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Staying in Control — Designing Dashboards and Metrics to Improve Thinking Under Pressure

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The human mind is the fastest computer in existence. In a moment it can take in multiple sensory inputs, match them to a pattern in your memory, and register it as good or bad. It then requests all your attention, adrenaline, and focus, to allow you to make a split second decision. By doing so, the mind allows you to take advantage of, or perhaps avoid, a challenging situation. In the Service Excellence world, dashboards are the keys to providing the sensory inputs necessary to allow your mind to naturally assist you in handling complex, and time-sensitive operations.

In this article, Shane Chagpar — Consultant at Kepner-Tregoe — identifies the five key steps in creating an effective dashboard with a focus on the service organization.



THE POWER OF VISUAL INFORMATION

Dashboarding and the concepts of real-time, easily accessible information for the purposes of decision making, are not new concepts. In fact, some might be surprised to learn that the origins of dashboarding stem back as far as the 1970s. Even with this great heritage, it is still evident that for many organizations, the dashboard is a highly misunderstood, poorly constructed infographic that looks better as part of a software demo than a day-to-day management tool.

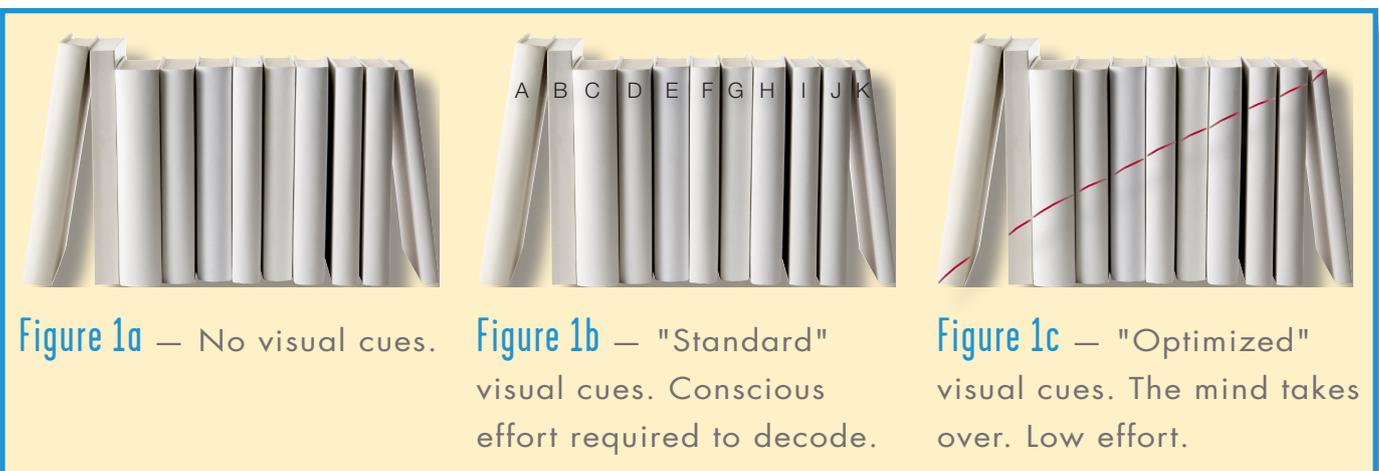
A dashboard in its simplest form is intended to present a collection of complex and relevant data through a series of visuals. The most familiar dashboard is the automobile instrument cluster. The purpose of the instrument cluster is to give the driver updates on various conditions: speed, direction of travel, remaining fuel, time of day, vehicle mileage, etc. By glancing at this information display, the driver can make quick, effortless decisions to stop for fuel, increase or decrease speed, or consider upcoming preventative maintenance requirements and needs. Similarly, a business dashboard — especially one tuned for a technology environment — should allow information to be digested as quickly as possible so that effective decisions can be made.

The key difference in an effective dashboard system is the ability to reduce the complexity of the information being presented, and allow the human mind to subconsciously take over and accurately compute — recognizing right, wrong, good, or bad conditions instantly so that appropriate action can be taken.

THE POWER OF VISUALIZATION

Figure 1a depicts a series of books out of order. Assume these books are manuals, and part of a set of commonly used reference materials. If individuals simply take a book, and return it ad-hoc, a simple question such as “Which book is missing?”, or “Where is the system diagram manual?” can actually become a small challenge. Don’t get me wrong, it’s not taxing. However, it does require conscious effort and brain cycles to answer.

Figure 1 — The Power of Visual Information





In order to overcome situations like these, most people number or alphabetize a series of manuals in a set, as in Figure 1b. The system depicted in 1b seems simple, easy-to-use, and it reduces complexity. In many organizations, a numbered or alphabetized system is thought to be best-practice, and so it remains for an organization. Similar to most dashboards, this system can still be improved but most don't take the effort to do so because they already believe that further optimization is not necessary. A good dashboard should be optimized for ultimate simplicity. If we were to return to the images in Figure 1, Figure 1c would represent a successful book ordering method that reduced complexity. The simple technique of drawing a line across the spines of the book is simple, yet it allows the brain to take over subconsciously, allowing one to immediately understand which book is missing — if any — and where it should be located, in order. This is the true power of visual information.

Step 1: Develop Objectives — Use Organizational Needs to Drive Information Collection, Not the Other Way Around

When working with organizational dashboards, understanding the purpose and starting design from the ground-up is critical. The business must take appropriate time to ensure that the questions being answered by the dashboard are relevant, and relate to a well thought out series of objectives. We start the process by asking questions based on KT's Decision Analysis methodology and listing responses:

- "What's important to our organization/department/group/product?"
- "What would we like to minimize or maximize?"
- "What are the keys to success in our environment?"

When responses have been generated, it is best to take a second look and arrange them in the categories or the natural groupings they represent. This way, when a discussion is complete, it is easier for everyone involved to step back and ensure that the objectives are appropriate and balanced for the business needs.

Table 1 — Sample Categories and Objectives Table

Category	Objectives
Align Business Processes with IT	Maximize Knowledge Capture and Re-use
Drive Operational Excellence	Maximize Productivity Minimize Errors in Financial Accounting Reports Maximize Preventative Maintenance Effectiveness
Achieve Compliance	Minimize number of Product Defects Maximize Period within Agreed Service Levels



Step 2: Identify Your Audience – Avoiding Information Overload

Not everyone requires the same amount of visibility into an end process. The CIO of an organization, for instance, might be interested in how Service Level Agreements (SLAs) are being met, and what the current cost of service is, whereas an application administrator might be more interested in the free disk space percentages on each of their servers, and the current uptime of critical assets. Common pitfalls at this stage include trying to design a single catch-all metric; including too much information; and wishing information to be a part of the dashboard simply because “we have the data.” The design of a dashboard should be focused around an individual, or a group of users that are empowered to make decisions and act upon the information that is being presented.

The goal of Step 2 is to prioritize and connect the objectives gathered in Step 1 for each group or individual that has been identified. Ideally, this step should be done with the members of the group for whom you are designing the dashboard, so that they may identify gaps and be able to share their needs with the designer.

This step should also include a rigorous clearing-out of unnecessary metrics. A recent CIO customer of KT inherited a metric pack of 192 indicators of business success. When the CIO asked the questions, “What do I do if this goes up?” and “What do I do if this goes down?”, those metrics were reduced to less than six.

Step 3: Create Metrics, Not Mess!

Designing and selecting appropriate metrics is a task that must be embarked on with great care. It is listed as Step 3 for good reason; too many organizations select metrics, and then build a process around them – leading to frustration and poor business results. Table 2, as shown below, details the questions required (based on KT’s Decision Analysis methodology) to create effective metrics.

Table 2 – Steps for Effective Metric Creation

<p>Pre-Requisites</p> <hr/> <ul style="list-style-type: none">A. Understand the business/process objectivesB. Understand the audienceC. Connect and prioritize the objectives to the audience <p>Ask</p> <hr/> <ol style="list-style-type: none">1. What should be measured to meet or exceed the objective?2. What are the key drivers of this objective?3. What are the Key Performance Indicators (KPIs) that indicate to us this objective is met or exceeded?4. How can we capture the required data to achieve our objective?5. How can we validate the captured data to ensure it is accurate?

The most important thing to remember in this step is that although a wide-variety of metrics may be available to measure best-in-class service, not all of them may be appropriate or tell the complete story of your organization/department/group/product. Consider the value to both the customer and the business of a given metric.



A common pitfall in metric design is viewing metrics in isolation. Viewing metrics in isolation can lead to incorrect conclusions and drastic decision making, as you are relying on only one metric to tell a story. Although some metrics have been researched and have been shown to be quite accurate in depicting a story, such as Net Promoter Score (NPS) or more recently its successor, the Customer Effort Score (CES), these have been the exception, and not the rule. The best practice in metric design is to layer a series of metrics, thus using multiple sources of inputs to create a picture to aid in decision making rather than relying on a single metric and making incorrect assumptions. Table 3, shown below, depicts a series of metrics: a particular condition one might observe; the common thinking most would jump to after viewing the metric in its condition; and a sample reality that shows just how poorly the metric told the complete story.

Table 3 – The Folly of Relying on Metrics in Isolation

Metric	Condition	Pitfall: Conclusion based on Isolated Thinking	Sample Actuality
Average Call Time	Increasing	The service team must be doing worse and underperforming compared to the last measurement period. Provide punishment.	Complexity of the incoming calls has increased as the knowledge base of easy-to-answer questions and customer self-help options has matured since the last measurement period. "Call Deflection" is working
Number of Units Produced Per Hour	Increasing	Productivity has increased. Plan party.	Product or inputs may have changed requiring fewer steps to assemble.

Another common pitfall in metric design is not spending enough time in Step 2, that is getting to know your audience. By doing this, a designer might choose a metric that they don't realize is easy to "game." When a metric is "gamed", inputs into the metric are purposefully manipulated to distort the picture, thus making an organization/department/group/product seem better than it is. Table 4 is a list of examples of metrics that are well intentioned, but upon closer inspection, easy to "game".

Table 4 – Common Metrics and Examples of System "Gaming"

Metric	"Gaming" Approach
Mean Time to Restore	Close the case after 10 minutes, ask the customer to call back or apologize for "accidental disconnection"
# of Knowledge Articles Written	Create repeat knowledge articles under different names
Proactive Problems Identified	Create separate problem tickets unnecessarily
Average Wait Time	Begin measuring wait time after the call has been routed to the correct queue, as opposed to when the customer first interacted with the service desk.
Average Phone Call Duration	Drop every other call (answer caller and immediately end call) to reduce the average call duration by 50%.
Average Case Duration	Silently close old calls, and reopen them if the caller comes back.
Customer Satisfaction Survey	At the end of a call known to be "poor" by the engineer, simply say goodbye, thanking the customer and wait for them to hang up, bypassing the survey. At the end of a call known to be "good" by the engineer, thank the customer and request if they can provide feedback, if yes, the engineer hangs up first, allowing the customer to proceed to the survey.



Metric design requires careful consideration and resolution of all challenges before proceeding to Step 4 and creating a dashboard. Issues to consider include:

- Direct connection to business objectives
- A layered approach
- The ability to accurately collect & verify data to prevent gaming
- Ensuring that appropriate individuals receive the data needed to perform corrective action

Step 4: Storyboard Presentation – Pretty vs. Functional

The next step in the dashboard creation process is to actually start to visually organize and display data. In order to do this well, it should be designed to tell a well-connected, and easy to follow story. The dashboard should contain graphs, charts, and visuals that have meaning when viewed in close proximity. The visual should allow for the least amount of conscious thinking required to understand and then take action on the data it represents.

To ensure that charts are quickly actionable, it is helpful to perform some thinking in advance to determine triggers and control limits. Triggers are a threshold value that automatically begins a pre-defined action if a limit is reached, or allow anyone viewing the dashboard to manually make a decision and begin pre-determined next steps to resolve the condition. Control limits are minimum and maximum allowable values of a metric for it to be considered “in-control.” A value that is outside these pre-determined limits is therefore considered “out-of-control” and by making the condition visible it is easy to determine that action must be taken to resolve the condition.

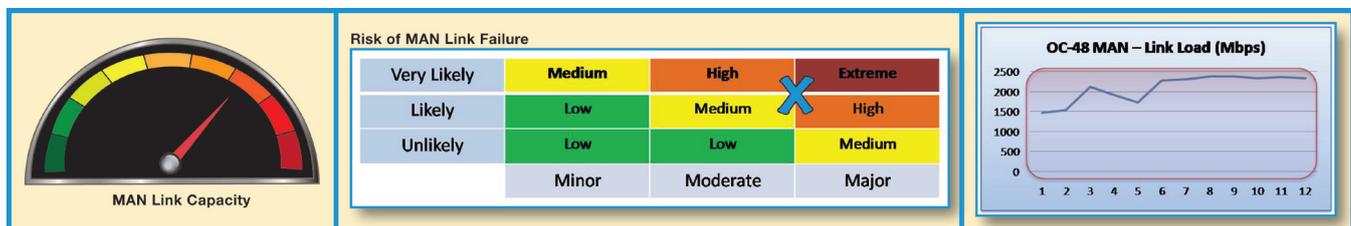


Figure 2 – Risk Management as Viewed with Different Visual Techniques

It is important when selecting a chart design to understand the level of detail required for effective decision making based on the intended audience. Figure 2 shows a series of different charts all depicting the same risk conditions. Consider the popular “traffic-light” chart, depicting Red, Yellow, or Green, depending on the status of the metric it is linked to. This type of chart has two built-in pitfalls. Firstly, most will only take action on items that are in the red zone, incorrectly suggesting that non-red items are not critical and therefore do not require effective action. Secondly, the chart does not show trend information. In reality, the underlying data could predict that something today in yellow will turn red tomorrow. Care must be taken in selecting chart type so that a balance between visually pleasing and functional information can be displayed.



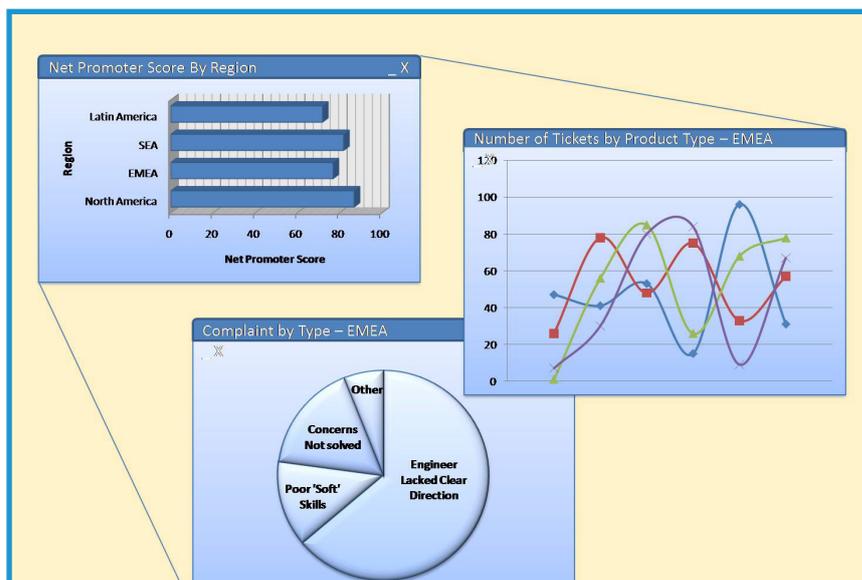
Step 5: Design for Digging, not for NASA.

A difficulty often seen when designers are completing Step 4 is that it contains so many graphs and visual displays that it begins to resemble something you would expect to see at NASA's mission control.

Step 5, which I jokingly call "Designing for Digging," is about prioritizing the information developed in Step 4. The key here is to design a dashboard that is layered. The top layer could contain the most high-level information, and by drilling down, or selecting a group or chart, one could uncover the source of the data, related graphs, or other layered metrics to assist in performing effective actions.

Figure 3 — Priority "First-Tier" Metric, and Drill Down "Second-Tier" Metrics

An anecdotal best-practice is that a dashboard *layer* should have no more than six (6) important pieces of data displayed at any one time; this stems from research on how many discrete channels of data the mind can keep track of at any one time. It may seem like a limited approach, but if designed for *digging*, a dashboard should provide the user with the ability to get to the most useful data quickly when required. An example of drilling is shown in figure 3, illustrating how additional information can quickly be digested if required. The drill down approach to dashboard design allows one to balance the abilities of layered metrics to tell a story, quickly aiding an under-pressure decision maker to control the situation effectively.



A QUEST FOR BALANCE

Recognize the dashboard as a tool to help aid in the decision making process. This is simply modeling the business, removing distraction, and focusing on key data to facilitate accurate and timely decision making — which may need to be made in a time critical setting. Without taking a step back before developing a dashboard and recognizing the system for what it is, and what it is not, one could easily fall into the trap of thinking that quantitative data will always trump qualitative data. Good decision makers should always use all the tools available to them, not just be transfixed by a single tool, and expect it to do all the work for them. The allure of a *pretty* dashboard can trick people into forgetting that some of the data could still be erroneous, either due to collection error, "gaming of the system, or an assumption in metric design being broken due to a changing environment. Whatever the case may be, the dashboard system and design, like other processes, must be regularly reviewed for accuracy, relevance, and alignment to business objectives.

HAPPY DESIGNING!



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Shane Chagpar is a full-time Consultant, Solutions Designer, and Instructor with Kepner-Tregoe, Inc. Shane is based out of Toronto, Canada and manages projects and clients as a member of the Service Excellence Team.

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Before joining Kepner-Tregoe in 2007, Mr. Chagpar had an active consulting record in various industries including telecommunications, finance, manufacturing, oil and gas, logistics, government, and health-care. His expertise encompasses a 17-year background in implementing and developing tailor-made solutions that combine hardware, software, process, and infrastructure to achieve improvements in service efficiency.

Mr. Chagpar's educational background includes a Master's Degree in Business, Entrepreneurship, and Technology from the engineering faculty of the University of Waterloo; a Bachelor's Degree in Systems and Computer Engineering from the University Of Guelph; Project Management training from the University of Ryerson in Toronto; Service Management best practices training from IBM; and quality control training from the American Society of Quality. All degree granting institutions were located in Ontario, Canada.

Mr. Chagpar currently holds industry accreditations and certifications including Project Management Institute's PMP, ASQ's Six Sigma Certified Black Belt, Cisco's CCNA, CCDA, and CCDP, Microsoft's MCP and MVP, ITSM's Foundation Certificate in both ITIL and Problem Management, as well as both CompTIA's A+ and Network+ certifications. He is actively involved in life-long learning and is pursuing further education in improving his engineering and management accounting background.

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We pioneer rational thinking processes and apply them to drive both strategic and operational outcomes. KT rational thinking plays a vital role in helping organizations improve the clarity of their vision and effectiveness of their operations. By collaborating with clients to drive predictable, measurable results, KT offers a more effective alternative to traditional business consulting.

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