types of Jobs

What people (sometimes called human resources) are we talking about?

- Management:
  - Project managers.
  - People managers.
- Technical staff:
  - Analysts.
  - Designers.
  - Programmers.
- Quality Assurance Function:
  - Testers.
  - Configuration Management.
  - Software Quality Assurance.

Processes



An investment in processes can lead to higher software quality. We discussed the benefit of repeatable, defined processes earlier in the course.

Processes and Standards

- Document Best practices
  - Based on our own experience
  - Based on industry standards
- Maintain
- Train
- Ensure we are following the standards
  - This is the role of SQA

We need to document our processes and standards.

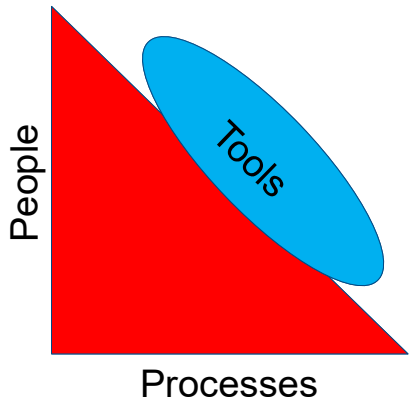
- Base our processes and standards on best practices. We can do this based on our own experience. What have we found that works well in the past? Capture that experience and share it. There are also plenty of government and industry standards that we can use as the basis for our standards and practices.

We should maintain our processes (encourage the things that work, eliminate what doesn't work). Put the processes and standards under configuration control just like software, ensuring that we make changes to the standards in a controlled way.

We should train people in the standards and processes, so they know the correct way to do things.

We should ensure they are following the standards. This is the role of Software Quality Assurance.

Tools



Finally, we can invest in tools. Now we're talking about software tools here, but the principle is the same as for any tools. For example, carpenters use power tools such as circular saws to help them do their work. In either case (software or carpentry) the use of tools and automation have many benefits:

Tools -- Benefits

- Reduces errors
- Increases productivity and efficiency
- Makes job easier
- Saves money in the long run

They reduces errors If we accept the premise that people make mistakes, the less that people are involved in the production of things the less likelihood of errors leading to defects. (This is one reason why manufacturing has invested so heavily in robots.)

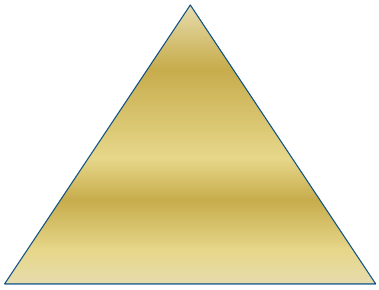
Tools Increases productivity. (It takes less time to cut a board using a power saw than with a hand saw.) We can get more work done in a shorter amount of time. This is another reason why manufacturing has invested in robots. Robots can perform tasks with perfection in shorter time than humans.

Tools make the job easier: Let's let the tools do more of the work. Think about how much effort it would take to build today's kind of software if we only had assembler language to work with. High level languages shift a lot of the effort of programming from the programmer to the compiler.

Tools save money in the long run. If we weigh the cost of the tools against the benefits we receive from the things we just mentioned, we again realize a positive return on our investment. Tools pay for themselves.

Next

- Quality Assurance



In the next video, we will take a closer look at the quality triangle as it applies to software quality assurance people processes and tools.