"A thief who is free well deserves his PhD in laws"
Plagiarism and the Romanian Educational system

EXCLUSIVE:
A Special Report from Our Man in Romania

In June 2012, the Journal "Nature" learned that Romania's Prime Minister Victor Ponta plagiarized in his PhD thesis on the subject of international laws, in 2003: 84 pages are identical to the text of another author (except tiny changes like adding the word "hence" to a paragraph). Other sources say that about 200 pages are more or less doubtful.

The name "Nature" of the journal suggests that it might be something about ecology and wildlife. In fact, however, Nature is more like a journal about science in general with some focus on medical and biological research. But they also publish on other topics – like NASA's Curiosity robot on Mars.

A few weeks earlier Ponta's newly appointed research minister Ioan Mang had to resign after it became public that at least eight of his scientific papers in the field of cryptology were plagiarized. Again it was the journal "Nature" that published it first.

The plagiarism was discovered during a profound political crisis in Romania, and it can be fully understood only in the context of this crisis.Before the scandal, Ponta's PhD thesis was not available to the public. It was archived somewhere, but the public did not have access.

We still don't know how the text was "leaked out" to the journal Nature. Anyway, it took a couple of days until even experienced journalists got their hands on the text. And they did not get an original but a copy of the leaked copy of Nature.

Later we found out more details: Ponta's work included a lengthy literature list - like most other PhD theses anywhere in the world. This literature list does include the book from which Ponta copied. However, the copied paragraphs are not included in quotation marks and the body text of the PhD thesis does not make references to the book. This way the extent of copied material is obfuscated. Hence the quotation of the copied material cannot be considered scientifically adequate – even though Ponta cited the book.

To make things even more complicated: Romania changed the rules for scientific citation in 2004 – one year after Ponta's PhD thesis. The rules were adapted to international standards - in preparation to the looming EC membership in 2007. It appears that – according to the old rules – what Ponta did it was not completely illegal, though the pure amount of copied material is simply overwhelming.

Napoleon taught us: if you want to hide a problem assign it to a commission – not to a single man. In this case they formed three commissions.

The first commission was a kind of permanent panel on ethics in science and was already assembled before the scandal. In this panel Basescu's camp had the majority. The panel scheduled its first meeting on Monday, at 9 am. The research minister belongs to the inner circle of Ponta and knew that he could not really "trust" this panel, as it was dominated by Basescu's people. Around 9:30 am the research minister showed up at the panel meeting and announced that the panel was dissolved. The research minister obviously intended to prevent a final conclusion from the panel.

You probably know how fast these panels usually work: a single week is the blink of an eye in the life of a scientific panel – particular in Romania. After 30 minutes, the research minister had good reason to expect that the panel members were still at their first cup of coffee and had not even opened their briefcases.

This time, however, it was different, and something surprising had happened: The panel members had come well prepared to the meeting and by the time the research minister showed up the panel had already finished its discussion and had edited, signed and sealed its final conclusion – which was against Ponta, of course. Hence, dissolving the panel did not have any effect anymore. The conclusion was already signed. Somehow the panel members had "guessed" what might happen and that they really didn't have any time to lose. (Note: Romania does not have strong industry but

The Political Crisis in Romania

In spring 2012, the socialist Victor Ponta came to power in Romania. He did not win an election but managed to form a new majority in parliament using the support of 'turncoats': A number of members of the former center-right coalition left their party and turned to Ponta. Since then we are experiencing an increasingly aggressive turf war between Ponta and the liberal conservative President Basescu.

Ponta has good friends in Moscow. He symbolizes old communist networks and political tactics – even if he is, at 39 years old, a rather young prime minister.

Basescu on the other hand is looking to the west. In his 8 years in service he overhauled the system of justice and implemented an increasingly efficient system of fighting corruption and organized crime. For this reason, quite a few high politicians and personalities in public life are at risk of losing the huge fortunes they earned with
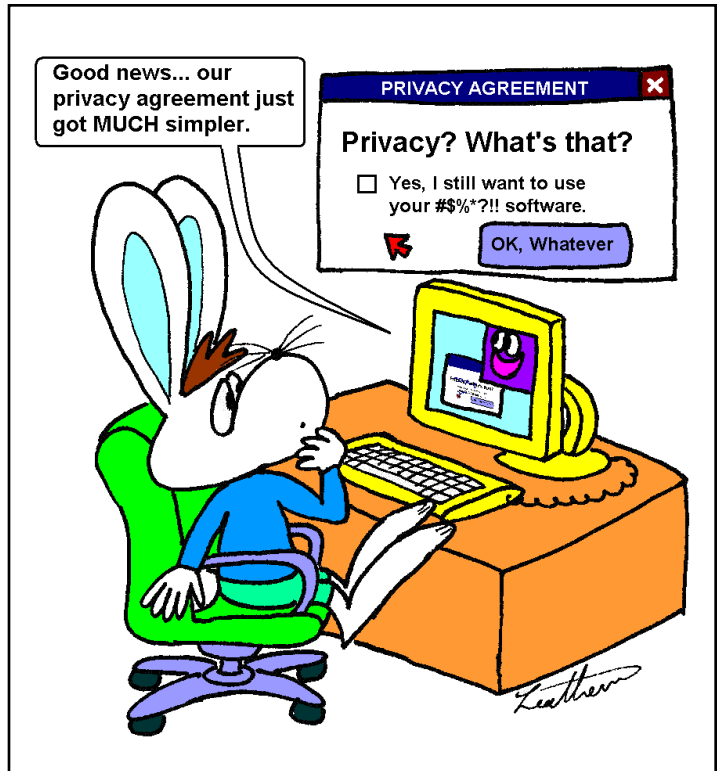
corruption and are even facing long years in prison. This may add to the reasons why a large fraction of the Romanian political class hates Basescu fiercely. After all: 22 out of the 256 Member of Parliament who suspended Basescu are defending against criminal charges (for corruption, money laundry and that like).

At the time of the writing of this article, the parliament has suspended President Basescu temporarily. Ponta received harsh criticism from international observers: they called Ponta's coup unconstitutional and blamed him for destroying Romania's democratic institutions. Right now no one seems to know how Romania's way out of this political crisis might look.

There is a lot more to be said about the political crisis in Romania – all of which, however, is beyond the scope of this article. The interested reader may want to search the news for keywords like Ponta and Basescu.

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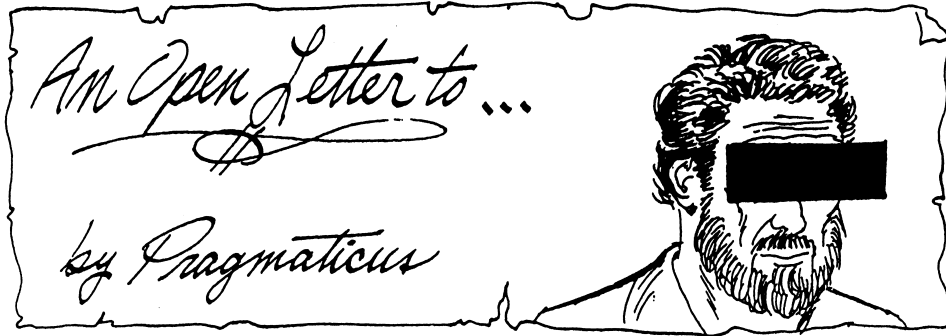Address _____

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An Open Letter to Those Concerned About Obesity

By Pragmaticus

Warning –This column has absolutely nothing to do with software or its practice. But it just might be important to you, nevertheless!

Everyone in the world is by now familiar with the problem of obesity. People all over the world, especially in first-world countries, are concerned about how fat they have become. Other people make millions of dollars, or rubles, or pounds, or francs, giving advice to obese people on how to reduce weight and become un-obese.

Well, I have some fresh insight on the matter. I have just returned from the United States, where I spent most of my life but from which I have been absent for about the last 7 years. And what was the first thing I noticed? (After seeing all the fat people, that is!)

Food portions at American restaurants have grown from normal size in that 7 year period to gynormous. My wife and I stopped at a fast food place and ordered a dinner meal for each of us for the quite reasonable (astonishingly reasonable, in fact!) price of $5.99. We hadn't eaten at this particular fast food chain in a number of years, and in trying to gauge how much food we needed to order, we both agreed that at $5.99, the meal size must be quite modest.

WRONG! Each of our $5.99 meals would have been adequate – for BOTH of us! That is, we could both have eaten happily for the princely price of $5.99! In other words, the meal was twice as big as it needed to be, and twice as big as we wanted it to be.

This pattern was repeated many times over the next several meals. At first, assuming that this had been an anomaly, we continued to order two meals for the two of us. And over and over again – at restaurants ranging from fast food to fine quality to Mom and Pop (it is not just fast food restaurants that are participating in this activity) – we were served more food than we wanted. Twice what we wanted, in fact.

And not only were the meals too large, but so were the plates. The normal plate size seems to have disappeared from the American restaurant, to be replaced by plates that are large enough to hold these double-size meals. And to hide the fact that the eater is eating far too much.

It took a few meals, and the advice of an American friend, to figure out what we needed to do about this. This friend told us that he had given up on ordering two meals for he and his wife at American restaurants, and instead now ordered only one meal, with the request passed on to the waitperson that they would split the meal. Sometimes, he said, restaurants will charge extra for this service. But most of the time, he also said, they will happily accomodate this kind of request at no additional charge. And so we did that, and the restaurants did that, and our problem of over-eating was happily (and inexpensively!) solved.

I got pretty excited about this finding, at first. Here, I kept saying to myself, we have discovered hte problem – in the US, at least – of obesity. People are simply eating about twice as much as they should.

My son, who is pretty aware about these things, threw some cold water on that theory. "You may," he said, "be mistaking cause for effect. That is, restaurants are serving larger meals these days because obese people demand them." That made me step back from my finding a bit, until I concluded that – either way, cause or effect – obesity is linked to double-sized meal portions.

I was already sensitive to this notion of food portions because a few years ago my wife and I spent a few months in Switzerland, cooking for ourselves in a kitchen-provided apartment, and discovered that after about a week we had lost 10 pounds – each! And with no intention of doing so.

When we analysed what had happened, we came up with two thoughts. The first, the one I believe in most strongly, was that the food portions sold in Swiss grocery stores – especially the meat portions, - were about 25% of the size of the portions we were used to buying in the US. And the second was that, in this Swiss city built on steep hills, we were doing a lot more exercise simply to get around than we were used to. We mentioned this phenomenon to a Swiss friend, and he added a third thought – parking was so difficult to find in this city that people simply had to walk further to get where they were going. Whatever! But, in any case, the Swiss people, we began noticing, were all fit and trim, and obesity almost didn't exist there.

Now let's back up a bit to consider another facet of this finding about food. Recall that, at that first restaurant, the food was astonishingly cheap. And that, too, turned out to be a valid generalization for American restaurants. From fine quality to Mom and Pop to fast food, food is ridiculously cheap in the US. We never did,

as far as I can recall, pay more that about $12 for a meal there (that is, one of those double-sized meals that we would split!) If you want to eat enough to be obese, you'll incur no financial penalty in doing so!

I found that particularly interesting in the light of the fact that, while we were there, Americans were deeply concerned about the price of gasoline. It hit $4 a gallon while we were there, and this was high enough that the issue had become a political campaign topic in the then-forming presidential campaign. Now there are two fascinating things about that concern – with food as cheap as it is, one would think that the financial burden of expensive gasoline would be a minor matter. And the even more fascinating thing is that that gasoline, while certainly expensive by American standards, is almost ridiculously cheap. At the same time, in Australia, petrol was selling for around $1.40 (sounds low, doesn't it?!) a **litre**. And given that there are four and a fraction litres to a gallon, that meant that the gas price we were used to was closer to $6 per gallon!

Now, we have travelled a bit of a distance in this column. The main point I wanted to make here was that Americans are accustomed, by excessive portion sizes, to eating too much food at every meal. The fact that food is also cheap simply exacerbates that problem. And the fact that gas is also cheap there, even though Americans think it isn't, is just a fascinating side issue to all of this.

So, people interested in the issue of obesity, I would like to suggest this. Pay no attention to those gurus who offer all kinds of expensive ways to help you lose weight. Simply east smaller meals – don't let those restaurants challenge you into eating too much – and enjoy the reduced cost of living you will earn thereby! How's that for a win-win solution!

To the Editor -

Thanks for the issue. Lovely story by Les Chambers about naked children and Fagan inspection (never thought I'd see those two phrases in the same sentence!!) Les makes an excellent point about bozo reviewers. I always tell students in my classes on peer reviews and inspections that it's important to be specific about the problems you see. I point out that, "The comment 'This sucks,' even if true, is not helpful."

Just today a former client contacted me about teaching a reviews class for his new company, based on the favorable results from three classes I taught at his former company a few years ago. He said that, after implementing peer reviews and making other process changes, within one year 90% of their projects were meeting their schedule targets and 95% were hitting their release dates within two years. He thought the reviews contributed significantly to this performance improvement. That's always great feedback to hear.

Karl Wiegers, Process Impact (and a Software Practitioner subscriber!)

Plagiarism

continued from page 1

Romanian spies are among the best in the world)

The second panel was formed by the research minister and consisted of professors devoted to Ponta. This panel came to the conclusion that Ponta's PhD thesis was completely in order. However, the professors asked to be anonymous – they were concerned about their scientific reputation. Finally, curious journalists found out who the members of the panel were. This way some light came into what happened on the panel: some of the panel members refused to sign the final conclusion. Others said they received the text of the final conclusion already prepared and were forced to sign it. Anyway, the research minister swiftly published the pro-Ponta result and said this panel was the only one that had relevance – from a legal point of view.

The third panel was formed at the University of Bucharest. Sources reported an extremely heated debate on the panel: Some of the members tried to defend Ponta's reputation; others tried to defend the University's reputation and its long term ability to submit internationally accepted degrees. The panel's final conclusion was against Ponta. As a logical consequence the university started the procedure to withdraw Ponta's right to use the PhD title.

If the state-owned University of Bucharest were to really cancel Ponta's PhD, the research minister would have to sign this decision. As the research minister belongs to Ponta's camp, it is considered extremely unlikely that she will sign any paper against Ponta.

You may wonder why do they need panels and signatures of a minister if things are obvious?

The truth is that each academic field has its own specific rules for scientific citation. If a literature academic writes 'to be or not to be' she will probably not use a full-blown citation: everybody knows that this is from Hamlet, of course. Citing this fragment with author, publisher and year of publishing might look ridiculous. In laws, where Ponta did his PhD, frequently long stretches of original text must be copied literally into academic work – from international contracts, for example. Under certain conditions, these text blocks are not included in quotation marks. So, you'd better know the details of the rules in that field before you blame someone of plagiarism.

Any accusation of plagiarism might easily ruin a research career. This is valid for any scientist, not only for PM Ponta. Hence, fairness dictates that the accusations are validated

> ❝ The professors asked to be anonymous - they were concerned about their reputation ❞

> ❝ Someone offered to write a PhD thesis for the former minister of transportation ❞

in some sort of legal procedure, and the final result should bear the signature of the research minister as a high ranking official. In a usual case of plagiarism the signature of the minister is probably only a formal request. In the current political crisis in Romania it constitutes a real obstacle.

In the discussions about Ponta's plagiarism, the authors of the original book had to be asked if they felt that Ponta plagiarized their work. This step is a mandatory in the legal procedure of checking the accusations of plagiarism.

We can see the logic of this request using an example in mathematics.

Let's imagine someone blames author X of having plagiarized a certain mathematical proof. The two proofs (original and alleged plagiarism) might differ in tiny though crucial details which are easily missed by readers outside of the field. So, it is certainly a good idea to ask the opinion of the original author.

In this case, however, the original authors belong to Ponta's camp. They said they were not interested and refused to accuse Ponta, of course.

It is like in a criminal trial: if an assault victim refuses any cooperation with the authorities, the case is in trouble. If the victim says nothing bad happened to her there is little the prosecutor can do – even if it is obvious that she has yellow and green bruises all over her body. Something similar happened when they asked the opinion of the original authors.

During the discussion about Ponta's plagiarism, another high politician - a former minister of transportation (who belongs to Basescu's camp) – reported a related anecdote in a TV talk show: someone offered (in 2002) to write a PhD thesis for him (the former minister of transportation). He reported a dialogue like this:

- "Now you are minister. And it does not look good if you don't have any PhD or other higher academic titles. You could have a PhD on something like "Development of European economy in the last 50 years" - or something like that.
- The former minister responded: "But I graduated in engineering of aeroplanes. I don't know about history of economics."
- "That's no problem. We will do all this for you. You won't have to worry about that"

I suspect the PhD thesis of PM Ponta came into existence in a similar way. My guess is that the PM did not even read his own PhD thesis in detail. I imagine some assistants compiling the stuff. On a rainy Sunday afternoon the PM used one or two hours to leaf through his own "PhD thesis" and concluded: "well, that all looks quite okay."

This is at least how I imagine that things might have happened.

How important is this plagiarism to the common people in Romania?

Very little. Quite a large fraction of Romanians don't know the correct meaning of the term "plagiarizm" ("What has been stolen at all - if they still have their books?") - My personal guess: This group might be as big as 20% or 30%.

Even more don't understand what went wrong in Ponta's PhD - after all: the book in question appears in the list of cited literature.

Some understand the problem but don't care. They have to worry to get the money they need for their and their family's living. For them this discussion is something like the question of whether the president wears his wedding ring at the left or at the right hand.

Those who understand the problem and care might be as few as 2% or 3% - but this again is a personal "guestimate"

Nevertheless – Ponta's plagiarism is a very handy tool for Basescu's camp: With this weapon they can bother Ponta whenever they want.

Imagine a lion in a cage. Some cheeky boys find themself little sticks of wood and use them to bother the lion in the cage. The lion can roar and lift his claws. Finally, however, what the lion can do is extremely limited. On the other hand: the boys won't kill the lion and will not even hurt him.

In this analogy Ponta is the lion and the plagiarism is the sticks.

A thief who is free well deserves his PhD in laws

The Romanian mass media has many times used this phrase in the context of Ponta's plagiarism. The story behind this expression is an irony, a joke, used by Romanian professionals in laws. The story goes like this:

A thief is caught and accused. He defends himself in front of the court – without a lawyer. Despite all the odds against him, he is not found guilty – because of his excellent defense.

The phrase expresses professional respect for an outstanding legal performance that deserves appreciation – independent of the "moral" evaluation of the case (the fact that he is a thief).

In Ponta's case: it is obvious that he is a thief – a thief of intellectual property. From a "common sense" point of view, things are completely clear and without doubt. However, due to his influence and the political and legal tricks of his camp he cannot be convicted. In this case: does the rule apply that the thief deserves his PhD?

> ❝ In Ponta's case: it is obvious that he is a thief - a thief of intellectual property ❞

A Journalistic Question For YOU to Solve!

Here's a dilemma for you:

There's a story in the Australian newspaper IT section this morning (July 24) that says the Australian Health IT system "went live despite known bugs." That sounds like a colossal IT disaster in the making. Suppose that you're the editor of the Software Practitioner. Don't you lick your lips at the thought of covering that story in SP?

But there's a problem. The Australian, one of the many newspapers in the Rupert Murdoch stable, is well known for running biased opinion pieces as if they were news stories. They are particularly virulent when it comes to stories that make a government, which they tend to oppose with all their editorial might, look bad (if that strikes you as odd, think of the behavior of such Murdoch news media as Fox news in the US or the now-defunct London-based News of the World that got dragged down in the English phone-hacking scandal). And bear in mind that the Murdoch press is so lacking in journalistic integrity that Australia is considering passing a law to permit the government to punish news media that provide biased news (given the ugliness of any government monitoring news coverage, you can see how bad the situation has gotten here).

So there you are. The basic question you have to answer is "What's the chance that this is a real news story, not a trumped-up political opinion piece?"

Here are some more details to help you make up your mind. The system in question is a national e-health records system, a consumer portal where people enter personal information, medical history and medication details for later retrieval by medical specialists who need that information to make diagnostic decisions. So far, that seems like a fairly important system, one that needs every bit of IT quality care to make sure it isn't put on the air prematurely.

But here's where the story gets sticky. The opening salvo of the Australian's news story is "The Gillard government [Julia Gillard is the present Prime Minister of Australia] knowingly launched the ... system despite warnings from its own e-health agency that it had more than 60 high-severity and critical bugs."

Now notice the ordering of that sentence. The first several words are an attack on the government ("the ... government ... knowingly launched...") whereas the real meat of the story ("despite warnings ... of high-severity and critical bugs") comes last. In other words, whoever wrote that story was more interested in making

> ❝ **The system in question is a national e-health records system, a consumer portal where people enter personal information, medical history, and medication details...** ❞

the government look bad than in identifying a problem needing solution.

One of the things it is most easy to like about American journalism is that it is almost always focused first on problem-solving, and only secondly on political point-scoring. The opposite, unfortunately, is true in Australia, where placing blame is often more important than solving problems (a recent case in point was the disastrous floods here a year ago, where a huge amount of effort is being spent on trying to find fault with engineers who managed water releases from a dam whose water was critical in the flooding, instead of trying to solve the problem of the flooding itself, which was largely a unique weather phenomenon).

So there you have it. Is this a story the Software Practitioner should feature, on the grounds that it may result in an IT disaster so huge that the whole world will soon know about it? Or is this a story of little interest to IT readers in that it is more about Australian politics than IT? Oh, and bear in mind that a previous IT disaster involving an Australian health service, the one where someone decided to go live with a state of Queensland system without bothering to run it in parallel with the old system it was replacing, is still causing huge headaches and costs to the people of Queensland. That is, there is plenty of history here to say that this problem may be very real and very large.

OK, Mr/Miss/Ms/Mrs editor. What do you do?

The First World And Manufacturing

Like most first-world countries, Australia has a significant problem sustaining a successful manufacturing industry. Low labor costs in the rest of the world make it difficult for manufacturing to be successful there.

Because of that, Australia has begun several initiatives to explore how to overcome this problem. The following story, from the Boeing On-Line News, discusses the role of the Boeing Company and its Australian branch in helping Australia address that issue.

Boeing recognized as a manufacturing success story in Australia

By Allison Bone

Boeing Australia has been playing a key role in the development of a new roadmap for the future success of Australia's manufacturing sector in the face of increasing regional

> ❝ **Boeing Australia has been playing a key role in the development of a roadmap for the future success of Australian manufacturing...** ❞

competition and a high Australian dollar.

Ian Thomas, president of Boeing Australia & South Pacific, was appointed to Australian Prime Minister Julia Gillard's Manufacturing Taskforce last year along with key industry leaders, senior government ministers, unions and research organizations. They were charged with the responsibility of developing a shared vision for the local manufacturing industry.

"Boeing Australia is a significant employer in the Australian manufacturing sector and an important industry partner. Participating in the Manufacturing Taskforce has provided the company with an opportunity to help shape the future direction of the local industry and to share some best practices as we focus relentlessly and globally on enhancing growth, productivity and innovation," Thomas said.

Boeing's approach to manufacturing in Australia was highlighted publicly by the prime minister as she received the panel's final report, "Smarter Manufacturing for a Smarter Australia."

Prime Minister Gillard said despite the challenges facing the manufacturing sector, there were some great success stories, with "strong businesses like Boeing, making the Dreamliner" components in Australia.

Michael Edwards, general manager of Boeing Research & Technology-Australia, was a member of the task force's technical working group.

"Boeing has a demonstrated record in Australia of developing technology to create a high-value manufacturing environment," Edwards said. "There has been tremendous value in bringing businesses like Boeing together with industry leaders, unions, research organizations and the government to develop a shared vision for the future of the manufacturing sector."

The task force report made 41 recommendations focused on policies around innovation; making research organizations more business facing; developing skills and education; energy and climate policy; procurement, including for the defense sector; lifting management capabilities; and trade.

Boeing Aerostructures Australia has some 1,500 employees in Sydney and Melbourne who manufacture complex aerostructures, including the moveable trailing edge for the 787 Dreamliner.

> ❝ **The task force report made 41 recommendations focused on policies around innovation...** ❞

Programming Languages
Of Birth and Death

Robert L. Glass

Over the years there has been a plethora of programming languages. Some of them "stick" and become commonly used. Others – most, in fact - fall by the wayside.

Why does that happen? Especially, why don't new languages replace old ones? After all, the popular C programming language and its variants have been around for over 35 years now.

A couple of researchers at the University of California/Berkeley decided it was a question worth answering. To find an answer (interesting issue – how would YOU have gone about answering that question?) they polled tens of thousands of programmers and combed through 300,000 computing projects compiled on the open source repository SourceForge. Specifically, they were seeking to learn why old languages persist and new ones are not adopted.

Here's what they learned:

1. Language designers don't always have practical objectives. "There's a tendency to solve a problem that no one has ever had," say these researchers.
2. Programmers don't always learn all they should about a new language, and when they run into problems down the road they give up on it.
3. The authors called this third reason "complacency," but it would better be called "recalcitrancy." Programmers plateau after learning several languages, and see no need to learn more. The researchers note that "by the time [programmers] hit 35-40 years old, they often move into management ... and at that point there's little motivation to learn new languages.' They fail to note, of course, that once programmers move into management they have little use for new languages.

The article reporting on this study (see reference below) was accompanied on the web by some reader reactions.

One said "Over time, you'd expect that as developers get older, they'd get more wisdom, and that's why they stop learning new languages." (These researchers had made the opposite point).

Another said "As I got older, I learned one thing – languages don't solve problems, people do."

Yet another came to the defence of C, saying "The reason no one has been able to improve on C is because there is nothing wrong with it – it provides a level of abstraction above assembler, while leaving the problem solver in control – what else does it need to do?"

The article said the study was partly motivated by the fact that Google is introducing two new programming languages – Go, intended to replace the C family, and Dart, aiming at JavaScript.

Information source:
"Why do some programming languages live and others die?" Caleb Garling, Wired Enterprise (online), June 2012

Software Engineering Employment Now Bigger than that of Traditional Engineering (!!!)

"Software engineering is a full-fledged profession in its own right" says the "Thank You" column written by Mike Wing in the May, 2012 issue of ACM Sigsoft's Software Engineering Notes (SEN). To support that claim, he cites these statistics from the US Bureau of Labor Statistics (2010):

- More people do software engineering work than traditional engineering work (1,759,500 to 1,362,500).
- The total number of people involved in software work is over 2 milion (counting 900,000 software developers, 300,000 programmers, 500,000 systems analysts, and 300,000 CIS managers.
- Perhaps 8 million people around the world do software engineering

Based on this data, Wing (who is writing this as his final column for SEN) suggests that the time for a National Academy of Software Engineering has arrived. He goes on to say that "software engineering is so huge that it is beyond any single organization's ability to represent, whether SEI, IEEE, ACM, or whatever. Even though various groups still keep trying to define the one process or body of knowledge to bind them all, perhaps some day they will realize that the more they tighten their grips, the more software will slip through their fingers."

He sees himself as an Agile advocate, but at the same time he says "There should be room for each to do what is appropriate for their own circumstances." But then he can't resist, and takes a swipe at "big brother process," saying "if big process provided any advantage in the commercial world [he distinguishes between the government world and the commercial world] some company would have taken over the world by now."

Cradle to the Grave: We are happier when we're in control

by Linda Rising,
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There's no doubt about it. We like to be in control. In this article, I'm going to share some interesting research that shows we have a definite preference for control in all areas of our lives. We are born with it and we die with it.

Let's start with an experiment that Martin Seligman and his collaborators performed in the 1970s. Animals in harnesses were given a series of shocks from which they could not escape. A group of control animals, which had not been harnessed, also received shocks, but were able to move out of the way.

In a follow-on study, researchers tried to teach the same two groups from the earlier experiment to jump a hurdle, again to avoid shocks. The control group quickly learned to escape the painful shocks, but most of the formerly harnessed animals did not—even though they were set free in the second experiment—they seemed resigned to their fate and suffered the shocks. A third group with no prior experience with the shocks learned to jump the hurdle but not as quickly as the earlier control group.

Seligman suggested that the animals in the harnessed group had learned from the inescapable shocks in their initial experience that nothing they did made a difference—that they were helpless to control their fate. Like the original control group, they had transferred to the new situation the lesson they had learned—something Seligman called "learned helplessness."

This discovery has had a tremendous impact in many areas of psychology. Hundreds of studies have been done since and the results show clearly that we can "learn" that we don't have control over our lives and that the consequences of this learning can be dire. Learned helplessness can affect future motivation to try. It can suppress the immune system and lead to clinical depression. According to psychologists, our most fundamental sense of well-being depends on having control over our environment and recognizing that we have control.

But we live in a country where we believe that anyone can be president! We firmly believe that hard work and determination conquer all! Most Americans should feel pretty good with regard to control. This "helplessness" should be rare in our modern society, but research shows the contrary. In 1966 and again in 1986, pollster Louis Harris asked a series of statements to test this, for example, one of the questions was: "What I think doesn't matter anymore." In 1966 36% agreed, while in 1986, 60% agreed.

Psychologists are continually trying to measure whether we are happy or not. Studies show that people in rich countries are happier than people in poor countries, but money doesn't matter as much as you might think. Once per capita wealth crosses from poverty to adequate subsistence, further increases have almost no effect on happiness. You find as many happy people in Poland as in Japan, for example, even though the average Japanese is almost 10 times richer than the average Pole. And Poles are much happier than Hungarians (and Icelandics much happier than Americans) despite similar levels of wealth.

Within countries, we see the same results over time. In the last 40 years, the per capita income of Americans (adjusted for inflation) has more than doubled. Does this mean we have more happy people? Not at all. In Japan, per capita wealth has increased by a factor of 5 in the last 40 years, again, with no measurable increase in the level of individual happiness.

The American "happiness quotient" has been going slowly but consistently downhill for more than a generation. While the American gross domestic product more than doubled in the last 30 years, those describing themselves as "very

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happy" declined about 5%. The same pattern can be seen when respondents are asked how happy they are—with their marriages, their jobs, their financial circumstances, and their places of residence. It seems that as American society grows wealthier and Americans become freer to pursue and do whatever they want, Americans get less and less happy.

Here's an intriguing study. Three-month-old infants were placed face up in an ordinary crib with their heads on a pillow. Mounted on the crib was a small umbrella, with animal figures. The animals were not visible to the infants, but when they turned their heads on the pillows, a small light would go on, making the dancing figures visible for a little while, then the light would go off. When the infants turned their heads, by chance, they were surprised and delighted, and they quickly learned to keep the figures visible by turning their heads. They would do it over and over again and continued to be delighted. Infants in a control group were paired with those in the first group. Whenever an infant in the first group turned his head, he also turned on the light for the corresponding infant in the second group. As a result, the infants in the second group could see the dancing figures just as often and for just as long as their controlling partners. At first, the infants in the second group showed just as much delight in the experience, but after a while they lost interest.

The different reactions of the two groups suggest that it's not the dancing animals that delighted the infants, but having control. The infants in the first group kept enjoying the display because they seemed to know that they made it happen. They seemed to be saying, "I did this! Isn't it great! And I can do it again whenever I want!" The infants who got the display for free did not have this exhilarating sense of control.

As Barry Schwartz explains the results in his book *Paradox of Choice*:

Infants have little control over anything. They can't move their bodies toward things they want or away from things that are unpleasant. They don't have much control over their hands, so grasping and manipulating objects isn't easy. They get poked, prodded, picked up, and put down at unpredictable and inexplicable times. The world is just a set of things that happen to them. Perhaps this is why the occasional bits of evidence that they can control some things are so salient and so exciting.

That was the cradle story. Here's another study that shows that our love of control lasts our entire lives.

A group of nursing home residents was given instruction on the importance of being able to take care of themselves. A second group was given instruction about how important it was for the staff to take good care of them. The first group was given some small responsibilities for their lives each day and a plant in their rooms to take care of. Members of the second group had no responsibilities and had plants cared for by the staff. Those in the first group were more active and alert and reported a greater sense of well-being than those in the second group, and what is most significant, those in the first group lived several years longer, on average, than those in the second group.

A few years ago I made a trip to Okinawa on business. Before my trip, I read the *Okinawa Program*, a report of a 25-year-study of the Okinawan "elders," the longest-lived people on the planet. As a result of the study, several indicators were identified that seemed to correlate with longevity. At the time, I thought that one in particular stood out: there is no word in the Okinawan dialect for "retirement." As these people age, they may reduce their working hours or take a less strenuous position, but they still contribute to their communities and they continue to feel they are making a difference; they are still needed. Now that I have read Seligman's research, I realize they also have more control over their lives. They "live until they die" and, as a result, they live longer.

I believe that based on this research, there are things we can do in our own lives and in our workplaces to improve our personal level of control and, as a result, our personal level of happiness. Since this year I celebrated by 70th birthday and I am still working and my friend, Robert Glass, is now in his 80s and also still an active contributor, I think we are both good examples of this desire or need to still be out there.

Recent research shows that IT workers feel that better recognition combined with the ability to work flexibly would make them more productive. More than two-thirds of those surveyed cited regular feedback from management as the single most important factor in making them feel motivated. Seven out of ten added that being able to work flexibly would make them more productive.

Sebastian Bailey, a management consultant, suggested that the results showed that companies could do more to keep employees happy and motivated. Even inexpensive measures could make a big difference in most organizations. According to Bailey:

By improving staff recognition and feedback, managers can help people feel motivated, energized and valued within the business.

From the employer's perspective this can lead to greater staff retention and markedly increased levels of productivity. From the employee's perspective it boosts their sense of progress and effectiveness.

As well as offering flexible working options Bailey maintains that a more collaborative working style could also be beneficial, particularly in IT where staff often work in isolation.

Companies that adopt a more collaborative approach seem to show increased productivity and a marked shift in the bottom line.

Business leaders need to think more about how they can incorporate such a culture of collaboration and recognition.

An experiment conducted in the same plant where the famous Hawthorne Effect was discovered in the 1920's, gave workers on a number of assembly lines training and then complete control and responsibility for running the lines without any supervision. Within three months output trebled and rejects were reduced to virtually zero.

I believe this research combines nicely with some information I discovered in reading about appreciating others in the workplace. My good friend and colleague, Mary Lynn Manns, and I have written a book called *Fearless Change: patterns for introducing new ideas*. One of the patterns is called "Just Say Thanks." The pattern cites the obvious benefits for this: workers feel good when they are appreciated and are also likely to volunteer to help in the future. What I was slow to realize is how beneficial expressing thanks can be for the giver. The benefits are enormous. In the *Paradox of Choice*, Barry Schwartz shares this observation and suggestion:

Individuals who regularly experience and express gratitude are physically healthier, more optimistic about the future, and feel better about their lives than those who do not. Individuals who experience gratitude are more alert, enthusiastic, and energetic than those who do not, and they are more likely to achieve personal goals.

Practice an attitude of gratitude. We can improve our subjective experience by consciously striving to be grateful more often for what is good about a choice and disappointed less by what is bad about it.

Research suggests that gratitude does not come naturally to most of us most of the time. Usually, thinking about possible alternatives is triggered by dissatisfaction with what was chosen. When life is not too good, we think about how it could be better. When life is going well, we tend not to think much about how it could be worse. With practice, we can learn to reflect on how much better things are than they might be, which will make the good things in life feel even better.

If you keep it up, you will find that it gets easier and easier, more and more natural. You may also find yourself discovering many things to be grateful for on even the most ordinary days.

Appreciating colleagues for their contributions lets them know how influential they are in the workplace. This enhances their feeling of control over their work day. As a manger, change your strategy and you change the way a company runs. Involve team members in decisions. Once the folks at the grassroots realize they own the problem, they also discover that they can help create and own the answer—and they respond quickly, aggressively, and creatively, because they have a closer understanding of what's going on. It's really all about collaboration and helping each other be the best we can be. It's another one of those—easy to say, but so hard to do—powerful motivators.

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> ❝ An experiment conducted in the same plant where the famous Hawthorne Effect was discovered in the 1920s gave workers on a number of asembly lines training and then complete control and responsibility for running the lines without any supervision. Within three months output trebled and rejects were reduced to virtually zero. ❞

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A Couple Of More Frequently Forgotten Fundamental Facts about Software Engineering

by Bob Corrick, a software practitioner who began programming in avionics and in applications for printing, now working in management information. Based on a continuing interest in making better systems for people, he is beginning to write about that. Email: bobcorrick@hotmail.com

In 2001, Robert L Glass published *Frequently Forgotten Fundamental Facts about Software Engineering* in IEEE Software[1]. (It later was expanded into an IEEE Computer Society book with the same title). I found it again a few weeks ago, and took up his invitation: *I'm especially eager to hear what additional facts you can contribute.* I wrote to Robert and he asked me to explain my suggestions.

I was struck by the pairing of these forgotten facts: *RD1—One of the two most common causes of runaway projects is unstable requirements. For the other, see ES1. ES1—One of the two most common causes of runaway projects is optimistic estimation. For the other, see RD1.* This made me wonder about a common factor, and I thought: what about the missing requirements and estimates? While thinking about examples, to elaborate on this, I found Jeff Attwood's write-up[2] about the book version of *Facts and Fallacies*,[3] from which I quote: *"Missing requirements are the hardest requirements errors to correct."* If I'd bought the book I would have had the answer...

But what about missing estimates? Some people suggest deliberately not doing estimation. Mike Cottemeyer[4] refers to that, and then makes the excellent point that good estimating requires a shared understanding, by the team: *"problems [in sharing understanding] can result from any number of organizational dysfunctions. Some of the most common are on the product side: in-sufficient business involvement, insufficient understanding of the business problem, and insufficient requirements decomposition."* And in the full article[5], he writes: *"and the wrong kind of discovery going on during planning... too much discovery going on... too much unanticipated work."*

It turns out that lack of understanding contributes to runaway projects: lack of requirements, and lack of the shared understanding that is needed for good estimating. The remedy for this is discovery: finding out about what you don't understand. The stages of discovery were described by Phillip G Armour in a popular article *Orders of Ignorance.*[6] First Order Ignorance is lack of knowledge: "I know that I don't know something." You can overcome this level of ignorance just by asking the right questions. Second Order Ignorance is lack of awareness: "I don't know what it is that I don't know." To overcome this level, you need some common practice: speaking with other people who have an interest in the outcome, or imagining yourself in the position of different types of user or customer. Third Order Ignorance is lack of process: "I don't know how to figure out what it is that I don't know." At this level you are in real trouble.

Now I would like to suggest a couple more fundamental facts.

OL1 - The structure of the organization – its communication paths – is reflected in its systems: this is Conway's Law[7] *"organizations that design systems (in the broad sense…) are constrained to produce designs that are copies of [their] communication structures."* As Russell Ackoff[8] said: *"we ought to stop managing actions and start managing interactions".*[9]

OL2 - Organizational learning can amplify the effectiveness of people, tools and techniques. As John Seddon and Bendan O'Donovan write:[10] *"Within all organisations, we posit that there is a systemic relationship between the underlying thinking of the managers, the ability of the system to improve and performance to the end user."*

Or are they fallacies?

(Footnotes)

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Elemental Design Patterns

By Jason McColm Smith
Published by Addison Wesley, 2012

Review by Bob Corrick

It's patterns all the way down.

The author sums up his own research at the end of the first chapter: "Elemental Design Patterns are the building blocks of computer science." He is not suggesting that we build software pattern by pattern - rather that patterns, in their simplest form, are there to be discovered and can be used to assess and improve programs. The research produced a pattern discovery tool "SPQR", and the twenty or so conceptual patterns are shown in diagrams and in code examples. The examples mostly use C++ or Java, and some use Objective C or C.

Overall the book is thoughtfully and enthusiastically written, and well produced. Sometimes the author's enthusiasm packed rather more into a paragraph than I could digest, but it hangs together on re-reading. I liked his use of "reliance" to refer to the relationship between parts of patterns, which seemed a fresh and more accurate word to me than "dependency", which would have suggested something rather too inflexible. It all seems accessible to a programmer who wants to know more about patterns, whereas the original Design Patterns book [GoF] seemed difficult to apply at the time.

Elemental design patterns are at the simplest level: calls from one place to another in a body of software mean that some class or module relies on another, forming a pattern. Some of the pattern names are familiar and well-researched (cohesion, coupling, recursion) and all are grouped together in some simple diagrams. These "design space" diagrams help to distinguish between the various patterns, based on the similarities in location, type, and name of the related calls.

Six patterns from GoF are described in detail, broken down into elemental design patterns. To support this, Pattern Instance Notation (PIN) has been used - unfortunately, some of the PIN diagrams look like a jigsaw puzzle. I can't immediately pick out the lines that relate labels to components, and I couldn't help wondering what Edward Tufte (Tufte wrote a number of books on the art of using diagrams to make a point, his most famous being The Visual Display of Quantitative Information) would have made of these. The writing rescues this section, and it is particularly good on refactoring.

Elemental design patterns can be formed by relationships between objects, fields, and types as well as between methods. The analogy with the periodic table of elements is backed up by an appendix on the mathematics (rho-calculus), which I freely admit I haven't read.

I've learned more about software in general and patterns in particular by reading this book, and I'll keep it.

[GoF] "Gang of Four": Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides. Design Patterns. Addison Wesley, 1995. Eighteen of the 43 references in the bibliography have the word pattern in the title.

The Language of Mathematics: Utliizing Math in Practice

by Robert Laurence Baber
Published by John Wiley & Sons, 2011
Second review, by Robert L. Glass

Back in March I did a review of this book here in the Software Practitioner, finding fault with it for expecting its readers to understand enough Math to grope their way through the first introductory chapters which, I felt, were not understandable without frequent back and forth referral to an Appendix that provided necessary explanations and definitions. Becase once I discovered that problem I quit reviewing, I promised that I would do a more thorough review of the book at a later time. This is that second and perhaps more thorough review.

I also said in that first review that I am a Math skeptic, someone who majored in Math as an undergraduate and continued on to earn a Master's in Math, but someone who had found very little use for what he learned in Math education for the typical software practitioner.

Wo now to that second rreview. First of all, I am intrigued at the daring that has caused this author to propose a "new and unique" way of looking at mathematics, and to challenge current math pedagogy as presenting an unnecessarily complicated way of approaching the topic of Math. The book stresses througout the simplicity of Math and its ability to represent problems and solutoins "precisely and unambiguously." For the person who sees math as a suitable problem-solving approach for the problems they typically encounter, this could indeed be a groundbreaking (earthshaking?!) book in presenting a whole new approach to understanding and applying mathematics.

Alas, I could not join that groundbreaking/. earthshaking readership group. Readiing the book again to try to put myself into a "problem-solving with mathematics" mood, I found myself increasingly skippiing through the material that the author intended to show me how appropriate math was for problem-solvking in various domains. The book presents examples of math being used on a variety of problems, from simple toy problems such as the kind academic Computer Scientists love to play with, to honest-to-goodness real-world problems like the 56 pages it devotes to solving a problem involving a shopping mall door controller. But I found mysefl resisting every effort the auhtor made to convince me that his problme-solving approach is superior. For exaqmple, I did not find the 50 (laborious) pages of the book devoted to "values, variables, functions and expressions" to simplify much of anything for me. And I found statements like "...even if two expressions are not equal for all values of the variables..., one may sometimes be substituted for the other" hardly reassuring regarding the "precise and unambiguous" nature of such explanations!

Early in the book the author says the "Language of mathematics is simple" but "quite different from any language you know." In doing this review, I still find myself doubting the first claim, but I can certaily agree wth the second.

But I still won't give up on this book. If there is any reader out there in SP-land who sees this book in a more objective light than me (this offer does not extend to the author!), I'd be happy to present a third review from you later on!

Dither your organization to become an innovative software shop.

Larry Bernstein and C.M. Yuhas,
former Bell Labs software project managers

During our 40 years at Bell Labs our behaviors were inspired by the spirit of technical excellence, innovation and integrity. Here are some of the ways that we encouraged innovative thinking in our software shops.

Better safe than sorry is hardly an appropriate mantra for software development shops. Ambitious goals and a tolerance for some false starts are productivity stimulants, but it is vital to keep commitments reasonable and clearly separated from goals.

To advocate innovation and the exploration of new technologies that push back the frontiers of science is about as radical as baseball or apple pie. Invention is the process of discovery and innoviation is the process of taking a new idea and making a successful business with it. Who doesn't want a productive, creative staff? Everybody wants to prevent burnout and reduce bureaucracy. The catch comes when it is time to pay the bills, meet the payroll and delight the customer. We fear relaxing control and granting enough time to allow innovation to happen. Too many managers then opt for the committee decision, the conservative estimate, the established method that will protect their position and hope good ideas will happen anyway, without a specific plans or nurturing. This fearful stifling need not be. There are specific strategies that that we have successfully used that free the creative impulse without causing chaos or violating good business practice.

Technical people seem to be more creative when they are somewhat uncomfortable. They need to be challenged to thinking out-of-the-box when they are faced with conditions of intellectual uncertainty that investigators at the University of Michigan call "dither."

We dithered by setting our goals higher than the customer commitments. As project managers our part of the bargain was to provide the extra materials and support needed to attain the goals, recognize divergent thinking and heap praise on even partially achieved goals. Of course we needed to make sure that the features committed to the customer were realized. Our employees were urged to find ways to meet the high expectations even if they searched for technology and found none. They often had to invent new tools or algorithms to meet the expectations and in a surprising number of cases they met the challenge.

In practical terms we turned the usual reward system upside down and praised more highly the engineer who says, "I'll try to get ten features done in six months; but, I am sure I can get four working and delivered," and actually produces eight than the engineer who says, "I'll get five features done in half a year" and does only that.

Another way to raise the dither index is to encourage a tolerance for error. It is good to make mistakes, it is bad to repeat them and a three-peat of the same error becomes intolerable. By choosing prototyping as the preferred development approach and by opting for small design groups at the start of a project instead of large interdepartmental committees, we signal to the teams that we are willing to accept errors under controlled conditions and when they have a rationale explaining them.

Not everything works in a prototype, but it is on a small enough scale so that an unusual thought can be transformed into a concrete working feature that may or may not work and be novel. This is a practical way of failing small so that you can succeed big. A rule of thumb for innovative organizations is that their success rate should approach 80%. Contrast this with good inventive organizations doing research; their success rate is 10-20%.

Bernstein was a Chief Technology Officer from 1991-94 for the Bell Laboratories network management development business unit comprised of 2,000 people with 30-40 deployed products. He set up a technology transfer process aimed at creating new products and services for the customer base and making software development more effective and cheaper. Input came from customers, sales teams, internal and external researchers, developers and formal, chartered technology assessment efforts to an Office of Technology Planning (OOTP).

The OOTP held monthly meetings that the CTO chaired to establish technology priorities. For example, a study of Object Oriented Database technology in 1992 showed it to be too immature for wide use. Two projects stopped using it before they reached the point of firm commitment to vendor products. On the other

The Funny Thing about Fundamentals

Almost by definition, 'fundamentals' aren't difficult to achieve. We're all capable of executing them. All they require are equal parts 'decision', 'determination' and 'discipline'. A quick example that comes to mind is the perennial issue of meetings that start late… and finish late, thereby delaying the next meeting and so on and so on until our day ends in disarray. Really not worth discussing, except this organizational productivity sapping behaviour is ubiquitous.

I've never really understood the concept of being 'late'. We make a 'decision' to be somewhere at a specific time. With 'determination' we carve out the time for the meeting, and the time to arrive on time allowing for inevitable delays, and then protect that block of time with tooth and claw from all assaults from both friends and foes, and then we apply the 'self-discipline' necessary to meet our self assigned goal of 'arriving on time'.

There's nothing difficult here. Yet? I know people who have lost well paying jobs because they deservedly earned the reputation of being unreliable. As I said at the start… I don't get it.

Of course? There is a reason we can't get to the next meeting on time. We start and end meetings 'on the hour'… and then wonder way we can't get from point 'A' to point 'B' instantaneously – as if the Start Trek Teleportation device is installed next to the coffee machine in each meeting room. Here's a clue. Meetings start at ten past the hour and end on the hour. This is a simple concept – give ourselves time to take a bio break.

Entire management movements are based on some very very simple, easily achievable 'fundamentals'.

Part of the Kaizen approach (Continuous Improvement) is based on five concepts even a five year old child can get their head around. I'm referring to the 5S Japanese concepts - seiri, seiton, seiso, seiketsu and shitsuke … which are with great abandon transliterated into English as Sort, Straighten, Shine, Standardize and Sustain.

Once again, there's nothing unachievable here. And the concepts are as applicable to our office space as they are to the production floor.

Sort – remove everything from the work environment that does not contribute to the work we do there. A precise way of saying – remove the clutter.

Straighten – find a logical place for everything and keep everything in it's place. Or if you prefer? Organize our workspace so that it makes sense, and keep it that way.

Shine – Keep the workspace clean. No translation is needed or necessary, we all know what 'clean' means.

Standardize – Make the three concepts above, the central way of thinking and behaving in the organization. This is a non-humourous version of the 'form' of the joke.

Rule #1: 'do the right thing'

Rule #2: When in doubt of what to do? Rule #1 applies.

In other words? "Standardize" is a strong reminder that we're serious about Sort, Straighten and Shine.

Sustain – Create a culture embedded with the discipline to maintain the 5S… ie? Yet another self-referential reminder that we're really really serious about Sort, Straighten, Shine and Standardize and Sustain.

I don't think there are too many organization who couldn't use a good dose of 5S (*as he looks around his office and shivers just a little bit*) and I don't know of anyone (*sneaking a peek at a mirror and shaking his head sadly*) that is incapable of implementing 5S as a way of thinking. (*one New Year's Resolution duly noted*).

Just like my earlier example of showing up on time, there's nothing really difficult, or complicated about 5S, There's nothing there that anyone could find difficult to accomplish. Nothing there that anyone could object to – who wants to argue in favour of a messy workplace?

Yet? There must be something difficult about fundamentals such as showing up on time, or 5S because they are not common practise. Despite being easy as I claim them to be, something is stopping us from achieving them widely and on a regular basis.

With myself as the nearest example to use as a bad example… I'm never late because of what I do for a living. I can't be late. If I'm late I can't do what I do. Being 'late' is literally a 'showstopper' for a speaker. It's obvious (even to me) that being 'late' has a huge negative value to me. I literally cannot afford to be 'late' – case closed.

On the other hand? My desk will make a great 'before' picture of a 5S implementation if I can somehow convince myself to a) make the decision to implement 5S in my office, b) determine to carve out the time to make it happen, and c) instil the necessary 'dedication' to make it happen.

Part of the above is going to rely on a back of the napkin calculation of what it costs me each year to maintain my messy status quo. Conservatively?

5% of my time in the office (about 30 mins/day) is wasted wandering around my office doing stuff and looking for stuff – based on a rough comparison to a more effective office layout, and a more organized desk. Since I spend about 150 days/year in my office? That's an immediate 7.5 days I've 'found'.

In addition? I hate to admit it, but I lose things. Books in particular. I regularly buy 2nd and sometimes 3rd copies of 'lost' copies from time to time. If I factor in the time spent looking for the book in my office and then the time spent sourcing an out of print copy? That's easily another 1-2 weeks wasted.

I doubt if these findings are much different from those of most offices. We're not as organized as we should be. I do know these findings are sufficient reason to make a change.

I really really need to implement 5S, but I don't feel too bad. Chances are very good that I'm in very good company. (*Looks over his shoulder at the reader*)

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hand, tools to find and fix memory leaks were found to be effective and were deployed to every project within four months of completion of the technology assessment report. The OOTP managed the technology budget for the organization, funded initiatives and produced a technology plan. It also managed the adoption of the technology project by project, providing experts as needed to expedite adoption of the new tool, process, or component. The ratio of revenue from new products doubled in the interval while productivity increased fourfold. Just how the OOTP works is more fully explained in chapter 1 of our book.[1]

We insist on understanding the basis for a recommendation for innovation. Innovation needs to be well grounded in good scientific method. A good approach is to identify "go/stop" decision gates that are spaced every 3-6 months, and have the courage to stop when serious roadblocks are found.

We take risks and move people to new assignments to further their career with the understanding that they will help those who take over their current assignments when troubles occur. Burnout occurs less often when people strive to meet high expectations and are even moderately successful than from their having to face the same problems over and over again. We advise our people that they should not be doing the same job today that they were doing three-to-five years ago.

Finally, the business leader must be optimistic. New ideas are fragile and wither before an, "Oh yeah? Is that so?" reception.

[1] Trustworthy Systems Through Quantitative Software Engineering, by these same authors, Wiley, 2005