Communicating academic library impact through visualisation

Abstract

In recent years, changes to the higher education environment have prompted academic libraries to demonstrate evidence of their value and impact to stakeholders. To achieve this aim, visualising data is an effective way to deliver important messages about impact and value in a clear and persuasive way.

Library and Learning Services (LLS), Griffith University, plays a crucial role as a key centre for information, training, and services aimed at assisting client success and retention. Since Semester 1 2009, LLS has been collecting workshop and consultation data which details client engagement with LLS services. In addition, feedback forms from clients who had attended workshops and/or consultation services offered by LLS between March and September in 2014 were used to produce a range of visual representations to demonstrate the positive engagement of LLS with students.

There has been a positive response to LLS impact initiatives from high-level stakeholders, such as Heads of School and the Pro Vice Chancellor (Information Services), although visualised information has impacted mostly on the LLS and its team members. However, visualised information has more recently informed LLS operational planning and impact and reach advice for senior staff. Visual messages have influenced LLS team members' practice, fuelling the redevelopment of some services and resources. Although there is little hard data to prove the actual extent of audience engagement with visual representations, the authors believe that academic library data has the potential to improve services and communication with

stakeholders when it is presented in an easily understood format. While visualised information has engaged LLS in being aware, and working towards better services for clients, the next stage of the project is to find ways of measuring the degree of engagement with the actual visual products.

Introduction

In recent times, "…information professionals…have had to learn new skills and competencies [in order to promulgate the impact on and value of the academic library to the institution particularly in respect of success and retention]... Significantly, many [of those information professionals] now ask and talk about strategic and proactive measures that both create and prove value for their organizations" (Kassel, 2002). Visualising data[1], for the purposes of demonstrating the impact and value of the academic library to student success and possibly retention, is one way to manage increasing pressures on the academic library.

During 2014, Library and Learning Services (LLS), Griffith University, Queensland, commenced a project which examined some aspects of the impact and value of its academic libraries primarily through undergraduate student feedback. An initial exploration of the literature was carried out around impact, focussing predominantly on the work of Associate Professor Megan Oakleaf, Syracuse University. Oakleaf has undertaken significant work in the area of academic library 'value'. Workshops followed for key LLS staff which provided information that exemplified the collection and visualisation of particular forms of evidence demonstrating impact and value. In response to the need to demonstrate value and impact, and throughout a defined

[1] For the purpose of this paper, 'data' and 'information' are used interchangeably.

period, 2014-2015, Griffith University libraries collected a variety of client feedback data through each of pen and paper and online Google forms. The resultant survey data was then visualised in forms that showed the clients' perception of library value for their study.

This paper outlines the value of visualisation in promoting the impact of some of the academic library's work to the institution. It addresses the principles of visualising and shows how these were reflected in several case studies, the results of which brought about changes to practice and requests for information that would be used at Executive level. The authors contend that whilst the initial part of the project has been successful in raising greater awareness of the value of the academic library and in creating room for more informed decision making, they are unsure of the degree of that effect and will therefore look to a further phase in order to examine this aspect of visualising academic library data.

Literature Review

Impact and value of the academic library

The academic library, the *heart* of the university (Leupp, 1924), contributes to student success and retention (Brown & Malenfant, 2016; Oakleaf, 2010; Soria, Fransent, & Nackerud, 2013). The academic library can be a transformational experience in the lives of its clients (Kuh & Gonyea, 2003). Globally, higher education competes for dollars (Soria, Fransen, & Nackerud, 2016) meaning that the need to *'prove'* the value and impact of the academic library in terms of institutional goals is pressing. There is increasing awareness with respect to the defence of library expenditure and the impact of library professionals on student success and

retention. Haddow (2013) claims that the importance of student engagement and retention is not lost on the academic library and neither is the ability of the academic library to demonstrate its value to, and impact on the scholarly community through creative, relevant and comprehensive evidence gathering practices.

The Griffith University LLS project sought to raise awareness and to influence decision making through the visualisation of relevant data. Evidence types assume many forms, including solicited and inferred (International Organization for Standardization, 2014) and are derived from one or more of the *strategic* (gathered and reported in response to pre-set goals); *operational* (specific to processes/activities); *performance* (economic, efficiency, effectiveness); *or value* (economic / social / environmental) aspects of the business.

Comprehensive evidence can assist the academic library to make decisions around how it might manage its collection and set planning and priorities for services. Given its capability and history in gathering, interpreting, and presenting evidence for client consumption, the academic library can visually demonstrate that it is a key contributor to student success and possibly retention. A picture paints a thousand words and none more so than the use of visualisation to compensate for the fact that numbers, and masses of qualitative text, "…have no way of speaking for themselves. We speak for them. We imbue them with meaning." (Silver, 2012, p. 9). Information visualisation makes it possible to comprehend large data sets in a short period of time (Ware, 2004). Well-presented visualisations which represent quantitative data dramatically enhance the ability to think about (Few, 2009), and to grapple with, the complexities of numbers. Therefore, visualised information has the potential to

contribute to good decision making as the data is immediately accessible. Importantly, though, visualising data as a tool for persuasion or decision making can only be as good as the data gathered.

The process of evidence selection from the masses of data sets available requires that library professionals understand data *choice* in visually demonstrating impact and value. That is, the data and information gathered must be truly representative in order to be effective. To not do this is to 'cherry pick', which at best, skews results and at worst, falsifies conclusions (Bouquin & Epstein, 2015). The subsequent visualising of data and information resulting in a persuasive product capable of changing, or at least influencing, decision making and perception, is complex. To do so, library professionals need to be aware of not only marketing principles but also optimising visual appeal for maximum effect (Brown & Malenfant, 2016; Dunlap & Lowenthal, in press) and accounting for limitations such as proving causality (Azzam, Evergreen, Germuth, and Kistler, 2013).

Information Visualisation

Producing accurate information to support decision making processes in a timely manner is challenging (Anderson, Milner, & Foley, 2008). Anderson et al. (2008) remark that information provided for decision making is often not fit for purpose because it is too difficult to comprehend. Still others (Azzam et. al, 2013) note that when complex information is presented in an easily understood visual format, it is an effective tool by which to communicate with external stakeholders; to engage the viewer and to tell a story about the organisation or phenomena (Arcia et al., 2016). With heightened engagement, visualised information also provides the opportunity for more informed decision making (Kosara & Mackinlay, 2013).

While there are various ways in which to visualise information, infographics is popular and easily designed. Infographics are a visual form of storytelling and they "help the viewer gain [almost immediate] insight from the data" (Stikeleather, 2013, para.1). Visual stories are easy to remember and often compelling (Kosara & Mackinlay, 2013; Wojtkowski & Wojtkowski, 2002). Storytelling is a critical element of visualisation in providing intuitive and instant comprehension of large data (Wojtkowski & Wojtkowski, 2002). Use of visualised data means that memorability can be enhanced through connecting facts with stories (Kosara & Mackinlay, 2013). Research conducted by Borkin et al. (2013) suggests that "visualizations are intrinsically memorable, with consistency, across people" (p. 2313).

Visualised data engages viewers more effectively than simple numeric representations (Hullman & Diakopoulos, 2011) and acts as a 'hook', drawing the viewers' attention to the contents (Smith, 2013). Arcia et al (2016) say that infographics which show comparisons will engage the individual viewer or a community in a more effective way. Viewers see themselves and/or their community as a *part* of the visualised information and make a personal connection to it. Moreover, better engagement will occur when visualised information is associated with a narrative as it can evoke viewers' emotions, which will lead to action, such as decision making and behavioural change (Arcia et al., 2016; Nicholson-Cole, 2005). In this paper, the authors discuss the specific use of infographics within an academic library in Australia."

Methodology

LLS offers services and instructional programs in information literacy, higher degree researcher training, academic skills advising, and Information and Communication Technology (ICT) literacy development. Many of these are delivered through workshops and individual consultations (face to face, online or email). Since 2014, LLS has been keen to assess the impact and value of its workshop and consultation services to the, mainly undergraduate, client. Given that the authors were interested in obtaining mainly qualitative—rather than quantitative—data to support their investigation, they utilised exploratory research and case study as the preliminary step in assessing impact, clarifying client expectation, and subsequently visualising that information to, hopefully, influence service improvement decisions. According to Meyer (2001), the use of case study is ideally suited for exploring new processes or behaviours.

Client data was collected through a short feedback survey which provided scope for the respondent to rate services, including workshop instruction (quantitative), and to write short response answers (qualitative). Specific client information, including study level and academic group, was also available in these data sets. The survey feedback was generally collected via a “feedback form” available online or through hard copy format. The latter was manually entered into a Google form to merge with online feedback. The quantitative information provided client satisfaction ratings. The qualitative information, in the form of short response comments, was analysed for themes and application to improvement processes (Braun & Clarke, 2006).

Case Studies

Case study 1 Love My Library

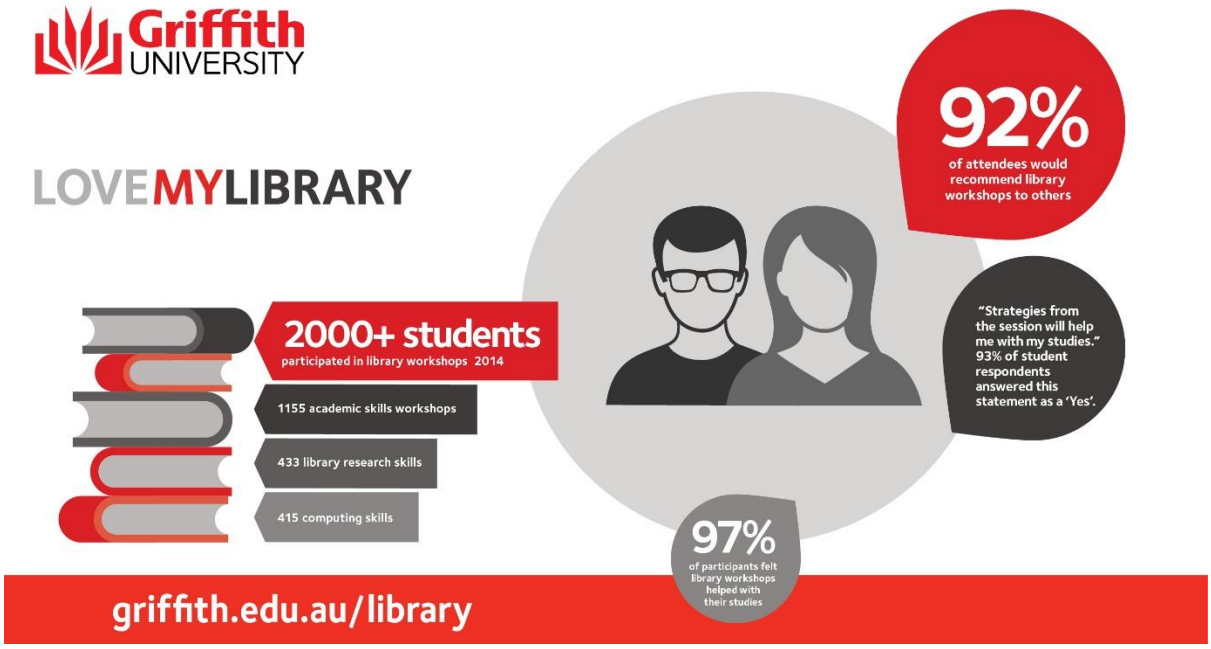

Figure 2. Love My Library promotion - impact visualisation

Recent and compelling evidence "points to the library as a positive influencing factor on students' academic success" (Brown & Malenfant, 2016, p.1). In particular it points to greater student success when the academic library and its resources are utilised. In a recent paper, the Association of College & Research Libraries (ACRL) noted that not only does the use of the academic library increase success but that "collaborative academic programs and services involving the library enhance student learning…and information literacy instruction strengthens general education outcomes" (Brown & Malenfant, 2016, pp.1-2). Imparting this significant evidence, within an individual academic library's context, is necessary and desirable. Case Study 1 represents one way in which data was captured and visualised for maximum effect.

Led by a Library Services Manager, a small team of interested librarians was established to produce visual representations of the 2,000 plus client responses collected during 2014 after workshops and consultations. Respondents willingly, openly, and honestly rated their experience with LLS in terms of their approach to study and ultimately their success. Over 600 of those responses contained qualitative comments. The next step was to take this rich and exemplary feedback and to visualise it for general consumption. To that end, the Information Services' Communications Team designed the concept - ***Love My Library*** – and this concept was the vehicle by which the respondents' feedback was visualised for both general (staff and clients) and for meetings with high level stakeholders including Heads of School, Deans and Pro Vice Chancellors.

The feedback was carefully chosen for visualising in various forms, including posters, carry bags, postcards, coasters, and booklets. The booklet used a narrative structure to tell the story of success via authentic student voice (quotations), in concert with the authority of the literature and, in one case, a professor. Further, the booklet physically unfolded to reveal elements of both the quantitative and qualitative data visualised as a poster for effective storytelling and memorability.

Every effort was made through ***Love My Library***, to establish a personal connection with the client through the use of their voice i.e. their text responses. This was important as research shows that the individualisation of data increases engagement especially when the data used for comparison has a meaning for the viewer (Hullman & Diakopoulos, 2011).

Presently there is little substantive data to prove the actual degree of community engagement through the various visual representations of impact and value of LLS.

However, “[a]ccurate visualizations of library data suggest avenues for staffing and service, resource expenditures, scholarly relationships and instructional outreach as well as opportunities for excellent collection development” (Finch & Flenner, In press, p. 16). Academic library data has the potential to improve services and communication with stakeholders when it is presented in an easily understood format.

Case study 2 Communicating LLS engagement with Griffith Sciences

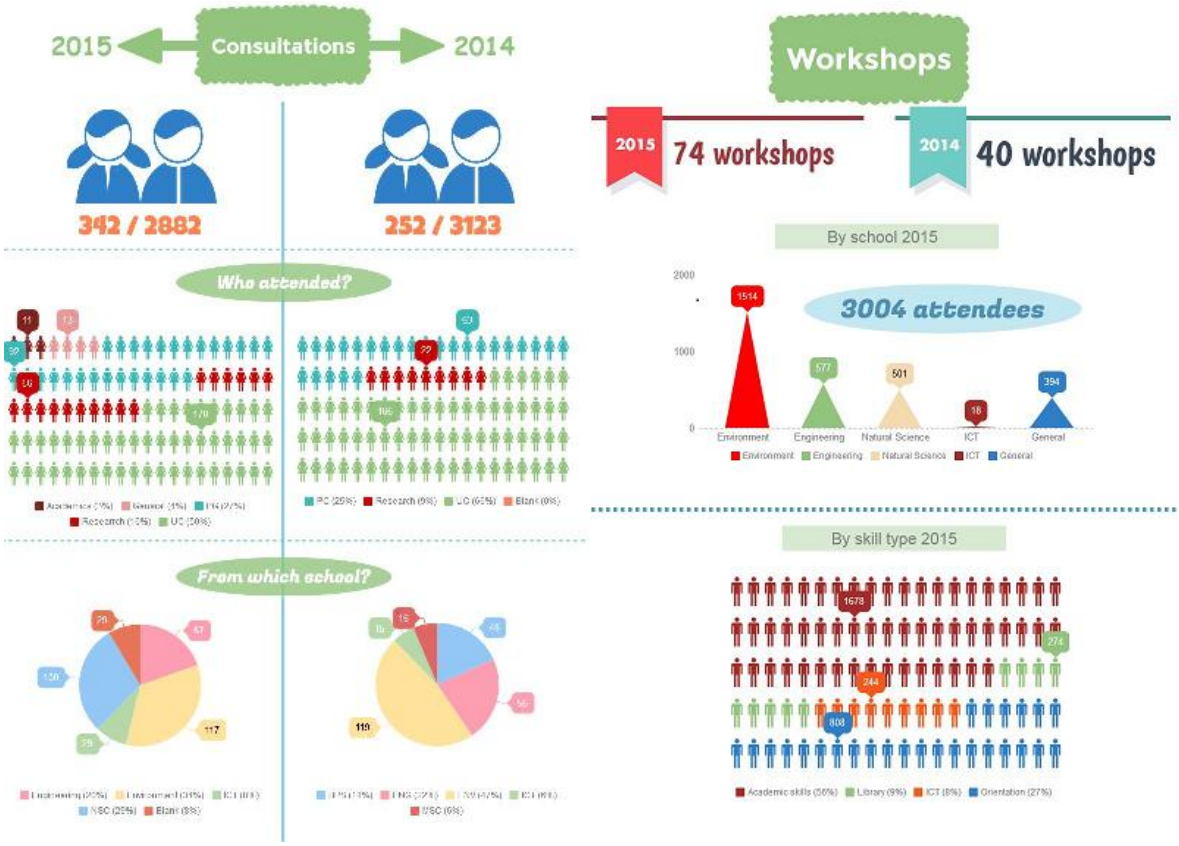

Figure 1. Infographics presented in an Information Services’ Report for Griffith Sciences Group Board

The purpose of visual presentation in Case Study 2 was to present efficiently and clearly the engagement of LLS with students in Griffith Sciences, one of the University's four academic groups. Data was derived from the analysis of workshop and consultation attendance, which LLS provided in Semester 1, 2014 and Semester 1, 2015. The participants' information was categorised by affiliations (e.g. academic staff, researcher, postgraduate or undergraduate), academic schools, and the LLS services and LLS skill types accessed, for example, academic skills, computing skills or information literacy skills. As the data available for 2015 consultations and 2014 workshops was incomplete, selected categories with complete data were analysed and provided a snapshot of attendance in both semesters.

Visualised data included a comparison of information collected between 2014 and 2015. The Piktochart, an infographic design tool, was used to develop the visual presentation of data. One of the infographics included data demonstrating the proportion of Griffith Sciences' students attending consultations compared with the total number of consultations delivered to all Griffith students. Another visual presentation showed a snapshot of Griffith Sciences' students accessing LLS consultations and workshops. The infographics were included in an Information Services report for the Griffith Science Group Board and were accompanied by supporting information from the Case Study 1 ***Love my Library*** campaign.

The visualised information presented in the report gave a clear indication of the proportion of students who used the services of LLS in each of the four Schools within the Sciences. Furthermore, all data used demonstrated the same message: the number of students attending consultations and the number of workshops delivered in Semester 1 2015 were higher than in 2014. The visuals also clearly illustrated that the number of students participating in LLS consultations and

workshops from one School was much smaller than the number of participants from one of the other Sciences Schools.

Case Study 3: Information visualisation for the Pro Vice Chancellor (Information Services)

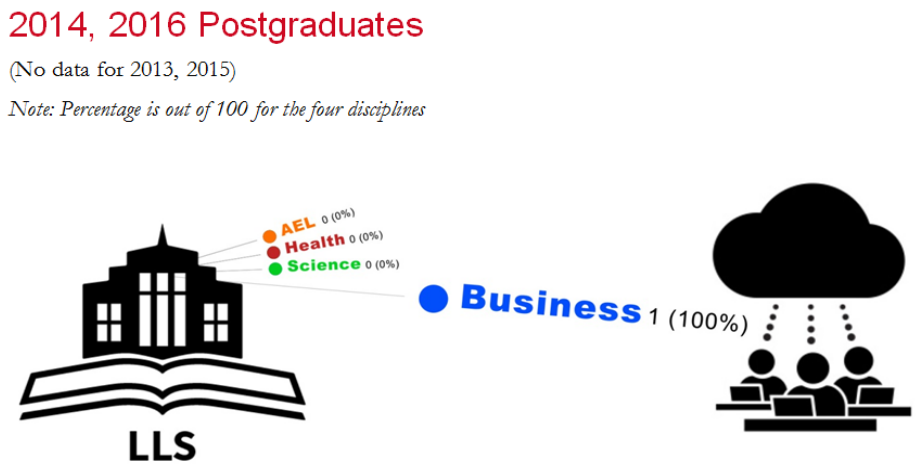

Figure 23. Packaged Learning Objects- Postgraduates, 2014

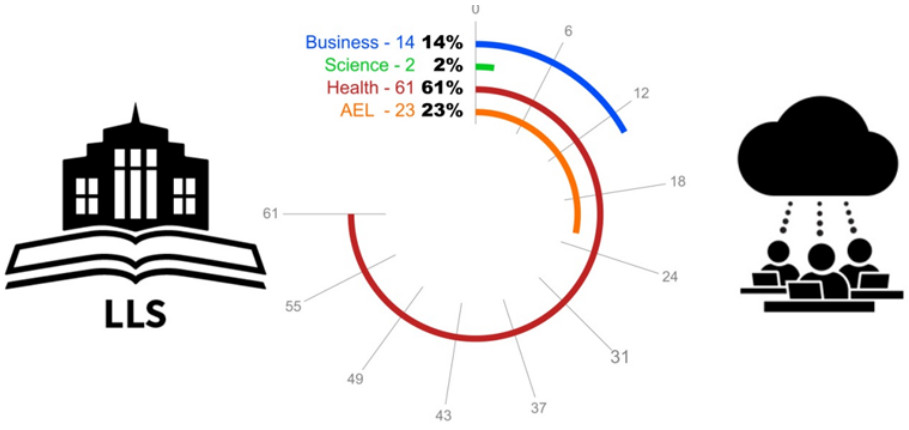

Figure 14. Individual Sessions- Undergraduates, 2016

As one of the seven portfolios of Information Services, LLS collects, analyses and visually represents a range of information for various reporting obligations. The work around visualising LLS impact is publicly encouraged and endorsed by the Pro Vice Chancellor (Information Services). Recently, the PVC commissioned a small team,

led by one of the authors, to produce a series of, mainly, visualised reports to allow her to present significant information to University Executive. The visualisation requirements included:

- The overall reach of LLS *broken down by Academic Group/cohort*
- Reach involving digital learning objects/digitally enabled *broken down by Academic Group/cohort*
- Normalised impact data, *broken down by discipline/cohort*, illustrating the correlation of LLS, normalised by entry score, to
    - GPA (success); and
    - Retention

Information was gathered from various sources, including feedback responses noted in Case Study 1 and relevant statistics from the Griffith University Planning and Statistics Portal. To provide both flexibility and surety for the PVCs presentation to Executive, the information was visualised in video format with voice over, PowerPoint, conventional Excel charts and some reports were captured in Tableau and then used in the PowerPoint slide set (examples of the static visuals are shown above). The visuals had to be highly self-explanatory as the PVC's presentation was to be short in length and the audience had to be able to engage with the masses of information quickly to enable any decision forming to take place. At this stage, the effect of the visual representations in terms of influencing Executive decisions is unknown. However, Library Services Managers have already utilised the visual information for presentations of their own.

Discussion

A large volume of data was visually represented in each case study. Nevertheless, feedback was generally positive and authors have not received comments to the effect that the data was overwhelming for the viewer. Mayer's (2001) research demonstrates that "[p]resenting explanation with words and pictures results in better learning than does presenting words alone" (p.78). This suggests that information visualisation makes information more palatable and, subsequently, the ability to process information is enhanced.

Case Study 1, ***Love My Library***, gathered a substantial amount of both quantitative and qualitative data which was analysed and visualised to demonstrate academic library value and impact. The data alone was ineffective. However, its careful and varied visual representation meant that both sophisticated and casual audiences received equally as powerful messages around the use of the academic libraries and their resources in terms of student success. Further, a poster series, depicting key impact and value data from the client perspective, was left within the confines of the library spaces for some weeks because the value of a visual item increases with more time spent viewing it (Harrison, Reinecke, & Chang, 2015). Moreover, visual messages have influenced LLS practice fuelling the redevelopment of some services, instruction, and resources.

The case study was presented, using a number of visuals, to LLS teams as an illustration of how simple feedback processes at point of service can solicit valuable information which supports planning, decision making, and continuous improvement. In this case, a significant outcome was that team members were able to see and

then change aspects of service and instruction, e.g. offering more online consultations, modifying hours for consultations, and reviewing the content and pedagogy used in some workshops. The visualised results from the case study made explanations of client feedback easier and provided collateral with which team members could go on to explain the feedback to the academic community. This case study generated requests for visuals from Managers to support their meetings and operational planning. Further, when feedback was visualised, some deficiencies in the types of survey questions were more obvious prompting a change to survey questions on a more regular basis. Representing the clients' voice in visuals made their perceptions of library value unequivocally clear and supported what were general assertions about impact with firm qualitative and quantitative data which paralleled the literature.

The second most significant outcome of visually representing the case study data was the opportunity to present a bid to the PVC (INS) and the INS Executive for funding to support the use of iPad technology intervention to gather feedback from the client, at the point of service, instantly. This bid was successful and LLS now runs surveys through iPads at all libraries on all campuses for workshops and consultations. The use of the survey tool, Lime Survey, has made this process easier in terms of gathering and aggregating information for immediate use. Turning the feedback around instantly has encouraged teams to respond quickly when they perceive an inadequacy or problem in service provision.

One of the benefits of visualisation is improving viewers' comprehension of the content under scrutiny (Bouquin & Epstein, 2015). Effective visualisation allows

complex ideas to be communicated with “clarity, precision and efficiency” (Tufte, 2001, p. 51). It can be interpreted in various ways by its audience, instantly (Tufte, 2001; Ware, 2004).

In the specific instance of Case Study 2, when the infographics were presented in an Information Services Report for one of the Schools in the Griffith Sciences, the Head of the School commented on the relatively low number of students from his School, who were attending workshops, compared with students from other Schools within Griffith Sciences. A meeting with that School’s Learning & Teaching staff followed the presentation of the infographics. LLS is currently negotiating with that School to embed services and instruction in a redeveloped program which will commence in 2017. It appears that the visualised information contributed to the Head of School being able to process complex data more quickly and to see relevant connections to their context. Furthermore, the infographic presented a personalised comparison. When viewers see themselves and/or their community as a part of the visualised information, infographics will engage them in a more effective way (Arcia et al., 2016). Therefore, the authors believe that personalised visualisation contributed to a concern about the relatively low number of students from the School using LLS services and thereby led to greater engagement between LLS and the school.

Case Study 3 reflects an unexpected outcome of Case Studies 1 and 2. That is, the PVC (INS) requests for more comprehensive and visualised data as a means of informing high level Executive discussions and decision forming. The significance of such requests for influencing decision makers was not lost on the team responsible

for provision of the relevant data, analyses, and findings from the data. The visuals, as described previously, were extensive and whilst the precise outcome of the visualised data for decisions is not known, the PVC's (INS) response was unmistakeable when she described the visuals and information provided as "Awesome." This particular request also caused the Library Services Manager responsible to reconsider the skills of teams in locating, analysing and producing visual representations of data using more sophisticated software including Tableau.

Conclusion

To date, visualised representations of the impact of services and programs by LLS have been received positively. Visual messages have certainly influenced LLS team members' practice, fuelling the redevelopment of some services and resources. Furthermore, the data has informed operational planning by impacting thinking around what and how things are done in respect of supporting student success. At the same time, there is little substantive evidence to prove the actual extent of audience engagement with visual representations. That is to say, the authors' confidence that the visualisation types used could be seen to be unequivocally effective in audience engagement with, and memory of, relevant impact and value assertions is lacking. Therefore, the ongoing purpose of this project will be to examine the extent to which the visualised and published data has been seen to be persuasive and effective. This will include some method of measuring the actual effect of the visualisation types on the audience in meeting the objective of demonstrating impact and value of the academic library to student success and possibly retention.

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