My role in the data jigsaw: The Starpath view

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Starpath
A University of Auckland Partnership for Excellence

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

Overview

Some good news, or a double whammy?

Connecting the pieces of the jigsaw

Importance of data

Types of data

Exploring data

Who, me?

A challenge for all

Connecting the pieces

Be part of the solution, not part of the problem

In one principal's words …

"We were drowning in data.

Now we are swimming in evidence, … thanks to Starpath."

Data?

"Without data, you are just another person with an opinion."

(Andreas Schleicher, head of the OECD)

"Schools are awash with data."

(Prof. John Hattie)

"Data are the fuel of school reform …in short, using data separates good schools from mediocre schools."

(Killian and Bellamy)

"Data is not the plural of anecdote." (Gove, 2011)

But the one I love most:

"Data don't change schools, people do." *(Love)*

A Revelation?

Before the kids will change,

WE have to change!

We must be the change that we wish to see in the world.

Mahatma Gandhi

The Importance of Data

Provides the focus to ask questions & make good decisions

Allows us to work effectively

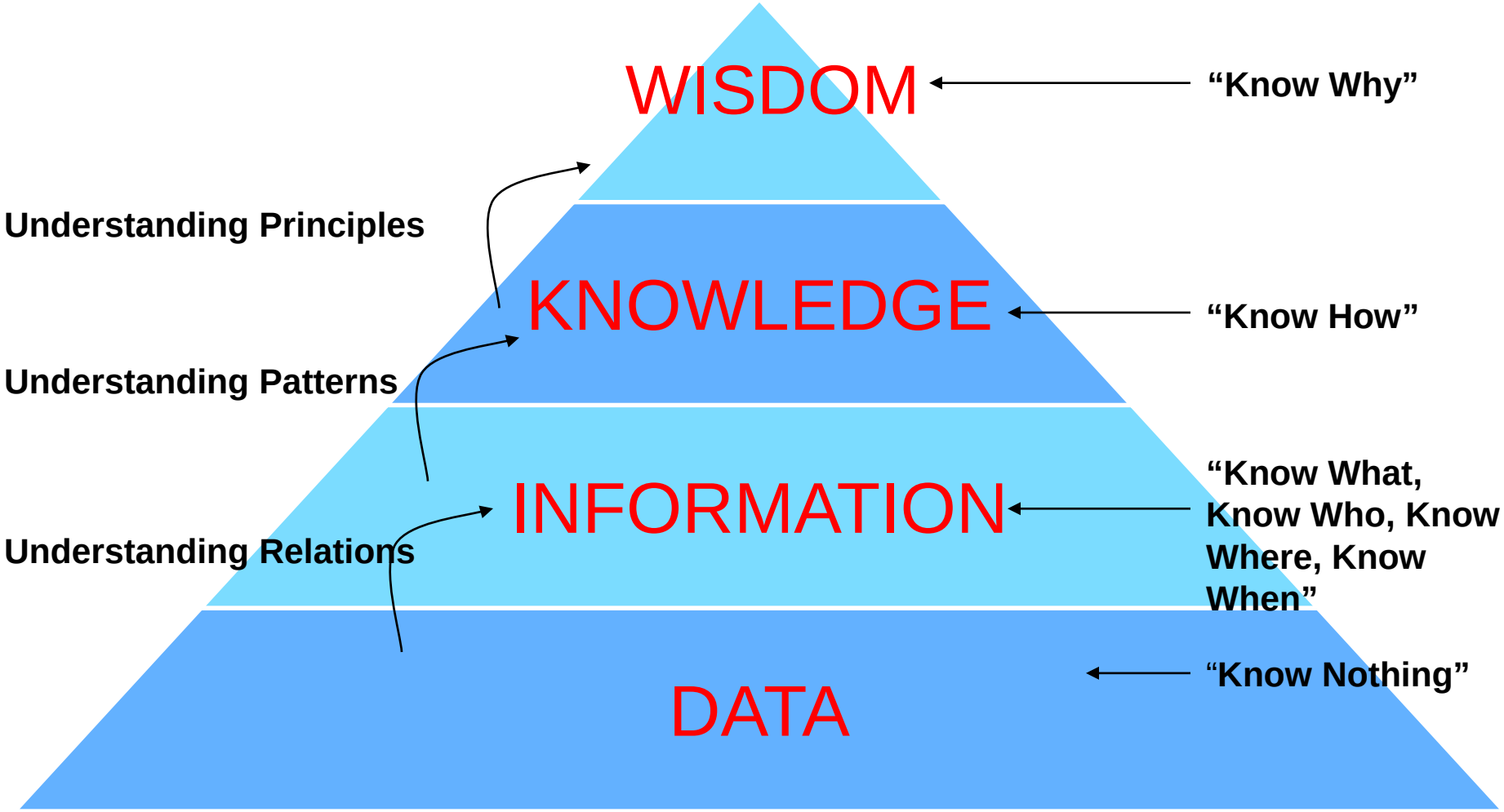
Improves school processes

Measures impact of strategies implemented

But never forget:

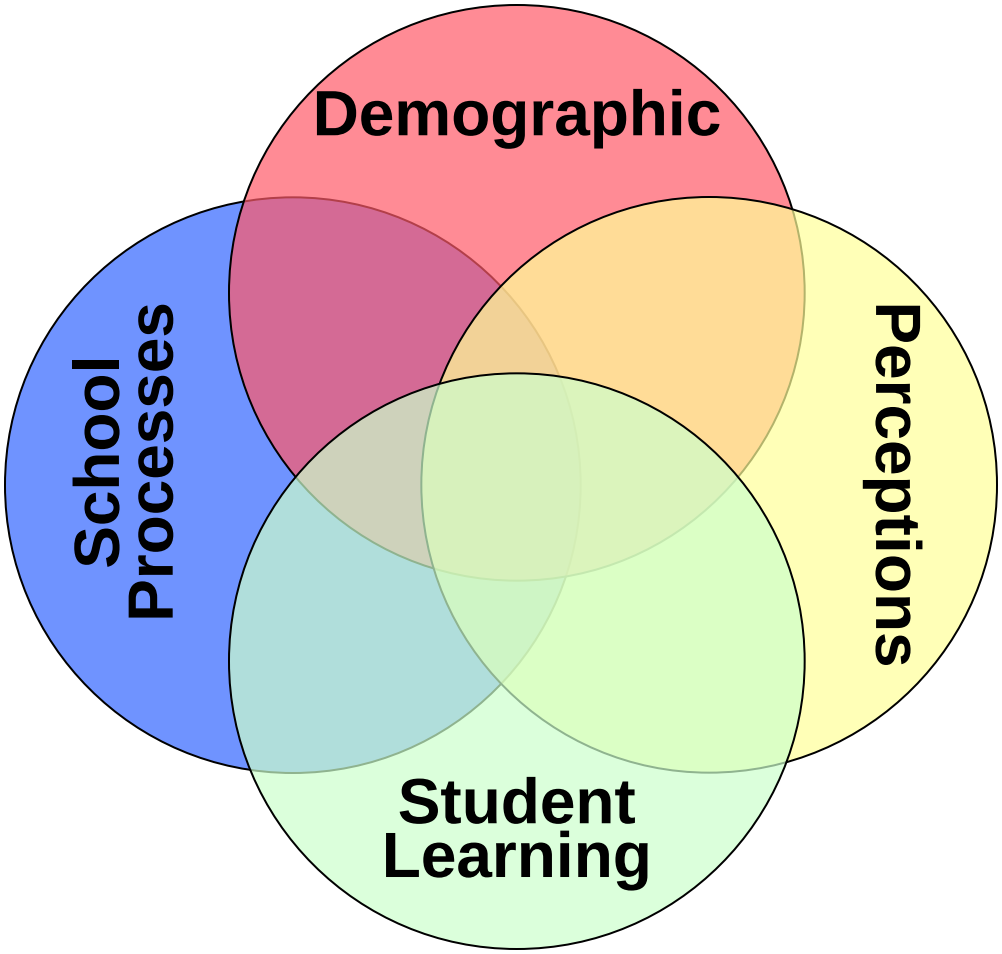
- All those numbers are our future

Data are just the beginning



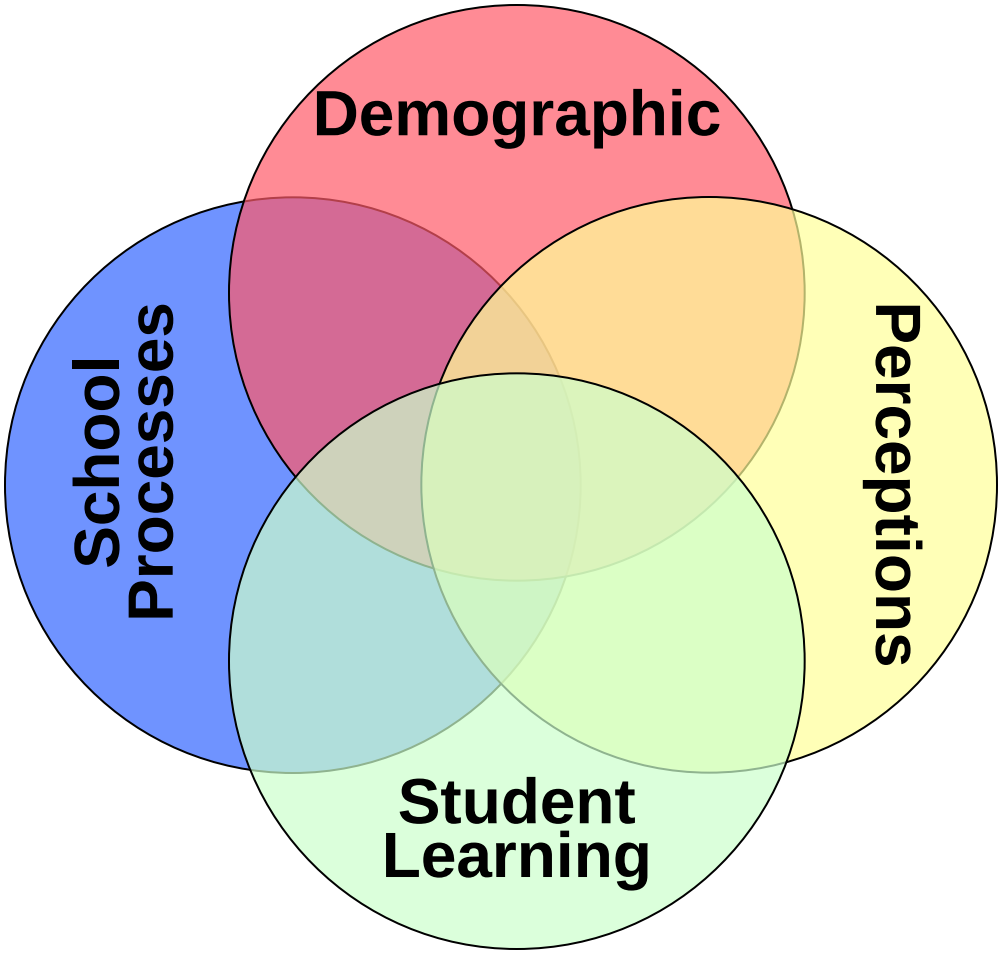
Source: "Data, Information, Knowledge and Wisdom" by Bellinger, et al. 2004

Bernhardt's Model of Data Categories



Source: Bernhardt, V. (2004). *Data analysis for continuous school improvement* (2nd ed.). Larchmont, NY: Eye on Education.

e.g., gender, ethnicity, attendance, special needs, ESOL

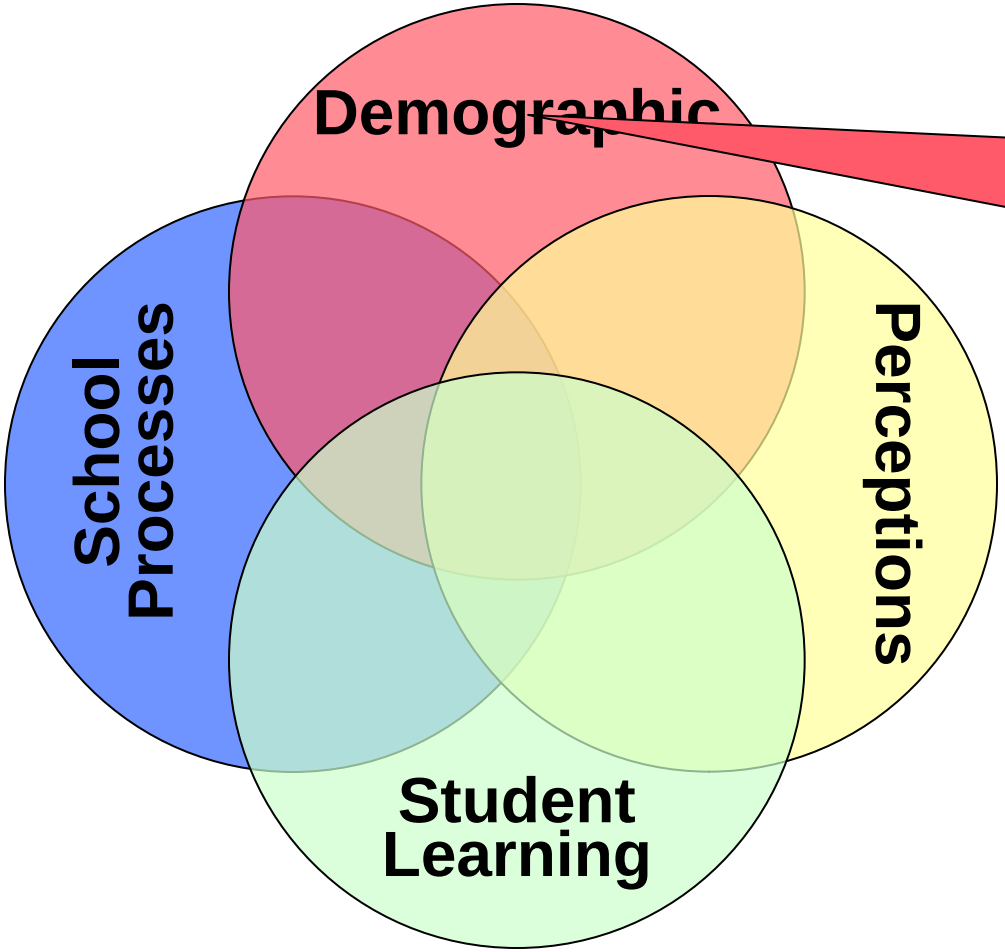


e.g., courses offered, class size policy, te Kotahitanga, student-parent-teacher conferences, school profile, PD funding

e.g., perceptions of learning environment, values and beliefs, attitudes

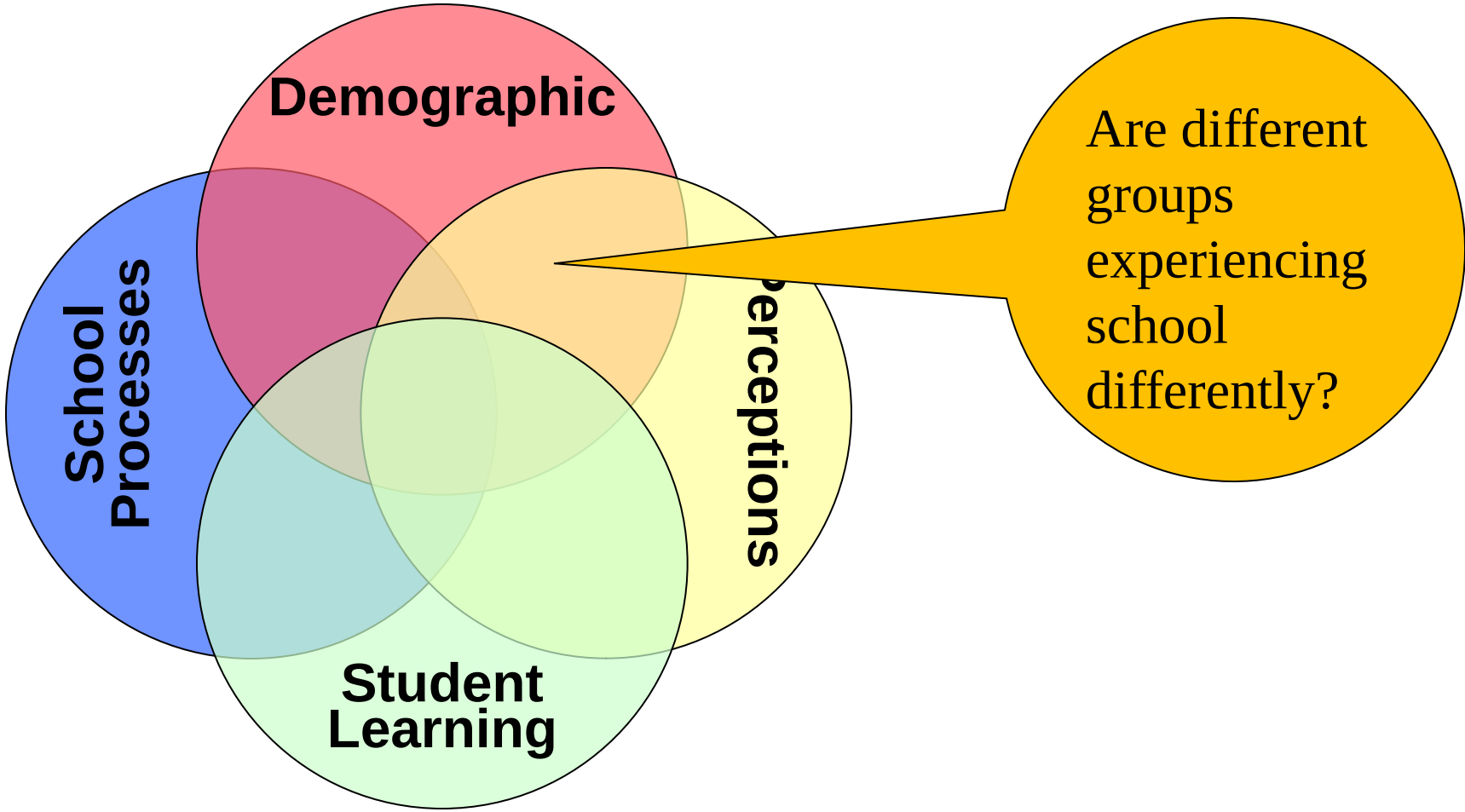
e.g., teacher observations of ability, unit assessments, PAT, NCEA, e-asTTle

One factor: Demographic

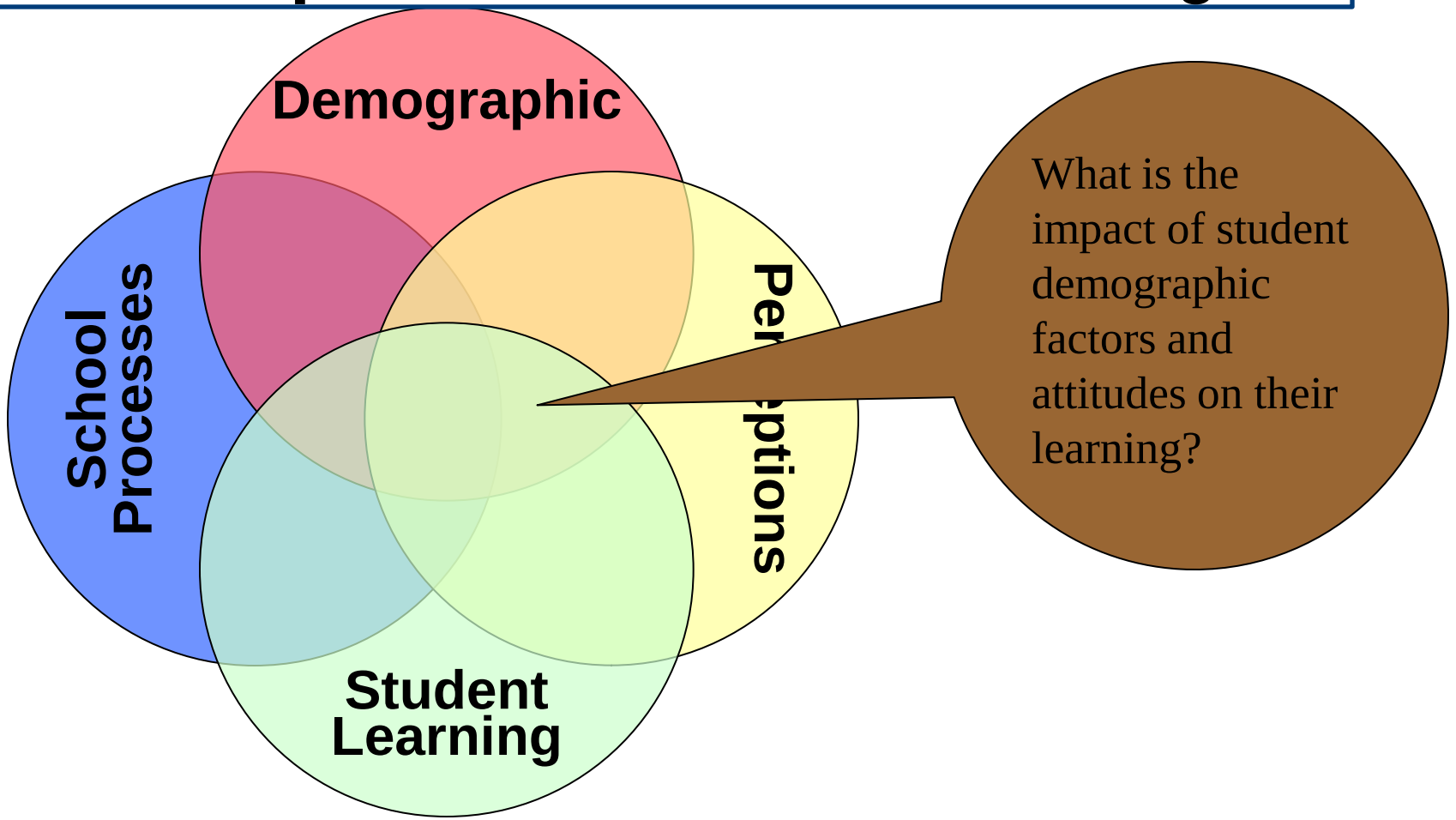


How many different groups do we have in this school?

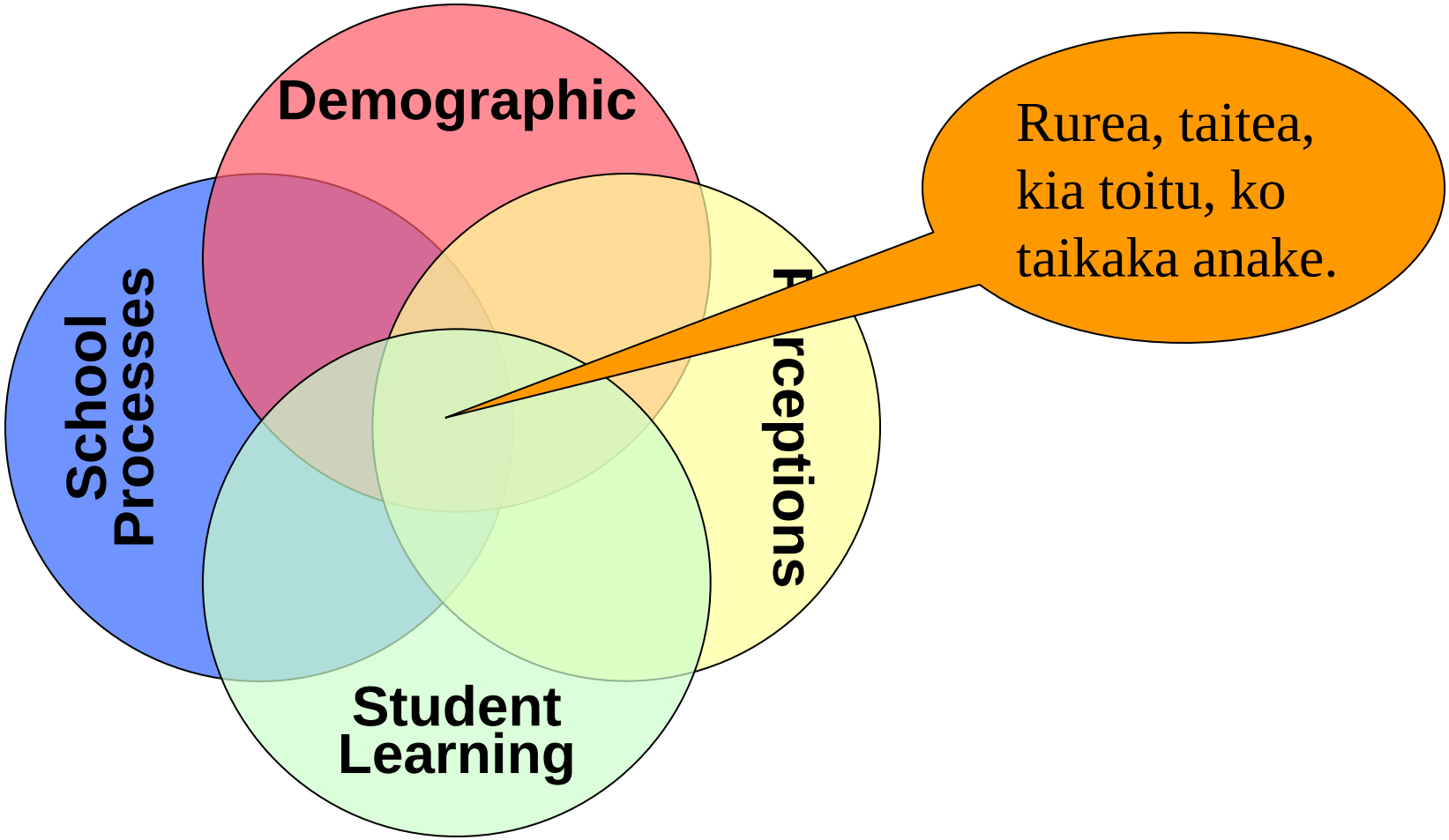
Two factors: Demographic x Perceptions



Three factors: Demographic x Perceptions x Student Learning

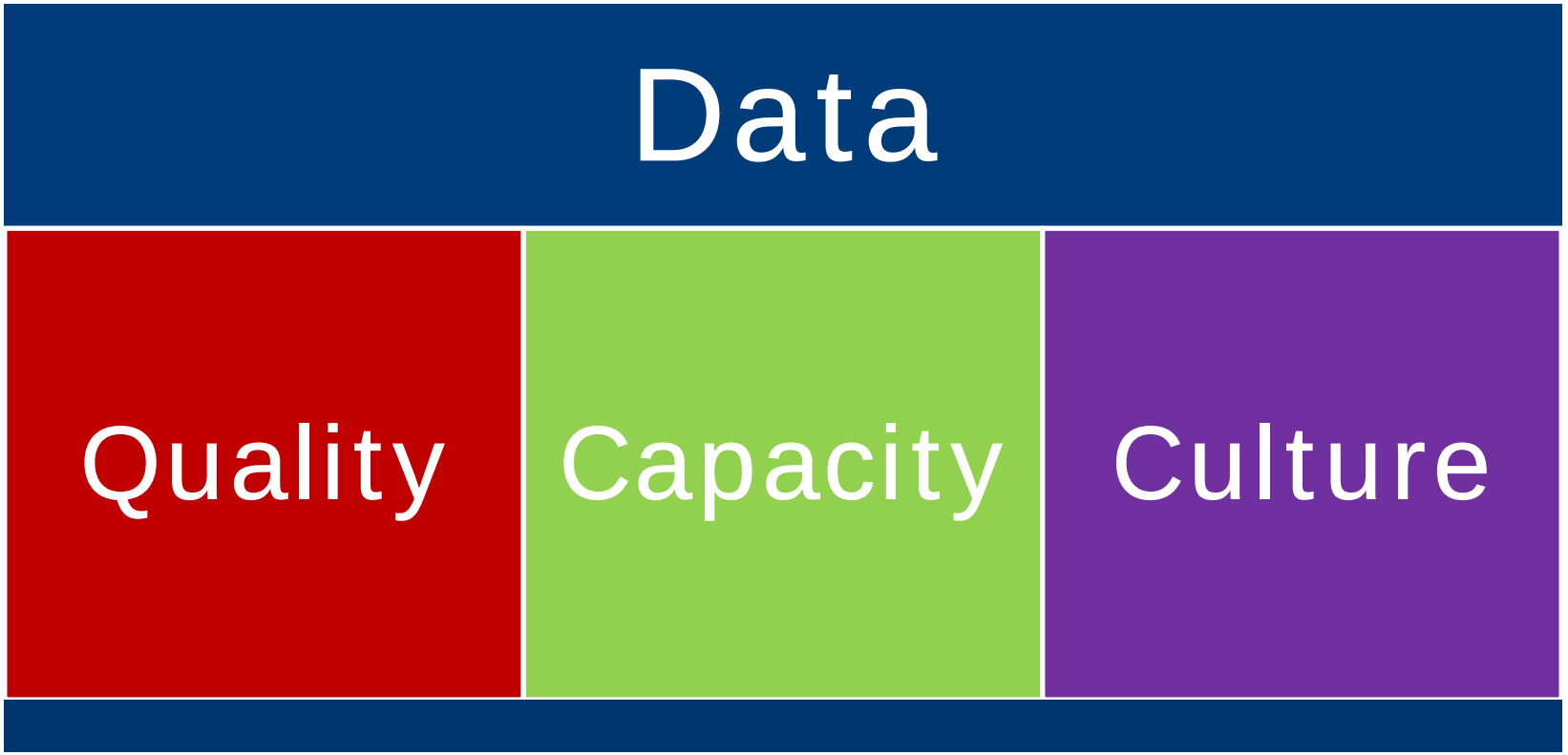


Exposing the heartwood



The foundations for data use

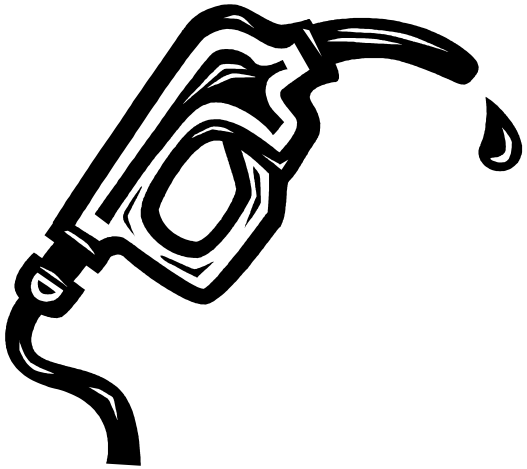
(Ronka, Geier & Marciniak, 2010)



Data Quality

High **quality** data requirements:

- Systematic organisation
- Use of multiple measures
- Standardised and clean
- Disaggregated (to the level of individual student)
- Currency



How data quality is most often compromised

Inconsistent or incorrect use of identification numbers (i.e., school ID or NSN)

Missing, incorrect or duplicate values

Incorrect assessment information

Inconsistent data entry practices

Lack of information about interventions or programmes

GIGO – Garbage In, Garbage Out

Source: Bernhardt (2007) Translating data into information to improve teaching and learning. p. 45

Data Capacity

Capacity requirements include:

- Technology to support (e.g., SMS)
- Accessibility of data
- Formats that aid interpretation
- Data and assessment literacy skills
- Identification of skill gaps, followed by
- Professional development

Data Culture

High trust – earned and respected!

A **Culture** that fosters data use include:

- Vision clearly articulated
- Commitment to on-going improvement
- Empowering of teachers, accompanied with
- Culture of collaboration, and
- Accountability for results
- Modelling by school leaders

Data for Starpath

- Includes
  - ‘hard’
  - ‘soft’
  - quantifiable
  - qualitative

- Specific focus on ‘student achievement’

Data also need to be …

- Systematic
- School-wide
- Organised
- Accessible
- Timely
- Credible
- Disaggregated

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But most importantly, data need to be …

USED

Data Use – there's plenty of evidence!

- Data use leads to improvements in student learning

  (Armstrong & Anthes, 2001; Cawelti & Protheroe, 2001; LaRocque, 2007; Snipes, Doolittle & Herlihy, 2002; Symonds, 2004; Tognieri & Anderson, 2003; Williams, Kirst, Haertel et al., 2005).

- Increased attention paid to data use also improves student learning

  (Heritage & Yeagley, 2005; Ikemoto & Marsh, 2007; Mandinach & Honey, 2008; Wayman & Stringfield, 2006).

BUT

- Expansion of data *gathering* without a corresponding jump in data *use* does **not** improve student learning.

  (Data Quality Campaign, 2006; Hamilton et al., 2009; Rothman, 2008).

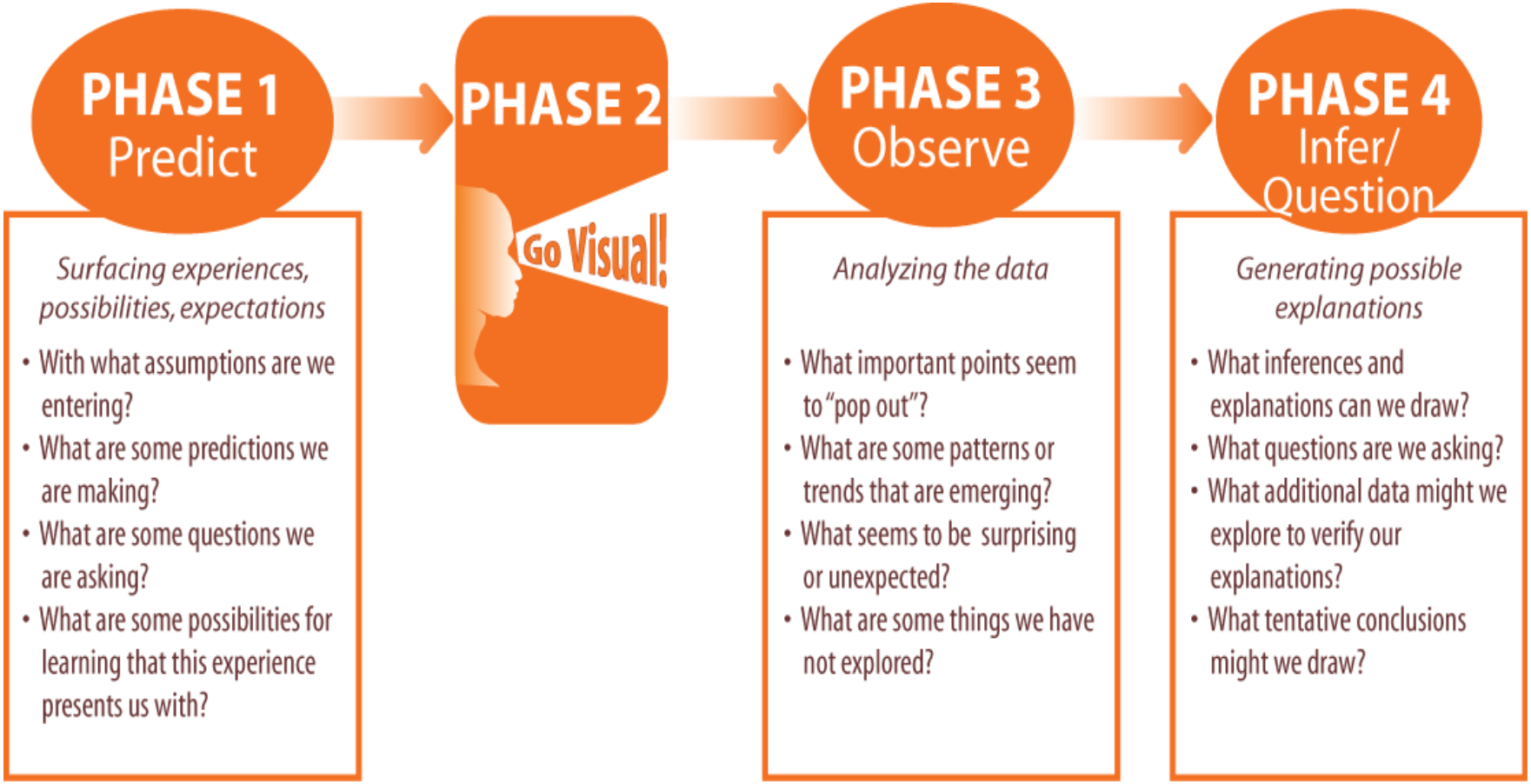
Data & Teaching as Inquiry

"Visible Learning

Data teams and school improvement

- Effective schools **frequently monitor** progress
- Schools need to be results focused and **data driven**
- Data teams **need accurate data** on what is happening at the school to make decisions
- Schools must have a **systematic way** of collecting, organizing, analyzing, and using data
- All staff must be **collectors and interpreters** of data

Data-based discussions



Adapted from Wellman, B., & Lipton, L., 2004. *Data-Driven Dialogue: A Facilitator's Guide to Collaborative Inquiry.* Sherman, CT: MiraVia, LLC. Used with permission.

Phase 2: Go Visual!

Building the Bridge Between Data and Results

Getting the picture

Purposes:

- Make handling dense data sets more comprehensible
- Treat the graphical aspects as critical components of analysis
- Provide interface for asking questions of the data (data teams/PLCs), and forming/testing hypotheses
- Create explorers/inquirers, **not** statisticians

Scenario: Feb 2015, Y11 XXX class, and some Y9 & 10 data on them

ID	Y9 T1 aRs	Y9 T2 aRs	Y10 T1 aRs	Y10 T2 aRs
5251	2A	2P	3B	3B
300927	2A	2A	2P	3P
300930	4B	4A	5P	5B
300933	2P	2P	2P	3P
300973	4A	5B	6B	6B
300977	2P	2P	2P	3P
300990	4A	4A	5P	5P
300997	3A	4P	4A	5B
300998	4B	4B	4B	4P
301026	3B	2A	2A	3P
301028	2A	2P	2A	3B
301038	4A	5A	5A	6B
301053	2B	2P	3B	3P
301066	3B	3B	2P	3B
301101	6B	6B	5P	5P
301106	4P	3A	4A	5B
301356	5A	6A	>6A	6P
301456	5P	4A	6B	5P
301534	4B	4A	4P	3P
301553	4B	3P	3B	4P
301556	4A	3A	4A	5B
302357	4B	3A	3B	3B

Incomprehensible?
Too dense?
HELP!! I'm out of here!!!!

Add a little colour

(using conditional formatting in Excel)

ID	Y9 T1 aRs	Y9 T2 aRs	Y10 T1 aRs	Y10 T2 aRs
5251	2A	2P	3B	3B
300927	2A	2A	2P	3P
300930	4B	4A	5P	5B
300933	2P	2P	2P	3P
300973	4A	5B	6B	6B
300977	2P	2P	2P	3P
300990	4A	4A	5P	5P
300997	3A	4P	4A	5B
300998	4B	4B	4B	4P
301026	3B	2A	2A	3P
301028	2A	2P	2A	3B
301038	4A	5A	5A	6B
301053	2B	2P	3B	3P
301066	3B	3B	2P	3B
301101	6B	6B	5P	5P
301106	4P	3A	4A	5B
301356	5A	6A	>6A	6P
301456	5P	4A	6B	5P
301534	4B	4A	4P	3P
301553	4B	3P	3B	4P
301556	4A	3A	4A	5B
302357	4B	3A	3B	3B

Same data: grouped

ID	Y9 T1 aRs	Y9 T2 aRs	Y10 T1 aRs	Y10 T2 aRs
301053	2B	2P	3B	3P
300977	2P	2P	2P	3P
301028	2A	2P	2A	3B
5251	2A	2P	3B	3B
300927	2A	2A	2P	3P
301026	3B	2A	2A	3P
301066	3B	3B	2P	3B
301553	4B	3P	3B	4P
302357	4B	3A	3B	3B
301106	4P	3A	4A	5B
301556	4A	3A	4A	5B
300997	3A	4P	4A	5B
300998	4B	4B	4B	4P
301534	4B	4A	4P	3P
300930	4B	4A	5P	5B
300990	4A	4A	5P	5P
300973	4A	5B	6B	6B
301038	4A	5A	5A	6B
301456	5P	4A	6B	5P
301101	6B	6B	5P	5P
301356	5A	6A	>6A	6P

Then adding gender, what do you notice?

ID	Y9T1aRs	Y9T2aRs	Y10T1aRs	Y10T2aRs	Gender
301053	2B	2P	3B	3P	M
300977	2P	2P	2P	3P	M
301028	2A	2P	2A	3B	F
5251	2A	2P	3B	3B	M
300927	2A	2A	2P	3P	F
301026	3B	2A	2A	3P	M
301066	3B	3B	2P	3B	M
301553	4B	3P	3B	4P	M
302357	4B	3A	3B	3B	F
301106	4P	3A	4A	5B	F
301556	4A	3A	4A	5B	M
300997	3A	4P	4A	5B	M
300998	4B	4B	4B	4P	F
301534	4B	4A	4P	3P	F
300930	4B	4A	5P	5B	M
300990	4A	4A	5P	5P	F
900973	4A	5B	6B	6B	F
301038	4A	5A	5A	6B	F
301456	5P	4A	6B	5P	F
301101	6B	6B	5P	5P	F
301356	5A	6A	>6A	6P	M

Same data: Pivot table/Cross tab

Reading	Y10	2B	2P	2A	3B	3P	3A	4B	4P	4A	5B	5P	5A	6B	6P
Y9	2B					1									
	2P					2									
	2A				2	1									
	3B				1	1									
	3P														
	3A										1				
	4B				1	1			2		1				
	4P										1				
	4A										1	1		2	
	5B														
	5P											1			
	5A														1
	6B											1			

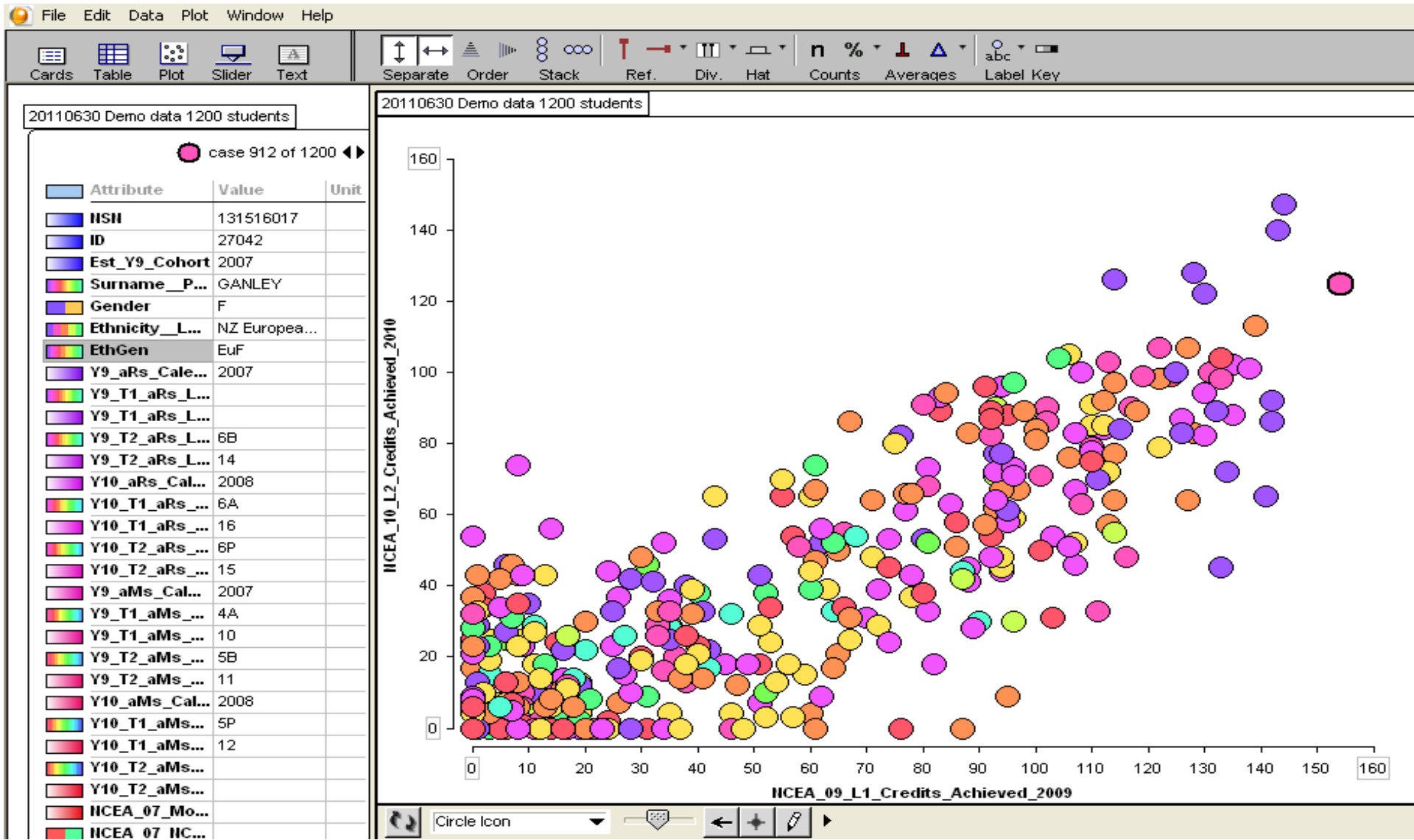
Interlude - Tinkerplots

Dynamic software for visualising data

... let your eyes do the walking!

Close cousin = Fathom

L1 credits 2009 v L2 credits 2010



Traffic lights for Year 13

ID	Opt A		Opt B		Opt C		Opt D		Opt E		Opt F		NCEA	M	E
128363391	L3TRMTP		L3STUZS		L3VISHA		L3ENGSL		L3HOSCK		L3MPAMH				
128363391	L3TRMTP	24	L3STUZS		L3VISHA	16	L3ENGSL	17	L3HOSCK	30	L3MPAMH		87	10	6
128362803	L3DRXNT		L3ARTDK		L3VISHA		L3MEDZE		L3DRANT		L3ENXEW				
128362803	L3DRXNT		L3ARTDK	18	L3VISHA	26	L3MEDZE		L3DRANT	24	L3ENXEW	21	89	24	13
123043247	L3STUZS		L3ARTDK		L3ECOJR		L3ENGTA		L3PEXWS		L3MASCH				
123043247	L3STUZS		L3ARTDK	18	L3ECOJR	9	L3ENGTA	7	L3PEXWS	17	L3MASCH	6	57	13	
128362949	L3ENPWN		L3MBTSS		L3PEDWS		L3AUTSU		L3MAPGE		L3MPAMH				
128362949	L3ENPWN	15	L3MBTSS	15	L3PEDWS	15	L3AUTSU	15	L3MAPGE	0	L3MPAMH		60	4	
123044003	L3VISHA		L3AUTSU		L3SCPMB		L3MASCH		L3MECSS		L3ENPWN				
123044003	L3VISHA	14	L3AUTSU	16	L3SCPMB	17	L3MASCH	6	L3MECSS	16	L3ENPWN	18	87		
128365113	L3GTOZG		L3GEOSC		L3PEDWS		L3ENGTA		L3HOSCK		L3MASCH				
128365113	L3GTOZG		L3GEOSC	16	L3PEDWS	15	L3ENGTA	6	L3HOSCK	30	L3MASCH	6	73	15	

Phase 3: Observe

- What important points seem to “pop out”?
- What patterns or trends are emerging?
- What is surprising or unexpected?
- What questions do we have now?
- How can we find out?

Phase 4: Infer/Question

- What are some inferences we are drawing about these data?
- What are some implications to consider as we prepare to look at student-learning and to help manage student improvement?
- What students should we focus on?

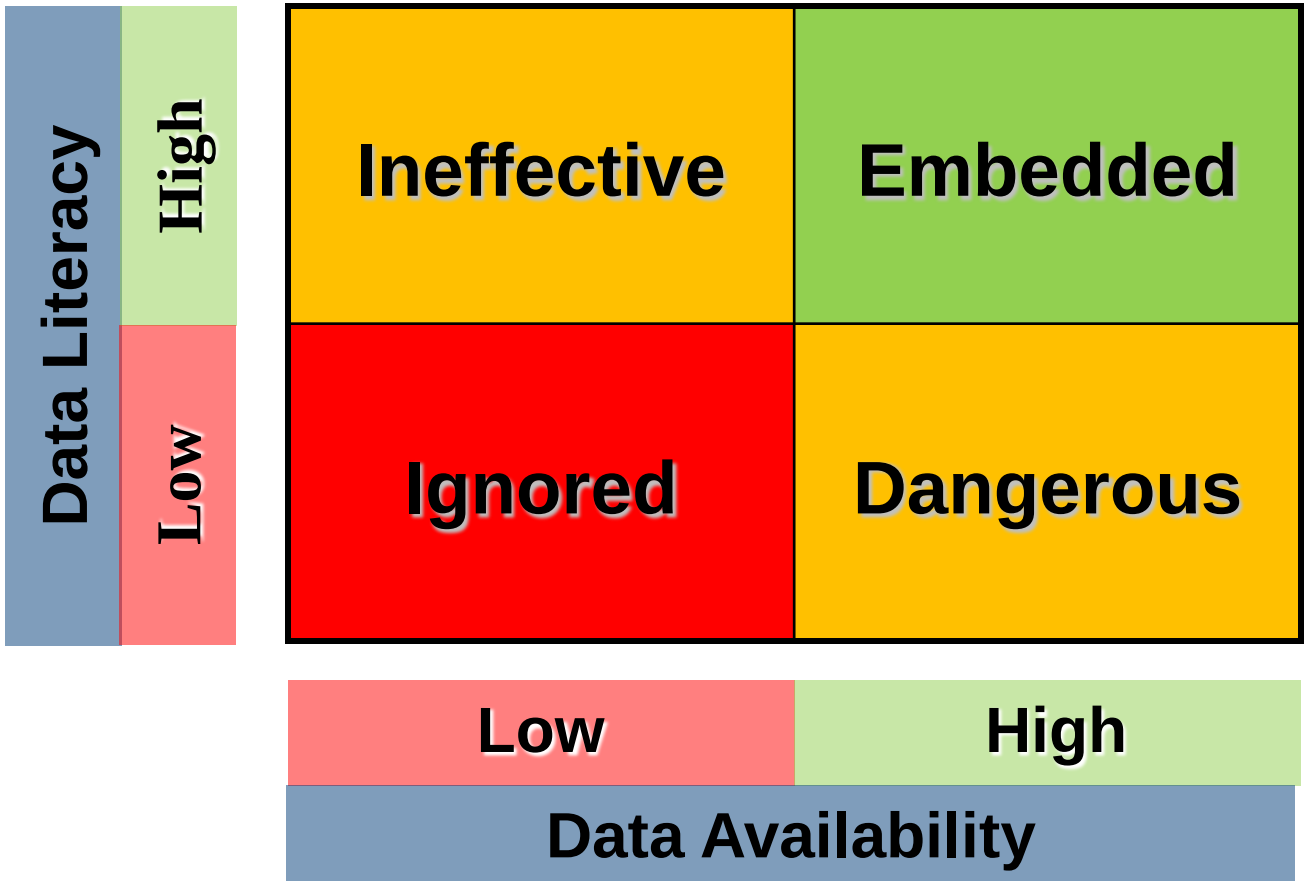
Creating a ‘data culture’ in school

- Senior leaders must lead, and get …
- Buy-in from all staff
- Clear, concise and easy to understand data and systems
- Promoting confidence and understanding in the use of data
- Viewing data as a ‘friend’, not a ‘foe’

Creating a ‘data culture’ in school

- Whole school approach to data
- Strategic vision linked to use of data in the classroom
- Placing students and student level data at the centre of data and performance management systems
- Underpinned by a moral imperative that **all children can succeed**

Data Availability and Data Literacy



The “right” question, or the “right” answer?

“Far better an approximate answer to the *right question … than an exact answer to the wrong question.”*

John W. Tukey

Source: Tukey, J. W. (1962). The Future of Data Analysis**.** *The Annals of Mathematical Statistics, 33, 1, 1-67.*

A good question …

- Can be answered
- Meaningful/valuable
- Genuine
- Researchable
- Can not be answered yes or no

Some good starter questions

- What patterns can you see?
- What do they tell you?
- Which students and student groups in your school are achieving well?
- Are all students, including disadvantaged groups, fulfilling their potential or should they achieve more?
- Do students who did well in NCEA Level 1, lose momentum and fail to make progress?
- Are the most disadvantaged students (e.g., those with SEN), making sufficiently rapid progress to catch up with their peers?
- Are the most able students stretched and challenged sufficiently?
- Are overall results at the end of NCEA Level 2 concealing poor progress?

Damn the ‘gap’!

Know the gaps

Identify gaps (G&T, SEN, ethnicity, gender)
Understand the gaps
Make gaps visible
Promote use of data
Build data confidence

Celebrate gap-busting!

Celebrate / promote gap-narrowing
Capture and share ‘*what works well*’
Gain a positive report card
Achieve successful ERO report

Narrow the gaps

Deliver “Quality First” teaching
Progression planning
Intervention (e.g. 1:1 tuition, RTLB)
Specialist pedagogy
Work with parents and families
Area-based initiatives / partnerships

Mind the gaps

Assessing students’ progress
Regular tracking and review
Challenge from BoTs
Relentless focus on gap narrowing
Aim for stretch targets

Barriers to building data culture / data use

- Lack of training in data use
- Haphazard data collection
- Lack of leadership
- Outdated/poor technology
- Unclear priorities and goals
- Lack of teamwork
- Distrust of data & its use

- So … we are there to …

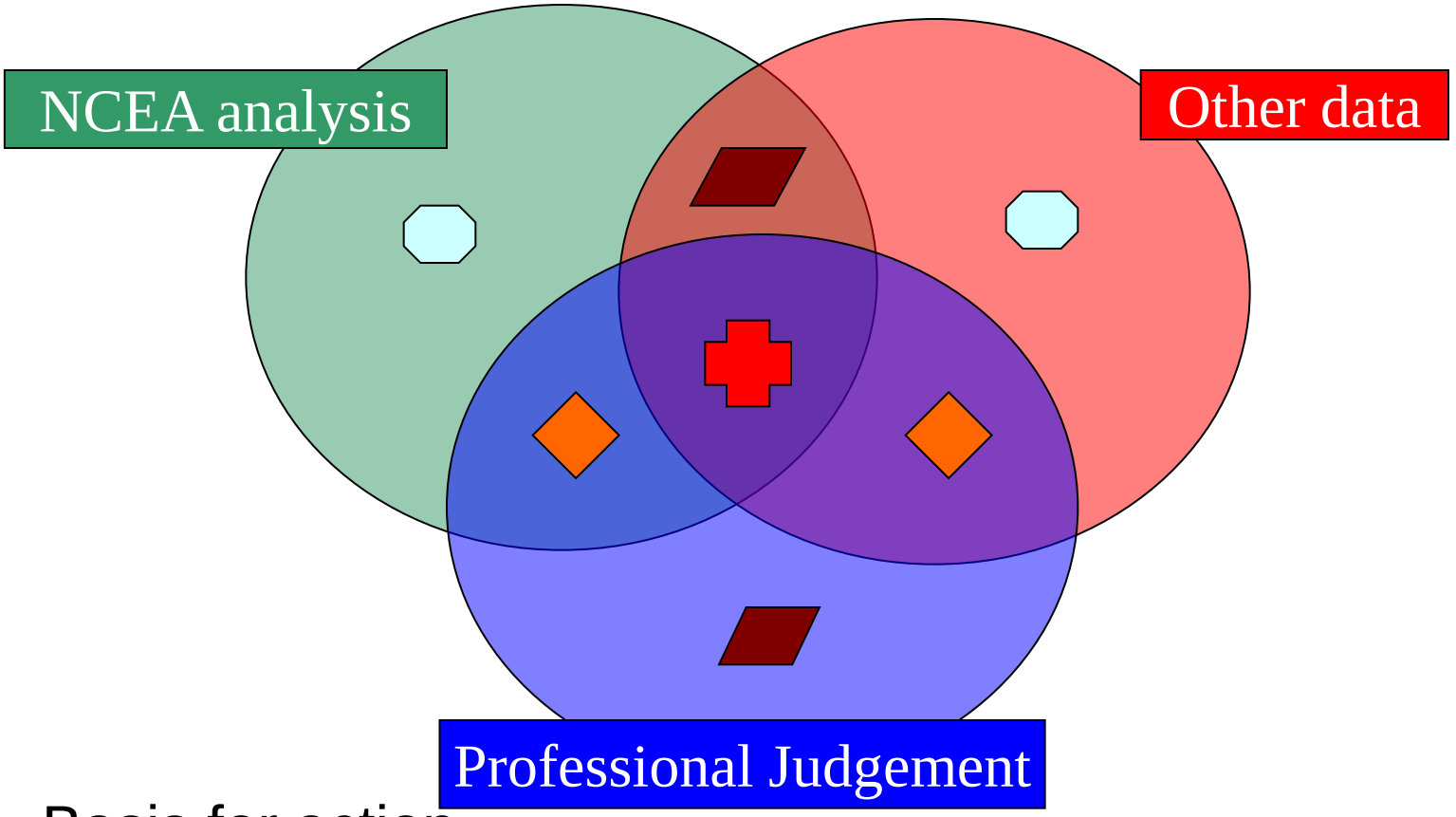
How true do you think is this?

Why do we avoid data?

The reason is fear— of data's capacity to reveal strength and weakness, failure and success. Education seems to maintain a tacit bargain among constituents at every level not to gather or use information that will reveal a clear need for improvement: where we need to do better, where we need to make changes. Data almost always point to action— they are the enemy of comfortable routines. By ignoring data, we promote inaction and inefficiency.

(Schmoker, 1999, p. 39)

The concept of triangulation



Basis for action

Check Accuracy

Investigate Further

Challenge Assumptions

Starpath commits to …

- helping teachers/schools improve
- assisting with key tasks
- collaborating in PD/training to effectively implement DUACTS within school
- monitoring of progress
- on-going research – to design a better mousetrap!

What is expected of you?

Crouch… touch…set!

This means …

- Commitment to evidence based improvement
- Implementation of programme & practices (adapted to local circumstances if/where necessary)
- Working with key personnel & in data teams
  – inquiring mind
  – collegial nature, and most of all
- Engaging with meaningful up-to-date data
- Get to know how to use your SMS

So what's this got to do with me? I teach …

Your role as a teacher … think about:

- Who uses the data that you enter (e.g., parents, students, board members, the principal, other teachers, payroll staff, the news media)?
- How do you use data to make important individual and group instructional decisions (e.g., progress toward curriculum standards, need for remediation and/or intervention)?
- What is the effect of the data you enter on students' educational experiences?
- What is the impact of incomplete or inaccurate data?
- What can you do to increase the accuracy of data?

Your role as a teacher … things to do:

- Ask for and attend training on the use of data in the instructional programme
- Ask for appropriate instructions and documentation
- Do not be afraid to ask questions about your data responsibilities
- Identify barriers to effective data entry and communicate these to the principal or other appropriate personnel
- Respect the privacy and confidentiality of student data by protecting data from students and unauthorised personnel

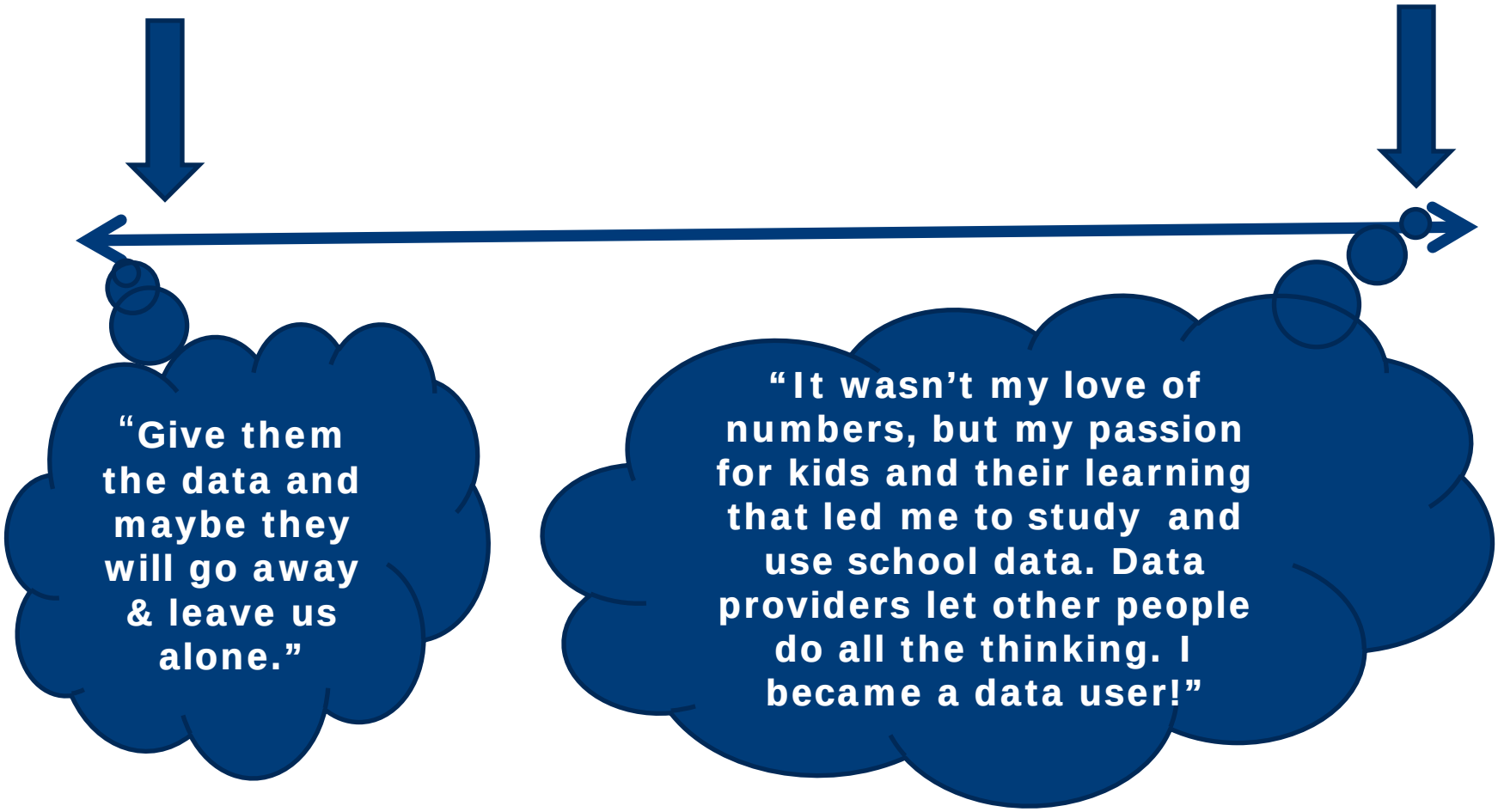
Your role as a teacher (contd)

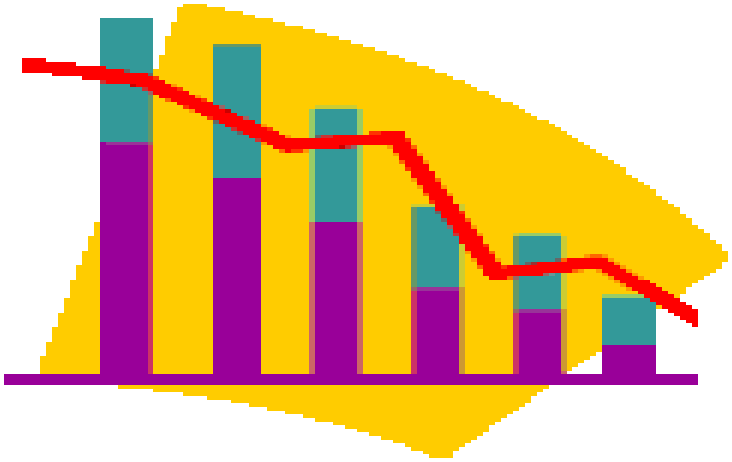
- Follow your school's data security policies and procedures (e.g., change passwords frequently, do not share passwords, etc.)
- Enter data accurately and in a timely manner
- Check your work for accuracy and completeness
- Ask for help if you make an error
- Follow up on missed assessments
- Share good ideas and best practices about data entry with your peers
- Check calendar for data reporting deadlines so that you can allocate time for data entry

Where do you think you will fit?

Data provider

Data user





"Every organization is perfectly designed to get the results it achieves."

--W. Edwards Deming

Let's change the design!

Guide for Data Teams

(Source: adapted from Sargent, 2003)

Eight steps for success.

1. Organise and set the context
2. Collect and organise the data
3. Analyse the data
4. Develop hypotheses
5. Develop improvement goals
6. Design specific strategies
7. Define evaluation criteria
8. Make the commitment to effect change

1. Organise and set the context

With all sights on improving student achievement and maximizing learning for all students, the collection of data should be seen as a natural and essential process for the organization.

This awareness and understanding can be achieved in several ways:

- Supervision and evaluation expectations that require evidence of student achievement to be collected and reported
- Professional development opportunities that train educators in the processes of assessment and the use of data as a basis for decision-making
- Putting systems in place to collect and manage the data
- Continual reinforcement of data collection and use through district practices and procedures
- Ongoing communication of student and school performance data

2. Collect and organise the data

Collecting data should be a planned, purposeful process. Not all data may be relevant so care needs to be taken in collecting that which will be helpful. Generally speaking, school data can be grouped into the four Bernhardt categories:

- Student achievement - how well are the students learning?
- Demographic - who are students in the school?
- Education programmes - who are the teachers in this school and what is the curriculum?
- Perceptions - how people feel about the school?

3. Analyse the data

Four analytical lenses, that when brought together, show clear patterns that provide focus for improvement plans and strategies.

- Individual student patterns – determine whether each student is making progress appropriate to…
- Achievement patterns – analyse results by year level and subject and then by skill patterns in a subject. Determine strengths, weaknesses, and patterns.
- Student patterns – analyse results based upon student demographic information. Determine how various groups of students are performing.
- Programme patterns – analyse results based upon education programme information. Determine how successful the programme is in increasing student achievement.

4. Develop hypotheses

The patterns that emerge through data analysis serve as the basis for formulating hypotheses that lead to an improvement plan. *Developing hypotheses is the process of formulating questions that explain the data.*

This questioning process helps to search and find meaning in the data.All hypotheses should be expressed at this point – **no holds barred**! Again, high trust.

Hypotheses then can be disputed if evidence can be shown that disproves an explanation. Many hypotheses usually are offered, but eventually the list is reduced into just a few of the most valid theories.

4. Develop hypotheses (example)

Problem: *Achievement levels in maths drop year by year and are at very low levels in Years 7, 8, 9 and 10. They pick up only slightly in Years 11 to 13.*

Sample hypothesis	Evidence to contrary
Our students are apathetic. They are turned off and just don't care enough to do their homework.	REJECT. We checked attendance, behavior and homework, and see no real pattern there with maths performance. These same students perform well in other subjects.
Our standards are just too high. The tests are too difficult, year by year.	REJECT. We looked at test results nationally and in neighboring schools. Maths performance is low nationally and locally, but our performance is particularly low comparatively. Also, we think the test items are fair for the year levels assessed.
Our math teachers in the junior classes have not had the proper training to teach the current maths curriculum.	ACCEPT AS A POSSIBILITY. We looked at their qualifications and training – these teachers do have appropriate qualifications, BUT when we looked at the record of PD activities, we found that very little maths PD has been provided for these teachers in 5 years.

5. Develop improvement goals

Goals should be focused and clearly stated. They should also be ...

- **Data-based**
- **Few** - focused on the primary purpose of improving student achievement
- **Measurable** - SMART goals
- **Sustainable** - systemic and sustainable
- **'Customer'-driven -** meet the needs of the school's 'customers' - students, parents, BoT, community
- **Consensus**

6. Develop specific strategies

- For each goal, several strategies need to be designed.
- Specific strategies can come naturally from the hypotheses that were accepted as possibilities.
- For each strategy, give a specific timeline and identify a person responsible.

Sample strategy

Formulate a mathematics team representing Years 7 to 10, with representatives from intermediate and high school mathematics. The team will be charged with making textbook and materials adoption recommendations. The primary focus will be on these middle years, but issues regarding primary and senior high school mathematics programmes will be heard, and action taken as necessary to maintain a rigorous, connected scope and sequence that is curriculum and standards-based.

7. Define evaluation criteria

- Be prepared to evaluate the success of its improvement efforts – this aspect often gets “short-shrift”.
- Team members should discuss each strategy and identify the measures that will be used to examine to what degree the strategy was successful.
- Evaluation criteria may consist of test scores, attendance count, records of meetings held, actions accomplished, observations, survey tabulations, and a variety of other measures.

8. Make the commitment to effect change

An improvement plan on paper is just that - just a piece of paper. It's up to the school improvement team and others to make the commitment. Commitment can be demonstrated by:

- signing the improvement plan.
- BoT adopting the improvement plan.
- building incentives into the plan once the goals are reached e.g., a celebration, further PD.
- professional development opportunities are provided that are coordinated to the school's improvement goals.
- scheduling regular/periodic meetings to discuss progress and success.

Starpath's cautionary tales

1. Use the SMS to store all achievement data.
2. Always use and retain the student's unique ID.
3. Adopt policy to use a consistent name for each student in all files.
4. Store all original data files in a data archive file.
5. Check data for integrity.
6. Avoid missing data.
7. Changing the school's SMS is a time for carefully planned change management.