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Principles for Testing?

James Christie

“There has been much debate in recent years about the balance between principles and rules when regulation is framed. Software development and testing are complex activities that do not lend themselves to fixed rules or prescriptive ‘best practice’.

If stakeholders are to be confident that testers will provide value then perhaps we need clear principles against which testing can be evaluated. Testing lacks principles intended to guide and shape behaviour. I will show how this has contributed to some of the confusion and disagreement arising from ISO 29119 and the Stop29119 campaign. I will also argue that we can learn from the “rules based versus principles based” debate and I will initiate a discussion about what form principles might take for testing, and where we should look for sources for these principles.”



James Christie jack of all trades, master of some

Developer & Business Analyst

Project Manager

IT Auditor

Information Security Manager

Test Manager & Consultant

investment accountant

trainee chartered accountant

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Rules versus principles

FD Roosevelt:

"Rules are not necessarily sacred, principles are."

Rules have to be explicit & specific about what can and can't be done, unlike principles.

Principles state *"fundamental propositions that serve as the foundation for a system of belief or behaviour or for a chain of reasoning."* (Oxford Dictionary)

"...a general rule of morality that guides conduct" (Chambers Dictionary)

There is a great deal of confusion about principles, rules and standards. First, there shouldn't be a binary choice between rules and principles. It's not a matter of principles = good and rules = bad. I'll come back to that. Nor is it a matter of principles being inviolable and rules being made to be broken. Roosevelt made an important point, but it's not quite as simple as that.

There is confusion about where standards fit in. Legal theorists tend to think of standards as being at the same level of abstraction as principles. That fits in with the approach many professional bodies have taken to their professional standards; they're principles driven.



An example of an area where rigid rules can be unhelpful is “incentives” offered by suppliers.

I’ve seen rules that forbade cash gifts, or any gift that could be resold, but which didn’t prevent extravagant hospitality and golf trips.

Once you try to specify everything that is unacceptable you create an opportunity for people to exploit the rule.

Principles without rules?

Concerns about consistency.

Problems when people are inexperienced, naïve or have poor judgement.







Motoring law is a mixture of principles and rules.

Serious driving offences are principles based, eg “dangerous driving”, “careless driving”. The law doesn’t spell out in detail what is illegal or what is permitted.

However, there are rigid laws. Eg the need to have a driving licence and insure the vehicle.

There are also laws that appear rigid but which have a degree of flexibility in application, eg speed limits.



International
Organization for
Standardization



What is ISO offering?

"A standard ... provides requirements, specifications, guidelines or characteristics that can be used consistently to ensure that materials, products, processes and services are fit for their purpose."

A standard that is not clear about its own purpose is offering a set of rules without guiding principles.

Unfortunately, ISO have defined ISO 29119 at a much more detailed, specific level than principles. It's equivalent to rules. And that is how people are starting to use them. They pick up on the standard and apply them as a set of rules that will help them do good rather than bad testing. I think they are encouraged to do so by the status of 29119 as a standard. People assume that it is a statement of the basics of the practice of the profession, similar to the standards for internal auditing that I'll talk about later. But ISO 29119 and IIA standards are operating at quite different levels and trying to do different things.

Bodies like the IIA and the accountancy profession have avoided traps that we've fallen into in testing by thinking through the distinction between principles and rules, and how standards should fit in. Other professions have guiding principles, a clear idea of their purpose. Testing does not. ISO 29119 certainly doesn't offer such guiding principles. It isn't clear about the purpose of testing, or even its own purpose.



Principles and principles

Groucho Marx

"These are my principles; if you don't like them, I have others."

Chambers Dictionary:

" a general rule of morality that guides conduct"

Things that are true

ISTQB Seven Testing Principles

- 1 - Testing shows presence of defects
- 2 - Exhaustive testing is impossible
- 3 - Early testing
- 4 - Defect clustering



Things that are true

ISTQB Seven Testing Principles

5 - Pesticide paradox

6 - Testing is context dependent

7 - Absence-of-errors fallacy



The seven basic principles of Context-Driven Testing



This I believe

- 1 The value of any practice depends on its context.*
- 2 There are good practices in context, but there are no best practices.*
- 3 People, working together, are the most important part of any project's context.*
- 4 Projects unfold over time in ways that are often not predictable."*

This I believe...

The seven basic principles of Context-Driven Testing



This I believe

"5 The product is a solution. If the problem isn't solved, the product doesn't work.

6 Good software testing is a challenging intellectual process.

7 Only through judgment and skill, exercised cooperatively throughout the entire project, are we able to do the right things at the right times to effectively test our products."

This I believe...

The logo for BCS (The Chartered Institute for IT) features the lowercase letters 'bcs' in white on a green background that has a curved bottom edge.

The
Chartered
Institute
for IT

This I must do

Code of conduct for members

"You shall:

- a. have due regard for public health, privacy, security and wellbeing of others and the environment.*
- b. have due regard for the legitimate rights of Third Parties.*
- c. conduct your professional activities without discrimination..." etc*

This I must do...

This I must do

International Standards
for the Professional
Practice of Internal
Auditing



"1120 - Individual Objectivity

*Internal auditors must have an impartial,
unbiased attitude and avoid any conflict
of interest.*

Interpretation:

*... A conflict of interest exists even if no
unethical or improper act results...*

*...can create an appearance of impropriety
that can undermine confidence..."*

This I must do...

The highlighted text is relevant to the problem I mentioned of managers taking extravagant hospitality from suppliers.

This must guide me

International Standards
for the Professional
Practice of Internal
Auditing



"The purpose of the Standards is to:

- 1 Delineate basic **principles** that represent the **practice** of internal auditing.*
- 2 Provide a framework for performing & promoting a **broad range of value-added internal auditing**.*
- 3 Establish the basis for the **evaluation** of internal audit performance.*
- 4 Foster improved organizational processes and operations."*

This must guide me...

Attribute standards – 1nnn. These state how auditors & audit departments must act
Performance standards – 2nnn. These state how audits must be performed.

This must guide me

International Standards
for the Professional
Practice of Internal
Auditing



The Institute of
Internal Auditors

"The Standards are principles-focused, mandatory requirements consisting of:

- *Statements of basic requirements for the professional practice of internal auditing and for evaluating the effectiveness of performance, which are internationally applicable at organizational and individual levels.*
- *Interpretations, which clarify terms or concepts within the Statements."*

This must guide me...

This must guide me

International Standards
for the Professional
Practice of Internal
Auditing



E.g. "2300 – Performing the Engagement
*Internal auditors must identify, analyze,
evaluate, and document sufficient
information to achieve the engagement's
objectives.*

2310 – Identifying Information

*Internal auditors must identify **sufficient,
reliable, relevant, and useful** information
to achieve the engagement's objectives."*

This must guide me...

Must is an "unconditional requirement".

"2300 – Performing the Engagement" provides a neat contrast to testing. It sets a benchmark for what auditors have to do.

Sufficient, reliable, relevant and useful are all defined briefly.

This must guide me

International Standards
for the Professional
Practice of Internal
Auditing



The Institute of
Internal Auditors

“Interpretation:

Sufficient information is factual, adequate, and convincing so that a prudent, informed person would reach the same conclusions as the auditor.

Reliable information is the best attainable information through the use of appropriate engagement techniques.”

This must guide me...

This is strikingly similar to FDA guidance about evidence required from testing. Evidence must lead anyone to the same conclusion.

See next slide.



US Food & Drugs Administration

011

What does the FDA expect?

Evidence that will stand up in court

The evidence has to be sufficient (quality and quantity) so that 3rd parties will have to come to the same conclusion if they review it, without interpretation by the testers.

Check out Griffin Jones' work.
See his talk on YouTube.

<http://www.youtube.com/watch?v=i8he7Rejn5s>

Image courtesy: Maxxar & FreeDigitalPhotos.net

This slide is lifted straight from a tutorial I give for testers who have to work with auditors.

This must guide me

International Standards
for the Professional
Practice of Internal
Auditing



The Institute of
Internal Auditors

“Interpretation:

Relevant information supports engagement observations and recommendations and is consistent with the objectives for the engagement.

Useful information helps the organization meet its goals.”

This must guide me...

Back to the IIA standards. Relevant and useful are similar concepts, but their distinct meaning is explained here.

We’ve nothing like this in testing. In particular, ISO 29119 doesn’t try to offer this sort of guidance.

This must guide me

International Standards
for the Professional
Practice of Internal
Auditing



The Institute of
Internal Auditors

E.g. "2420 - Quality of Communications

*"Communications must be **accurate**,
objective, **clear**, **concise**, **constructive**,
complete, and **timely**."*

Interpretation:

***Accurate**... free from errors and
distortions and are faithful to the
underlying facts."*

This must guide me...

This is the part of the standard governing audit reports.

It is brief, clear and very demanding. You cannot fake an audit report by throwing figures at a template!

This must guide me

International Standards
for the Professional
Practice of Internal
Auditing



“Interpretation:

***Objective...** communications are fair, impartial, and unbiased and are the result of a fair minded and balanced assessment of all relevant facts and circumstances.*

***Clear...** easily understood and logical, avoiding unnecessary technical language and providing all significant and relevant information.”*

This must guide me...

This must guide me

011

International Standards
for the Professional
Practice of Internal
Auditing



The Institute of
Internal Auditors

“Interpretation:

Concise... to the point and avoid unnecessary elaboration, superfluous detail, redundancy, and wordiness.

Constructive... helpful to the engagement client and the organization and lead to improvements where needed.”

This must guide me...

This must guide me

International Standards
for the Professional
Practice of Internal
Auditing



The Institute of
Internal Auditors

“Interpretation:

***Complete**... lack nothing that is essential to the target audience and include all significant and relevant information and observations to support recommendations and conclusions.*

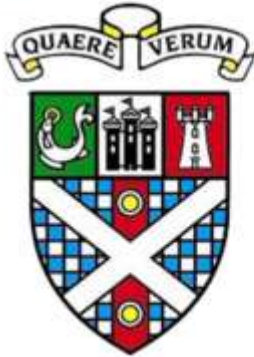
***Timely** ... opportune and expedient, depending on the significance of the issue, allowing management to take appropriate corrective action.”*

This must guide me...



THE INSTITUTE OF
CHARTERED ACCOUNTANTS
OF SCOTLAND

Principles not Rules: A
Question of Judgement,
2006



This must guide me

"An overwhelming majority of those involved told us they were looking for accounting standards firmly governed by high-level principles, wholly devoid of anti-abuse and 'bright-line' rules."

"Principles based does not mean principles only. We expect that a principles-based accounting standard will be accompanied by guidance... Guidance anticipates the use of judgement whereas rules discourage judgement"

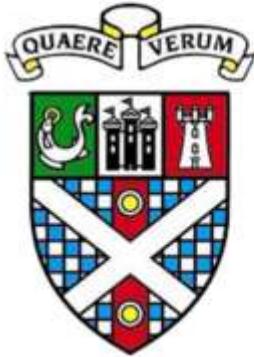
This must guide me...

Chartered accountants in Scotland and also in England/Wales have moved towards a clearer understanding of the need to rely more in principles than rules.



THE INSTITUTE OF
CHARTERED ACCOUNTANTS
OF SCOTLAND

Principles not Rules: A
Question of Judgement,
2006



This must guide me

"A principle is a general statement, with widespread support, which is intended to support truth and fairness and acts a guide to action. Principles cannot be replaced by mechanical rules.

Sometimes a set of rules may be proposed to guide the observance of a principle, but it will always be a matter of judgement whether following these rules will achieve conformance with the principle."

This must guide me...



THE INSTITUTE OF
CHARTERED ACCOUNTANTS
OF SCOTLAND

Principles not Rules: A
Question of Judgement,
2006



This must guide me

"Rules represent specific instructions like a computer program. Rules are sometimes arbitrary and may not always reflect the underlying principles."

"Rules-based standards are not sustainable."

"Rules-based standards reduce or eliminate the exercise of professional judgement and lead to de-skilling of the profession."

This must guide me...

In defence of principles,
2009



This must guide me

"2. Principles-based regulation is better equipped to adapt effectively to continuously changing circumstances, and to implement requires highly skilled and competent supervision.

3. There is significantly less room for unethical behaviour in a system guided by principles which is well supervised, in contrast to a rules-based framework that does not address substance."

This must guide me...

In defence of principles,
2009



This must guide me

"4. Rules-based systems can create a box ticking mindset and compliance cultures, where the focus is upon meeting the letter rather than spirit of the regulation, or an attitude of 'anything goes' so long as it is not prohibited.

5. We note, in light of the current crisis, that the USA's rules-based regulatory framework did not cope demonstrably better than the UK's principles inclined system."

This must guide me...

Point 5 is interesting. It's basically saying the UK wasn't any worse than the USA.

You can certainly make a valid accusation that the accountancy profession in the UK did a lousy job.

Principles don't guarantee a good outcome. However, the accountancy profession in the UK can be held accountable for failing to live up to its principles.

With rules that accountability is often missing. People can comply with the letter of the rule, and defeat the ends towards which the rule was directed. They then go scot-free.



THE INSTITUTE
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THE INSTITUTE OF
CHARTERED ACCOUNTANTS
OF SCOTLAND



The Institute of
Internal Auditors



Chartered Institute of
Purchasing & Supply



THE CHARTERED
INSURANCE INSTITUTE



The professional body for accounting
technicians



Chartered Institute of
Management Accountants



FINANCIAL CONDUCT AUTHORITY

So what do outsiders expect?

They see what other professions are doing and assume testing standards will be similar to other professional standards, or at least comparable.

This must guide me...



International
Organization for
Standardization

What does ISO offer?

Chambers Dictionary

"Concept. Noun; a notion, an abstract or general idea"



ISO 29119

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image courtesy of iStockPhoto.com

Not a guide to action.

ISO 29119 offers some "concepts" that don't provide a useful guide to practice.

Does not represent the practice of testing.

The debate is hindered by ISO 29119 exercising strict copyright control.



What does ISO offer?

Wiktionary

"Template: a generic model or pattern from which other objects are based or derived."

See also

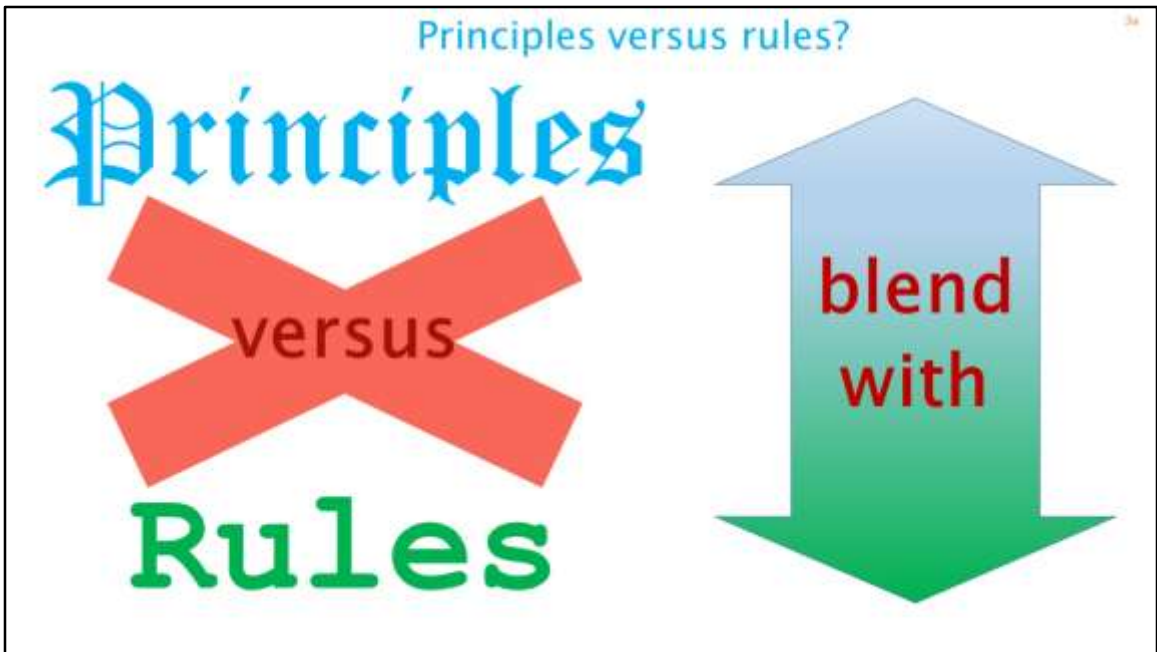
- *boilerplate*
- *macro*
- *stencil*
- *cookie cutter"*

ISO 29119

"All rights reserved ...etc"

In contrast to the stringent requirements for internal audit reporting the ISO 29119 test completion report templates are all about the format, not the substance.

I can't show the part of the standard for test completion reports, but it is woefully inadequate. The template encourages test managers to throw some metrics at the stakeholders without demanding that they provide valuable information.



It mustn't be a binary question of principles or rules.

It has to be a matter of blending principles and rules in a way that works for the context.

I'm going to draw on the work of John Braithwaite, an important regulatory theorist (Australian).

Just search for his name, along with rules and principles.

Blend? On what basis?


← John Braithwaite →

Simple => rules Complex/experimental => principles

1 2 3 4 5
6 7 8 9 0
+ - = / % & # !

BODMAS
 $2 + 3 \times 4 = 14$ (not 20)

Image courtesy: digxalen & FreeOriginalPhotos.com



The arithmetical rule for the order of operations is simple and fixed.

That approach doesn't work for complex problems where we have to experiment using principles to guide us.

The problem faced by the crew and ground engineers in Apollo 13 was such a problem.

There were no rules to guide the engineers. They had to rely on skill, experience and an understanding of engineering principles.

Blend? On what basis?

Simple
=> rules

John Braithwaite

Complex/experimental
=> principles

1 2 3 4 5

6 7 8 9 0

+ - = / % & # !

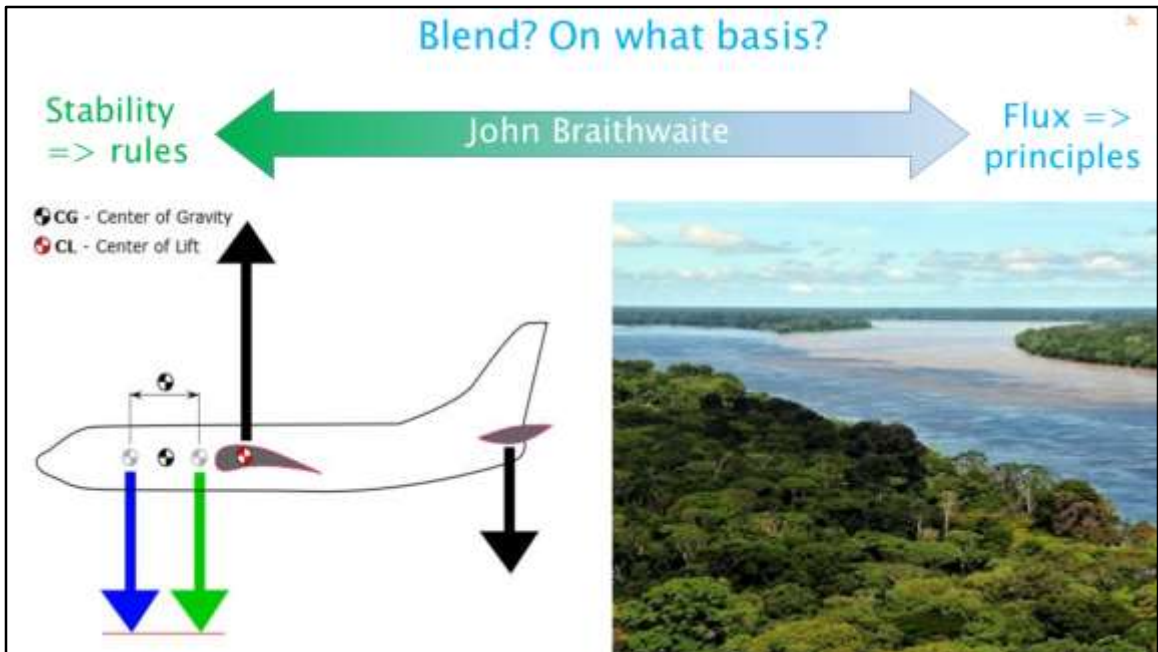
BODMAS

$2 + 3 \times 4 = 14$ (not 20)

Images courtesy: diggsalem & FreeDigitalPhotos.com



Clip from Apollo 13.

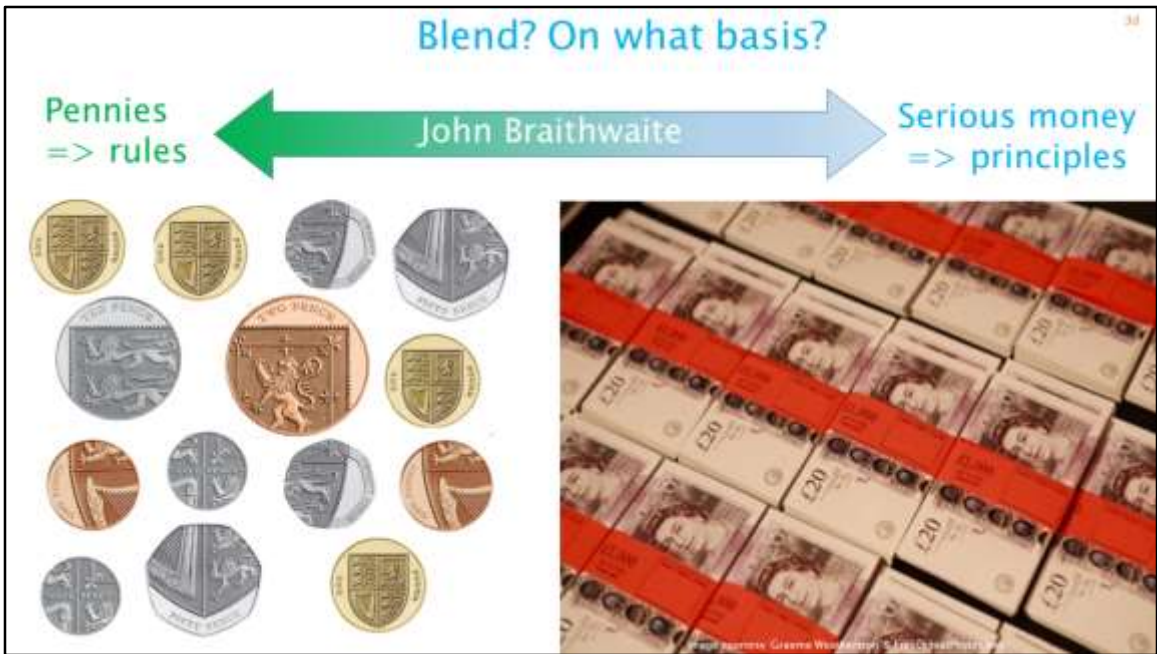


If the problem is stable then rules work. Mechanical engineering is more likely to be suitable for rules.

Managing an ecosystem (eg a rainforest) is more likely to require principles because the problem is in a state of constant flux.

The illustration for stability is a bit meta. It's a diagram about designing aircraft to be stable in flight. Stability is a fairly stable problem.

Aircraft designers follow well understood engineering rules.



Rules work when there is nothing much at stake.

If there is serious money people will game fixed rules, exploiting loopholes and complying with the rules in creative ways that get round the spirit (ie what should have been an underlying, guiding principle).



Blending rules & principles Another heuristic

Locally developed and specific rules that are guided by overarching principles are likely to give the best results.

Principles spell out the desired outcome.

Rules apply them in ways that work locally.

Braithwaite developed his ideas from looking at how regulation of mines worked most effectively.

There had to be clear, overarching principles, but the fixed rules had to be developed locally, taking account of the local geology and conditions.

The local rules are consistent with the principles and interpret them, but they're not interchangeable with other sites.



Rules & principles – let's talk

Julia Black, London School of Economics
The way to make rules fit with principles is by a series of iterative "regulatory conversations" between the regulator and the regulated.

Where's the conversation been in testing?



Image courtesy of iStockphoto.com

You don't get the best outcome by dictating principles and rules from the centre and laying them down as diktat.

We need to talk!



Rules & principles – let's talk

So do we need overarching principles for testing?

If so what form should they take?

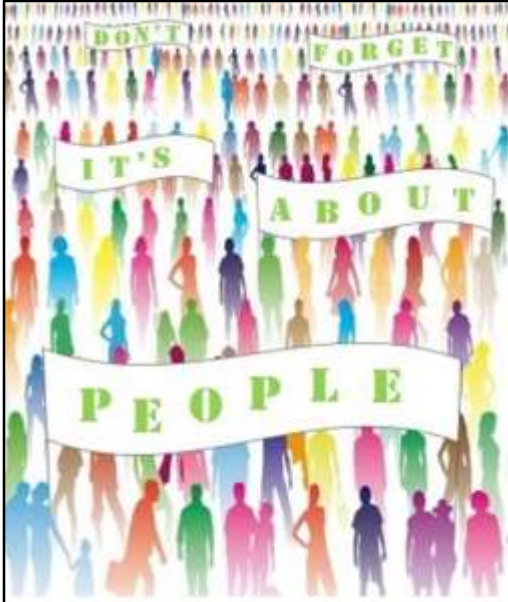
Where should we look for inspiration?

Where has the conversation been in testing?



Image courtesy of iStockPhoto.com

We need to talk!



Wrapping up



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