

Building a Data-Informed Decision Culture: The Primer I Wish I had- Michael Le

This presentation is rooted in the philosophy of an expanded definition of decisions makers outlined in the Statement of Aspirational Practice for Institutional Research released by AIR.

The philosophy states that “Top-down policies and structures alone do not ensure informed choices and commitments to successful pathways. Broadly engaging all stakeholders in data-informed decisions (tactical, operational, and strategic) is essential for institutional excellence. This hybrid model positions students, faculty, staff, and other decision makers as key consumers and clients of institutional research and is foundational to a change agency vision of institutional research as a driver for institutional improvement. “

This presentation relies on this fundamental premise. You don’t have to agree with it, you just have to be aware of it.

I’ve been working in institutional research for about nine years. Six of those years I have been fortunate enough to use Tableau. Out of grad school, my primary data analysis and dissemination tools were IBM SPSS, Microsoft Excel, and Microsoft Word. All this work would then be incorporated into a PDF. That PDF would be posted on the web and disseminated via email.

Shortly after starting at Humboldt State as a full-time analyst, my Director asked me to “check out Tableau.” I was hesitant at first, but after seeing a demonstration I decided to give it a try.

But I was swindled. I was never given a choice between the red pill or the blue pill. For those who don’t know, this phrase was made famous in 1999 by the movie “The Matrix.” Before we go any further, I want to give you the choice:

“You take the blue pill, the story ends. You wake up in your bed and believe whatever you want to believe. You take the red pill, you stay in Wonderland, and I show you how deep the rabbit hole goes.” The term “red pill” refers to a human that is aware of the true nature of the Matrix. I believe you all are here today because, like me, you too took the red pill. I’m using that term to describe learning about modern analytics. Once you learn about modern analytics, there is no going back.

But before we talk about the red pill, let’s talk about the blue pill.

In addition to learning Tableau, my Director had another request for me. That same year, our sister campus produced a 163-page fact book. My boss emailed it to me and said, “Our fact book will be amazing if we can put 200+ pages in it.”

This notion was common at the time and based on the idea that data democratization occurred by curating data into tables, organizing it by an index, and publishing it electronically. My first use for

Tableau, like many others, was to twist and torment the tool to produce tables to be locked up into a PDF. I would use it to extract data from our data warehouse and export the tables as images. Doing this would allow the campus to be data-driven because every metric they would want would be in the fact book. Right? Well, perhaps not.

But that's not to say that static tables do not have their place.

Every year, the FBI releases a report that is considered the gold standard for tracking crime statistics in the United States: the Crime in the United States report, a collection of crime statistics gathered from over 18,000 law enforcement agencies in cities around the country. The 2015 report contained 81 tables of information. There's some good stuff in it and researchers rely on this. In no way am I slamming data tables, because as it turns out that, we need these things!

But we can make the data tables more accessible! Sound familiar? Last year at Forum, our opening Keynote was Stephanie Evergreen and she was talking specifically about this.

Another task I was asked to do was to change a bunch of HTML data tables into useful and insightful visualizations. I began turning the data tables into dashboards that utilized visual analytics. Many of these dashboards are available publicly on our website.

As institutional research evolved, I did too. Eventually I began producing infographics and using hover over tool tips to educate my campus about our various metrics. As we heard in the 2018 AIR Forum opening Keynote from Stephanie Evergreen, this is details on demand.

I was in a meeting once and a Vice President pulled up this dashboard. After citing the proportion of first generation students, that same VP was able to use the tool tip to answer a question about how first-generation is defined.

While I still do my significant testing in IBM SPSS, I used Tableau to visualize the results. This an example of a survey that I analyzed and then used Tableau to create an executive summary. The survey asked students and faculty to compare two different learning management systems or LMS's

On the top of this summary I ordered the survey items from most to least important as ranked by my participants. Then, I ordered the satisfaction questions by importance so one could quickly see the difference from the top five most important items. While neither was ranked as horrible, one was clearly the victor.

It feels good to be able to do this kind of stuff and especially when you get Monday morning emails like this from your boss. I should mention that this is pretty incredible, given that most emails from my boss do not read like this.

A more typical email from my boss reads like this, “If I have to start explaining each and every piece that needs an overhaul, you do not have enough M&Ms in there to keep me calm... And that data center nomenclature is beyond offending my eyeballs...” So, you see, I’m pretty happy when I can impress her.

My first tip for you is to fail fast, fail forward. You need to be willing to prototype something, not just pilot it. But once you do so, you have to be able to take criticism. The stuff you design, the stuff you create – it starts out as your work but belongs to the institution. To be great, sometimes you have to adopt the whole vision, not just your vision.

But even then, you need an informed opinion. Two years ago, at the Tableau Conference, my high school friend who is now a Programmer Analyst at American Express said to me after my presentation, “Mike, honestly, these aren’t that impressive.”

But here’s the climate I’m in. I want faculty to use these dashboards, but when I produced a series of box and whisker plots to show the median number of units that students earned at graduation by department, my faculty asked me... What is a box a whisker plot? Despite hover-over information, I might as well have showed them this...

What I originally failed to understand and what my friend didn’t know was that while my audience was well educated, most of them may not know how to read a box and whisker plot.

Further, if I truly believe in the expanded definition of decision maker, then I need to make my product accessible to a broad audience.

So, my second tip to you is this: Simple might be better. Just because you know something backwards and forwards, inside and out, upside and down- that doesn’t mean your audience does too. We can get really fancy with our data visualizations and sometimes that is a good thing and other times, it’s not. What good is a fancy chart if everyone does not know how to read it.

But seriously, I had to do some soul searching and when in doubt I turned to the tech for a solution.

What was the purpose of:

Solitaire: The intention was that Solitaire would get a generation of computer users, most of which were familiar with a command-line input to teach themselves how to drag and drop, without realizing that's what they were doing.

What about Minesweeper? This game was designed to make the idea of left- and right-clicking second nature for Windows users.

In 1992, the game Hearts was introduced. Why? It was a way to get people interested in (and hopefully impressed by) the networking capabilities of their new system.

My third tip to allow yourself to be inspired. There are so many industries that have gone through these growing pains and there's a lot we can learn from them.

So, I went to work and built a workbook that was very simple and introduced my campus to some easy-to-understand data visualizations.

This workbook is an example of a Governed Workbook. A Governed workbook/dashboard is a visualization developed by an analyst and locked so that the user can only answer a very specific question. We're going to revisit this idea of a Governed Workbook later, but for now I'm going to show you a few examples from this workbook.

When data is relevant, people want to find their story in it. This workbook starts at the University level and allows the user to drill down to a college...

This is done by clicking on the college name on the right. I've included the whole college tree as navigation, because honestly – who memorizes this thing?

To select a department, a user just clicks one level lower on the Department abbreviation. In this case we're looking at Math. Other than seeing their story, which in this case is a decline in math majors since 2010, they want to see other departments stories too.

So, the user can click around to what they believe to be a related major – like computer science. Here we see that computer science has been growing since 2011.
I think we can agree that was simple. Perhaps we can also agree that it was a little fun too. What we if we want to go deeper?

Let's start with a simple question. What is the Biological Sex composition of your Department?
Before we answer that, we know that a number of in isolation is often meaningless.
So, given that we know from the earlier infographic that HSU was 57% female overall for fall 2016, what would happen if we compare two like disciplines such as math department and computer science department.

So, what do you think the Math Department is in terms of percent female for fall 2016.
+ Turns out to be pretty close to the university average at 53%.
What about the Computer Science Department?
+ Not so much, only about 13%. Did you notice these tables below? I didn't want people to just know the percentages, I also wanted them to know the counts too. Check this out!
+ The change in math appears to be tied to a loss of male students.

+ The change in computer science is a story of growth, but were female students have nearly double, male students in computer science have nearly tripled. There are too many stories for them all to be told IR, but making data accessible you allow decision makers to find those stories.

In another section of the workbook we have data for all classes offered over the last 10 years, by instructor, by term. I was nervous about putting this out there, but the Provost insisted and I complied. This is an example of one course and two instructors who taught it. You can clearly see a change in success rates between the 2012-13 academic year and the 2013-14 academic year. Now, it could be that we suddenly got a different type of student, but it's more likely that it's an instructor effect. So, what do we do with this data? What do you think Instructor CODE 1234 thought about this? Well, I showed it to them.

Here is one place where I am going to read you a wall of text.

"... Because no one was looking at the data and thinking about how it might have signaled some career development needs (or opportunities), I had no idea that I was failing way more students than my predecessors. For all the connection I was making with young thinkers, I may have also been teaching a class that many students thought was too hard. Word got around and enrollment went down.

If my chair had met with OIE to see how the department was doing and then made me aware of this in a supportive way, we could have decided to have me talk to Center for Teaching and Learning about ways to change the class without losing the changes I'd been proud of."

This faculty member is now the campus Academic Assessment Coordinator and is embedded in institutional effectiveness. Last fall, we partnered with the Center for Teaching and Learning and held several workshops titled: Program Review Made Easy. Creating change is a big job, but I have found my change agents to help me!

Find Your Change Agents. A change agent is anyone who helps an organization transform by improving business processes and interpersonal interactions. Leaders focused on change management or change control are often labeled change agents.

As institutional researchers, we can take the blue pill and continue on with how we have been doing IR... but once you take the red pill there is no going back. Decision support means building a data-informed decision culture. As an example of where I think we're heading, I want to talk about a consultant survey we recently administered on our campus.

This 42-question survey asked things like: On which days do you typically come to campus? What time do you typically arrive on campus? What time do you typically depart from campus? This sounds reasonable right? If we want to get a sense of how many people are on campus and at what time, this is a good way to do it. But us seasoned IR professionals know how this goes. We analyze it and

we don't learn anything new. But we're going to be asked to use our fancy visual tools to make this look good.

Okay fine... Monday through Friday are popular times to be on campus. Is that shocking to anyone? Look the number of responses! With over 2,700 responses I must have powerful data! Right?

Okay... okay, maybe that's not useful. But what if I visualize more data?!?

It appears that most people arrive on campus between 7 and 9am. Well that makes sense. We're doing a parking study because we don't have enough parking and since we don't have enough parking you have to get to campus early to get parking.

And then everyone leaves between 3 and 6pm. Why? Well because if you left earlier you wouldn't be able to get back on campus and find parking.

I would argue that we are looking at the problem incorrectly and using the old tools (i.e., Surveys) to answer the question. We need to look at the problem differently.

Spoon boy: Do not try and bend the spoon. That's impossible. Instead... only try to realize the truth.

Neo: What truth?

Spoon boy: There is no spoon. Neo: There is no spoon?

Spoon boy: Then you'll see, that it is not the spoon that bends, it is only yourself.

This is a map of the first floor of our university library. The red borders are concrete walls. The color indicates the strength of Wi-Fi emitting from various routers. You can see that we have several. A pet project that I started is to map out the flow of students as they enter the library and move from router to router.

Had I thought about this project differently, I would have realized I could prototype the flow of students in and out of the library. This can scale to campus and could answer the question of how many people are on campus and where at a given time.

But I didn't have time to complete this project, so 2,700 students answered this survey.

Change is coming, whether we like it or not. Ask yourself, is my thinking of the problem and solution what's holding us back. Can I change my perspective, challenge myself, be inspired, and do something different? Can I change the problem?

While I wasn't able to rethink that other problem, I was able to rethink a different problem.

In any given year, we receive thousands of applications. We admit 75% to 80% of our first-time undergraduates and yet only about 17% to 20% of admitted students show up on campus. So, what

happens to the other 9,000 students who didn't show up? Traditional methods would be to survey these admitted students. But I happened to ask, "couldn't we just submit their information to the National Student Clearinghouse?"

I partnered with my senior Data Scientist, Ward Headstrom and our Data Administrator, Ronda Stemach and we worked on a project called Chaos to Order: Integrating National Clearinghouse Data into a Data Warehouse.

If this sounds familiar, it's because you may have seen it on the AIR website under the Visual Display of Data section in eAIR.

So instead of surveying, we used the National Student Clearing House to match students and find out where they attended college if they did not come to us.

We then mapped this by their origin high school. We're all the way up here. We attract about 87% of our FTUG Cohort from outside of our local area.

It's interesting see that CSU Chico and CSU San Francisco have very similar markets of interest as Humboldt. By that I mean they are enrolling students up and down the state. Contrast it with CSU Northridge and CSU Los Angeles. Both of these CSU's tend to enroll students from their immediate community. Then you have CSU Cal Poly, San Luis Obispo and CSU San Jose who dominate the coastal markets. What we found was interesting! Useful, we're not sure, but certainly fascinating!

Although, it can start with you, you need to tailor this process to your campus. Each campus is unique, so bending the spoon may look different for you than it does for me.

My sixth tip is to Build Your Own Data-Informed Decision Culture. Unlike Neo, you can't be the only person to change your perspective. Although, it can start with you, you need to tailor this process to your campus. Each campus culture is unique, so bending the spoon may look different for you than it does for me.

Remember that campus I told you my Boss wanted me to "one-up?" Well the Director was in my session at the AIR Forum, and during the Q&A she told me I needed to check out their website. As it turns out, 2013 was the last year they produced that giant fact book too.

They switch over to a full-scale enterprise solution to disseminate data dashboards to their campus! If you visit CSU Monterey Bay, you can watch their very cool video on accessing the student data warehouse!

As we do this work, we need to be careful of how we do it. The good folks over at the FBI Criminal Justice Information Services Division tried doing this. This year, the Crime in the U.S. (CIUS) report has been streamlined and updated. Uniform Crime Reporting (UCR) staff have strategically trimmed the number of tables and refined the presentation of data in this year's publication.

<https://www.fbi.gov/news/pressrel/press-releases/fbi-releases-2016-crime-statistics>

In their own press release, the FBI proudly stated that, "the Uniform Crime Reporting (UCR) Program streamlined the 2016 edition by reducing the number of tables from 81 to 29..."

According to an analysis by FiveThirtyEight, the 2016 Crime in the United States report — the first released under President Trump's administration — contains close to 70 percent fewer data tables than the 2015 version did; a removal that could affect analysts' understanding of crime trends in the country.

Let's assume best intentions. Let's assume that the 70% reduction in data tables is to be helpful. But the moral is Do not sacrifice what you have for what you want. It just makes change more painful and, in some cases, may be the wrong thing to do.

In Phil Simon's book, *The Visual Organization: Data Visualization, Big Data, and the Quest for Better Decisions* – Simon describes a four-level model of a visual organization.

0 – No data, 1 – Small data, static, 2 – small data, interactive, 3 – Big data, static, 4 – Big data, interactive

To move from box 1 to 2 and 2 to 3, we need tools. You're not likely to get an unlimited supply of analysts, so you need to create a culture of using data to make decisions. But how do you do that? Before Tableau, I didn't really know about Big data and interactive data visualizations. In some circles it's as common as a PDF table of data.

To build a data-informed decision culture, you need to leverage these four things:

Governed Dashboard or Workbook

Created by an analyst to answer a specific question or show Key Performance Indicators. Cannot be edited by users.

Ungoverned Dashboard or Workbook

Created by an analyst or functional user to answer a specific question or show Key Performance Indicators. May be edited by users.

Curated Dashboard or Workbook

Created by users and validated by the organization's analyst.

Data Democracy

Curated data sources that users and analyst use to create original work.

But here's the key. No product is going to magically give you a data-informed decision-making culture. You have to commit to building that! These tools show you the pathway forward, but you have to accept it. Whether you use Tableau, Power BI, or Qlik – none of them have this part solved.

We're getting to the end of this presentation and I imagine that most of it has not been ground breaking. In fact, until these 3 slides I would imagine that most of you have been amused, but not impressed. You may want more, but each of these last 3 slides are a whole presentation in and of themselves.

I did this presentation to share the awe that others and I have experienced when we combine a modern analytics tool with a high performing database. We literally feel like Neo! Our potential is unlocked. I developed this presentation 2 years ago in spring of 2016 and originally delivered this talk in October of 2017. I did so as a marker of what I saw happening in our profession. Since then I have learned a lot more, but I have avoided to urge to update this presentation. Also, this was meant as an introduction.

So, with that in mind, my eighth and final tip is that this is no longer "new". When I started down this path in 2013 and did my first presentation on visual analytics there was so much we didn't know as a profession. Only a few institutions were really using a modern analytics tool. Now, I imagine the vast majority of you are. Some of you have even had time take this presentation and incorporate it into your work.

In October 2018, my colleague and buddy Michele tweeted me about the work that my other colleague and buddy Virginia Moench at Winston Salem State was presenting at the 2018 Tableau Conference. Genie as she's better known was showing her off her digital escape room!

Beyond typical higher education dashboards | with Winston-Salem State University
<https://tc18.tableau.com/learn/sessions/32419>

Where should we send our admissions representatives to recruit future students? Which course combinations lead to success (or failure)? Where should we schedule alumni events to reach the most people? The answers to all of these questions lies with data. At Winston-Salem State University, Tableau has helped us move beyond the typical admissions funnels and enrollment line graphs to create dashboards for everyone across campus. In this session, we will share our dashboards for longitudinal survey data, major migration, yield rates, co-course mapping, course evaluation reports, assessment games, and more. Join us to learn how we created these dashboards, the mistakes we made along the way (so you can avoid them), and to get ideas for how to make dashboards at your own institution.

The full Tableau session can be viewed online for free and Genie even made a digital escape room that you can download called Jack the Ripper.

I've been asked what's next now that this presentation is 2 years old and my response is, "maybe it's time for a sequel."
