STATISTICAL LITERACY: BRINGING CONCEPTS TO LIFE IN OUR DIVERSE AND EVER CHANGING USER COMMUNITIES – THE EXPERIENCE OF THE AUSTRALIAN BUREAU OF STATISTICS

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ABSTRACT
This paper discusses recent experiences of the Australian Bureau of Statistics in building statistical capability, including the introduction of an Integrated Statistical Capability Framework, adopting new strategies and building new partnerships, to help bring statistical literacy competencies to life in our diverse and ever changing user communities.

INTRODUCTION

Building statistical literacy is the means by which National Statistical Institutes (NSIs) empower governments and the wider community to access and use data effectively for informed decision making. The Australian Bureau of Statistics (ABS) is committed to achieving the objective of a more statistically literate community through the implementation of an integrated statistical capability development framework and development and delivery of resources and programs that build the ability of data users to make sense of statistics.

Without an increase in the level of statistical literacy in our communities, no matter how effective NSIs are in improving the range, relevance and accessibility of official statistics, the ability of data users to add value to the decision making process will be constrained.

A challenge for NSIs is how best to build a more statistically literate community when data users are diverse in terms of their roles, needs, abilities and learning preferences, and the relevance of statistics as a part of our everyday lives is not always well understood.

The means by which NSIs deliver statistical literacy content can be as important as the content itself. The increasing range of mechanisms through which statistical literacy abilities can be enhanced provides opportunities for NSIs to be more relevant to those from whom we collect information, and for those who need to be effective data custodians and data users.

As a result of a rapidly changing environment, both internal and external, the ABS is adopting new strategies and approaches to respond in a more integrated and engaging manner to the need for a more statistically literate workforce and society.

THE ABS INTEGRATED STATISTICAL CAPABILITY FRAMEWORK

In addressing the issue of statistical capability, of which statistical literacy is an element, the definition and categorisation of the problem was not as coordinated and cohesive as it needed to be, which impacted on the overall ability of the ABS to make a “demonstrable difference".

To address this situation the ABS is now implementing a standardised Integrated Statistical Capability Framework, developed by the ABS in 2012, as the basis for a more effective and strategic approach to building capability:

Statistical Capability Dimension	Target Audience										
		Government		Education				Industry			
	Internal ABS	Data producers	Policy developers	Educators	Students (Yr 1 - 12)	General Community	Media/ Opinion leaders	Small & medium size businesses	Industry associations & large businesses	Not for Profit sector	NSOs (Asia Pacific region)
Statistical Leadership	✔	✔	✔				✔				✔
Statistical Production	✔	✔									✔
Statistical Literacy	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

Figure 1. *The Integrated Statistical Capability Framework.*

As statistical literacy development strategies in the community can take years to realise, there will continue to be a need to have statistically literate staff with the ability to identify the stories in the data and communicate these for maximum community benefit. As a consequence, a key initial application of the Framework has been to guide organisational efforts to ensure a statistically capable workforce so that the ABS can continue to fulfil its role as a producer of official statistics that describe the world in numbers, as well as support data users to develop their skills to better understand the story contained in the numbers.

The Integrated Statistical Capability Framework has been incorporated by the ABS into the *ABS People Capability Framework* which is focussed on building ABS staff capability. The framework has also been published as a handbook: *Statistical Skills for Official Statisticians 2012* to provide guidance primarily for ABS staff around the statistical skills, knowledge and expertise statisticians require for designing and delivering statistical solutions that meet the changing needs of governments and the community.

Further to the use of the Framework for more effective staff development purposes, this framework will also be pivotal in improving the coordination and integration of the activities of the various ABS areas involved in building the statistical literacy of external data users and producers. The Framework will assist with: capability gap assessments; determining capacity to fill these gaps; strategic and tactical decisions about priorities; cataloguing the various learning resources available, and enabling the ABS to provide advice on best practice methods

The Integrated Statistical Capability Framework is a foundational element that will enable the ABS to more effectively develop, implement and monitor a range of strategies aimed at building statistical literacy, and other statistical capabilities, across all the identified target groups.

STRATEGIES TO BUILD STATISTICAL LITERACY

The use of the Integrated Statistical Capability Framework as the basis for building statistical capability is being supported by a range of strategies that effectively engage a wide range of target groups and overcome the limitations of the more 'traditional' methods of delivering capability building, such as training courses and static text based information.

Recent strategies used by the ABS to bring statistical literacy (as distinct from statistical leadership or statistical production) concepts to life in our diverse and ever changing user communities include:

USING SPORT TO DEVELOP AN INTEREST IN STATISTICS

The ABS has looked to sport, which many young people have an interest in as well as an aptitude for, as the basis for a fun and engaging means of developing a greater awareness of and interest in statistics.

In 2012, the ABS released a suite of resources based on Australia's own football code, Australian Rules Football, colloquially known as "Aussie Rules" or "Footy", as the first part of a proposed Sports Stats series of statistical literacy resources to help build some basic statistical awareness and skills. In 2013, the ABS is scheduled to release a further suite of resources based on the sport of the National Rugby League (NRL).

Footy Stats, and NRL Footy Stats, the names given to the two sports-based products developed by the ABS, are a suite of free web-accessible resources. The resources involve groups of teenage youth participating in a range of sports-based activities and discussions that help develop skills in how to collect, analyse, interpret and communicate basic statistical concepts, with the guidance of a facilitator. The facilitator could be a teacher if the activity is done as part of a school program, or a suitable adult if done in a community context.

The program has a focus on Australia's Indigenous youth, who too often experience high levels of socio-economic disadvantage and lower than average retention rates in the formal education sector. It is also relevant to other young people to help build some basic statistical abilities. Importantly the activities help raise awareness of the possible use and value of statistics in their daily lives, as well as the role of the ABS as the national statistical organisation.

The program draws upon key learnings from child enrichment programs in Australia which indicate that programs which focus on a child's strengths rather than any notions of learning deficits have more success in developing social, literacy and numeracy skills. As such, the development and structure of the program has taken into account the need for the learning environment to promote:

- independence (doing an activity),
- interdependence (working with others on an activity) and
- self-motivation (leveraging off the participant's strong interest in football),

while all the time placing importance on the notion of having fun.

The development and promotion of both Footy Stats and NRL Footy Stats have been done in partnership with the relevant national sporting bodies, the Australian Football League (AFL) and the National Rugby League (NRL). These experiences have proven to be excellent examples of the willingness and interest of national sporting organisations to work with the ABS to help build the life skills of young people.

'INCENTIVISING' THE LEARNING PROCESS

To more effectively engage people with the process of increasing their statistical literacy there is a need to consider what will make the message that it is important to be statistically literate more appealing to our target audiences. To say that it is in someone's interest to become more statistically literate needs to be communicated in a way that effectively addresses the question: "How will learning more about statistical concepts, analysing and communicating data be of benefit to me?"

To maximise personal commitment to, and engagement in, the learning process, the ABS is considering a wider range of options about how to get the identified target audiences engaged, as an adjunct to the investments in developing the content of the statistical literacy resources.

The use of incentives are one such option, where an incentive is defined as being something that appeals to a person, such as: receiving recognition; improving career prospects; being provided with an opportunity to demonstrate to others what you can do; receiving a prize, or simply having fun.

One approach to providing 'incentives' draws upon the practice of commercial companies where the use of promotional techniques such as the chance to win a prize, buy one get one free, free tastings/samples, and various other options are commonplace. In these scenarios the intent is to encourage someone to try (a potential consumer), and then hopefully they will become an ongoing consumer once they have experienced the 'benefit' of the product or service.

While incentives are a means of creating the initial interest, it is the associated product/service itself that will ultimately help answer the question "What is in it for me? Why should I purchase/use this product/service?" While there are considerations for agencies which are Government funded in terms of how public monies are spent which may limit the use of incentives, the question is fundamentally one of cost versus (achieved) benefit: "How much does it cost us to develop and promote our current suite of statistical literacy resources compared with how well are we effectively engaging with our various target groups?".

The use of social media by consumers, the associated expectations of immediacy of access and engagement, and the widespread use of incentives have changed the landscape for NSIs in terms of how best to engage with and communicate the message to the community about the value of being statistically literate and raise awareness about the options available to enhance literacy.

In 2012 the ABS trialled offering a popular prize (an Apple iPad), coupled with the use of social media to raise awareness about a new statistical literacy resource (*Statistical Language*), to seek feedback on whether the resource was useful and how it could be enhanced. This proved to be one of the most successful user feedback processes conducted by the ABS and showed an identifiable relationship between using social media (Facebook and Twitter) and the provision of user feedback.

In relation to the question "How does seeking feedback relate to building statistically literacy?" the feedback had to demonstrate that the resource had been read and considered, as evidenced by the quality and relevance of the feedback that was provided. The role of the

incentive (the prize) was simply to get the attention of those using social media and to provide the link to the ABS website where the 'promotional' information and actual statistical literacy resources were located.

The use of these types of incentives, however, needs to be considered in the context of a wider statistical literacy enhancement strategy. Providing an incentive in isolation from having associated statistical literacy infrastructure and key messages about why it is important to be statistically literate, is unlikely to bring about the required outcome of improved statistical skills in the community. Conversely, having the available infrastructure without effective means of engaging the community will also lead to less than optimal outcomes.

No matter what type of incentivised process is used, the idea of an incentive is all about understanding what is important to the individual and leveraging that interest.

INTERACTIVE LEARNING

Learning through hands-on participation is by no means a new concept and the approach forms the basis of many highly successful statistical literacy building initiatives offered by NSIs internationally. Current examples in place across a number of countries include the international Census At School program which helps build the skills of young people through hands-on involvement in collecting and using data, as well as building a greater understanding of and appreciation for the role of official statistics (such as the census of population and housing).

As evidenced by the Sports Stats program and the range of statistical literacy resources developed for the schools sector, the ABS is committed to pursuing the benefits of investing in resources that build the interest in and statistical skills of our youth. A range of interactive educational resources and games for students are provided in the *Education Services* pages of the ABS website, and supported through engaging a specialist teacher to support the work of the ABS in this area.

Extensive efforts have also been undertaken in recent times by the ABS, in collaboration with key education sector stakeholders, to capitalise on opportunities to influence the content and focus of statistical training as part of the review of the Australian National Curriculum for schools. Significant senior level ABS engagement has been undertaken to help expand the statistical content in the new curriculum.

For the ABS, a highly successful initiative that allows people to drive the engagement and learning process has been the *2011 Census Spotlight*. This was developed as an online promotional vehicle in the lead up to the 2011 Australian Census and its wide appeal related to the visual quality, humorous nature of the animation and dialogue, as well as its engaging and personalised approach. The success of this initiative as a promotional strategy has been internationally recognised, but it's effectiveness as a statistical literacy development tool through its role in explaining some key concepts (i.e. population change), potentially without the user even realising they are being 'educated' while they were being entertained, should not be overlooked.

THE "USER-PRODUCER" DIALOGUE

Within the context of government as a (potential or actual) key data user and source of important administrative data, developing the relationship between data users and producers to improve evidence informed policy decision making has been a key area of attention for the ABS. The truism that "good data does not guarantee good decisions" underpins many ABS efforts to build the statistical capabilities of those who develop, implement, monitor and review government policy and programs so that are able to use data more effectively and intelligently.

A major initiative in this space during 2012 by the ABS was a series of workshops known as "Rethinking Statistics", based on an Organisation for Economic Co-Operation and Development (OECD) program. The master workshops brought together policy makers and data producers, targeting senior policy managers/officers with an interest in exploring the "other side of the statistical divide" and the benefits of turning numbers into information and knowledge. For statistical producers the workshop built an understanding of the policy making process and how to better engage with the policy process to ensure statistics are relevant and fully utilised to inform public debate.

The same philosophy of bringing together data users and producers has been applied by the ABS to the development and conduct of "Evidence Informed Policy Making" courses on behalf of the Statistical Institute for Asia and the Pacific during 2011 and 2012.

Without political commitment to the value of evidence informed decision making, and an understanding of the importance of official statistics and statistical capability (including statistical literacy) as an integral input into the policy process, ABS efforts to work with government to enhance statistical literacy will be restricted in their reach and effectiveness.

FUTURE DIRECTION

A current area of investigation for the ABS is the development of learning pathways, including the potential for offering accredited learning options. Post-compulsory education is undergoing a transformation - people are increasingly selective about what they 'consume'. If the ABS is to have a more effective role in building the statistical skills of the community, an approach whereby a more flexible set of defined 'building blocks' that people can access at their own pace and which form part of relevant learning pathways will be required.

Coupled with this is the need to adopt contemporary approaches such as blended learning and eLearning, as well as leverage the wide range of online statistical offerings such as those provided by *Massive Open Online Courses* (MOOCs), and those available via social media channels as well as internet sites dedicated to building capability.

Accreditation in the context of the Australian education and training sector refers to training that is endorsed under the *Australian Qualifications Framework*. As an indicator of value and quality, this offers an incentive to those engaged in the learning process as they will be accessing nationally recognised training which contributes towards a qualification.

Whilst acknowledging that many NSIs are investing in the development of video based or other visual means of delivering modularised learning (an ABS example being the video based *ABS Presents* series for which a new video on crime and justice will be released in 2013, or ABS experimenting with the use of avatars to guide clients through some of the packaged learning materials), there is further scope to move away from our reliance on our websites to more actively embrace the extensively used media channels such as YouTube for such delivery.

The ABS is exploring how best to establish and deliver learning pathways that are relevant and provide an incentive to those in the community to become more statistically literate.

CONCLUSION

The rapid increase in the means available to access and engage with data increases the challenges for the ABS and other NSIs to help equip the community to be able to use the data effectively and appropriately.

The adoption by the ABS of the Integrated Statistical Capability Framework has been an important innovation in positioning the organisation to be more focussed and therefore effective in building the statistical capability including statistical literacy of target groups. Complementing this, the ABS has increasingly adopted more engaging means to bring statistical literacy concepts to life in our diverse and ever changing user communities.

Whilst building the statistical literacy competency of our users is an important outcome and requires an ongoing commitment, it is also necessary to acknowledge that for many users there will continue to be relatively low levels of statistical literacy in the immediate future. As a consequence, there continues to be a challenge for the ABS, as well as all NSIs, to ensure the statistical literacy of staff so that the statistical stories in the data continue to be identified and communicated for maximum community benefit.