A KEY PERFORMANCE INDICATOR FOR JOURNALISTS
THE VALUE OF SYSTEMS THINKING FOR THE FIELD

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Legacy approaches to journalism education, formulated before computing and the Internet, focus on the democratising service outputs of the profession in promoting discussion, public scrutiny, commerce and entertainment. This focus has been at the cost of a reduced emphasis on the process of producing and distributing journalism, the expertise for which has largely been relinquished to engineers. This has made journalists vulnerable to economic variables and reduced their capacity to create and capture value in their markets in an agile manner. However, since the early 2000s, broadband has allowed and then required journalists and journalism educators to regain production and distribution expertise and to include systems thinking in curriculum areas. This article discusses the economic implications of this and the expected impacts on journalism practice and commercial funding. The article concludes that a ‘key performance indicator’ for journalists is now the ability to optimise where and how a digital file of text, audio, video or other computer code is placed on any relevant computer network.

INTRODUCTION

The single most important skill for a journalist to acquire in the 21st century is digital file management. This statement might be confronting for ‘traditional journalists’ who emphasise instead curiosity, ethical behaviour, an open mind, the ability to scrutinise authority, the various craft abilities of shorthand script and formulating and asking questions using newsworthiness criteria, and the ability to write in formulaic structured genres such as the inverted pyramid. These are indeed essential ingredients in journalism (except shorthand). However, in a world where some profit and others fail to profit, the one extra thing which has consistently made a difference to profitability/economic viability of journalism is the ability of practitioners (individually or grouped into large or small companies) to also manage and distribute content that audiences are willing to pay enough for. In the language of the 21st century, ‘commercially viable content’ is a digital file containing a combination of text, audio, vision, images and/or graphics usually with structural mark-up such as HTML. File management involves placement of these files in a network system to optimise audience access and transactions with each item.

This one extra thing can be called a ‘key performance indicator’ which, in business terms, means ‘what you do to increase performance dramatically’ (Parmenter 2010: 1), or to set yourself apart from your competitors. In the case of journalism in 2012, both performance and competitiveness have to go up to ensure improved productivity and profitability. Efficient and professional digital file management skills can help journalists make their work perform better, in terms of reaching bigger audiences, using broadband and internet dissemination which offers increased efficiency over other distribution methods. This improved technical performance is likely to improve the competitiveness of each item of journalism production, thus enhancing the productivity returns (sales) available.
Not everyone understands how file management fits into journalism; this is the central theme of this article.

**HISTORICAL PERSPECTIVE AND PRIOR LITERATURE**

Since the earliest days of journalism, the ability to not only create but also to manage and distribute content has been the key to profitability: what Deuze calls the ‘combination of mastering newsgathering and storytelling techniques’ (Deuze 2005). Journalists as an interpretive community (Zelizer 1993) have always known that discovering and even writing down a ‘great story’ was less than half the task. This is understood as much by reporters (one subgroup within the expert system of ‘journalism’ [Miguel 1999]) as it is by sub-editors, photographers, producers, editors and news directors, all of whom contribute to the journalistic task.

The story has had to be conveyed to a publisher with the means of production and distribution for the story to have anything more than notional existence. Thus the first reporters in the field handwrote and then mailed stories to editors who worked with typesetters and printers using engineered machines to produce saleable newspapers and magazines.

Distribution took place using more machines: horse-drawn wagons, trucks, trains, ships and later aircraft, mostly working for postal systems (Kielbowicz 1984:1). This is an illustration of a ‘broadcast network connecting one broadcaster to many in the audience … (and) the aggregate value of this network to the broadcaster is given by Sarnoff’s Law, which states that the value of the network is proportional to the size of the audience’ (Swann 2002: 418, citing Reed 1999).

Postal systems were overtaken by the telegraph, the telephone and eventually – in the 1980s – the fax machine, computer-based email and modem. In my own experience, hand and typewritten articles were commonly still provided to publishers by some reporters as recently as the 1990s but nearly all publishers now require journalists to provide reports as digital files created on a computer of some kind. When compared with broadcast, these offer the possibility of two-way (Swann 2002: 418) or transactional (Reed 2001:23) communications and have increased value.

More recently, the management, distribution and sale of computer files takes place using a system of routers, local-area and wide-area networks, also designed and constructed by engineers and now generally (though not always correctly) referred to as the Internet. And broadband, whatever else it describes, is how the general community understands ‘fast internet’. These local and wide-area networks facilitate the formation of a third and even more valuable kind of network, a ‘Group-Forming Network … (where) roughly speaking, the value … is given by Reed’s Law, which states that the aggregate value … is proportional to the number of non-trivial groups that can be constructed from n users (Swann 2002: 418, citing Reed 1999): ‘If n is large, then aggregate value according to Reed’s Law is proportional to $2^n$.’

*It’s the many-to-many – or group-forming – network, which allows network members to form and maintain communicating groups. Examples … include on-line communities, business-to-business exchanges, and buyer cartels (Reed 2001: 23-24).*

Reed’s Law strongly suggests that for journalists to have access to the greatest available value opportunities, they have to be involved in such Group-Forming Networks, not merely the broadcast or transactional networks of history. They can do this either as ‘participant-followers’ (Norman et al 2010: 351) or as what I call ‘actor-drivers’¹. Participant-followers may derive some benefits as employees but actor-drivers are likely to derive more benefits since they will control the means of production and revenue collection.
CONCENTRATION OF ACTORS

When I trained and entered the journalism profession in 1981, only 30 years ago, the sector was populated by capital-intensive media corporations – which owned the means of production and as such filled the roles of actor-drivers and recouped available returns on investment – and participant-followers, including journalists and other workers, mostly those who contributed content and/or operated the machines of production.

The professional demarcation was sharp and clear among the participant-followers, between journalists and the people who worked the machines. In large industrial enterprises such as metropolitan newspapers, journalists – whose ranks included reporters, subeditors and photographers – were members of one particular trade union (the Australian Journalists’ Association, AJA) and they created content by hand, using their skills, inquisitive instincts, wordcraft, contacts, charm, ethics, intellects … and their pens, typewriters, cameras, enlargers, chemicals and paper. The typesetters, compositors and printers were members of another trade union (the Printing and Kindred Industries Union, PKIU) which jealously guarded its members’ workspace and when the AJA members had created their content, the PKIU members took over, exclusively. Thus the management responsibility for the content passed out of the hands of the creators into the hands of engineers so that it could be delivered to the end users, the audience. Similar demarcation was present in the production of radio and television bulletins, the printing union members being replaced by people also called technicians and engineers.

Within the next 20 years, the actors in this play changed but the roles remained the same. I watched as computerisation gradually eliminated the roles of print typesetter, the hand compositor, and then many other roles associated with the pre-press preparation for printing, and then one day the last of those employees left the company where I worked (News Limited). But as the pre-press trade unionists departed, their ‘engineering’ role was gradually usurped and then overtaken by engineers of another kind, providing network systems and software which also have gradually taken over the task of manufacture and delivery of the news product. In the mid-1990s I observed News Ltd and Fairfax Ltd invest billions of their shareholders’ capital in enormous print infrastructure in each of the Australian capital cities; in 2012 we have watched the first of those sites being decommissioned. Another kind of engineering has taken over: user-experience design, populated by software engineers, programmers and human-computer interaction specialists. These are the wunderkind who build content management systems which combine to create news products for our mobile engineering devices such as smart phones, tablets and whatever comes next. But they remained in the class of participant-follower.

CHANGES

Now a strange thing has happened. For journalists, including myself, to operate these content management systems, we have had to try to understand them and learn how they worked. Information technology specialists have been required to pass on their knowledge of network architecture and systems operations so that journalists can perform their tasks in the news supply chain (Cokley 2002; 2003). This knowledge has subsequently been incorporated into journalism curricula (Cokley et al 2000; Cokley & Eeles 2003; Cokley & Capel 2004; Cokley 2010) and it has become evident in newsroom operations, such as the restructures of major newsrooms this year (Jackson 2012).

Further, these skills have now diffused into the wider journalism community, outside the confines of large industrial enterprises sometimes called ‘Big Media’. Since at least 2007, the number of paid employment opportunities for journalists of any kind outside Big Media has exceeded the number of jobs inside Big Media, without the total number of jobs having significantly decreased (Cokley & Ranke 2011). The sector which is expanding, and where journalism investment is moving, is that of small-to-medium sized enterprises of up to 10 reporters and editors or producers, but many of which contain only one or two editorial staff. These are what institutional journalists used to call ‘niche’ publications but ‘niche is the new...
large’. In the years before the early 1980s and the emergence of desktop computer typesetting and pagination in the 1990s, the entry costs for journalists into this sector were relatively high; now they are low, thanks to the network architecture of all those engineers, and the knowledge they have passed on.

Some of that knowledge continues to be passed on, online, in the diffusion of proprietary and open-source content management systems which power the blogosphere. I have been able to compare the in-house systems of News Ltd up to the present – systems including Vignette and Fatwire (see IDM 2009) – with those available and used by social media systems such as Facebook, WordPress, Tumblr and Blogger, shopping sites such as EBay, and citizen journalism enterprises such as Noozdesk, IndyMedia and OhMyNews in Korea. They are essentially similar in operation and user interface, suggesting that an understanding gained in social media CMS can be very useful in training-to-work transition for journalism graduates. Existing systems in News Ltd will soon be replaced by another, Méthode (EidosMedia 2012) which is XML-driven and requires even stricter file management skills as well as code and mark-up literacy. For journalists to complete their new editorial creation and publication tasks, efficient management of digital content files has become a business-critical necessity. But it has also become clear that some journalists have been able to change classes, from participant-follower to actor-driver, by understanding, learning how to operate, then controlling and even owning the means of production.

**ACCURATE MANAGEMENT**

Network theory and the experience of computing-in-practice strongly suggest that how effectively the journalist completes this digital content management task and makes the transfer from participant-follower to actor-driver is directly related to the size of the audience reached and the potential revenue available. This is because the Internet is constructed as a series of tables and nested databases related by links, and where files are placed influences how many connections can be made to them (an illustration of network effects, see Katz & Shapiro 1994:94).

Tables organise the World Wide Web and make the network ‘work’. ‘Tables ... provide a compact method for presenting relational information in an immediate and intuitive manner, while simultaneously organizing and indexing that information’, notes (Hurst 2006). Grannell (2007) contextualises the modern table even better when he suggests that ‘tables were initially intended as a means of displaying tabular data online, enabling web designers to rapidly mark up things like price lists, statistical comparisons, specification lists, spreadsheets, charts, forms, and so on’. When you search iTunes looking for music you like, you’re using a set of tables (the Internet) to visit a table (the online shop) to sift through searchable tables (the database of range and price). Social media websites such as Facebook are essentially databases of each member’s likes and dislikes, tabulated so they can be compared with, and linked to, the likes and dislikes of millions of other people on the same network. The algorithms behind everything enable and encourage the fundamental habit of people to compare this with that. Tables can exist in three dimensions as well as in two but the most common tables are two-dimensional. They are directly related to how we represent items in graphs, on axes commonly labelled known as X and Y.

Network science explains what happens next (see Newman et al 2006 for a wide ranging explanation). Network science began in 1736, when the mathematician Euler solved the Konigsberg Bridge Problem using a graph, derived from a table. What emerges in a graph is a relationship which can be solved (and possibly predicted) using mathematical formulae (Newman et al 2006:3). People who habitually use graphs and tables use these tools to uncover and see relationships, and this explains why graph theory has become very popular.
WHO USES GRAPHS AND TABLES ... AND WHY

Use of tables and graphs has become so popular in a range of disciplines external to journalism but two especially are relevant here: sociology and engineering.

‘[N]owhere has graph theory found a more welcome home than in sociology’ (Newman et al 2006:3), especially in interpreting data from ethnographic studies. It would be difficult to overstate the pervasive impact sociology in all its forms has had on 19th, 20th and 21st century living. Sociologists, along with economists, have formulated more theories about human life, which subsequently work their way into commercial and political life, than any other discipline with the possible exception of mathematics. These theories, often derived from ethnographic data, are used by ordinary citizens as well as businesses and governments to make decisions about how we live our lives, and these data sets are often translated into visual representations. Some examples can be viewed at the Australian Bureau of Statistics new BetaWorks site.

Engineers use graph theory to improve – and hopefully ensure the quality of – their outputs. An engineer, Tim Berners-Lee, designed the World Wide Web and engineers developed Google, which proudly proclaims itself as ‘an engineering company’ on its website and engineers like them help daily to develop social networks at Facebook, Yahoo and many others. Google has become explicitly involved in the carriage of tabulated data to Web-browsing citizens through its Search function, and visualisations of search shown through its Maps application.

Because tables, visual representations and maps allow connections to be made between various pieces of data, and are innately suited to publication and viewing on the World Wide Web in a format that is easily understandable by the reader, they have become useful and popular among communicators who use the Web professionally, especially journalists. Books such as the Data Journalism Handbook (an initiative of the European Journalism Centre and the Open Knowledge Foundation, published by O’Reilly Media) and websites such as Journalism in the Age of Data attest to this popularity.

MEMBERS AND CHARACTERISTICS OF GROUPS

Imagine a group of human beings as a potential network. In this network, each individual is a vertex and ‘vertices in networks typically have various properties associated with them’:

For instance, individuals in a social network have age, income, race, nationality and so forth. Pages on the Web have textual and visual content, location, topic, link patterns and so forth. It seems very likely that these properties would affect where edges in the network fall and indeed this appears to be the case: ties in social networks are found to depend strongly on race, for instance ... this phenomenon is called assortative mixing. (Newman et al 2006: 554-555)

In lay language, this suggests that ‘like links with like’ in assortative mixing while ‘like linking with unalike’ is known as disassortative mixing. Newman et al 2006: 555) note that ‘there is one property that every vertex in every network has, namely degree’ where the degree of a vertex is the number of edges (lines connecting vertices) which include the vertex v. They explain (p.555) that vertices which mix with other vertices of similar degree are known as ‘assortatively mixed by degree’ but high-degree vertices which mix with low-degree vertices are said to be ‘disassortatively mixed’. Finally they note (p.555) that ‘most social networks are found to be assortatively mixed by degree, while other types of networks, including technological and biological networks, seem mostly to be disassortative’.

Online web 2.0 social networks have features not seen in other kinds of networks (p.556) chiefly that ‘individuals in social networks can find short paths to others despite having only very limited information about the structure of the network’ and individuals in such networks have the ability ‘to categorize themselves and each other into socially meaningful groups, that is, to construct notions of social identity’. The extent of ‘social distance’ (Watts et al 2002, in
Newman et al. (2006: 556) is reduced due to the effects of assortative mixing by degree. The bottom line for journalists is that where and how stories and pictures are placed and shared on the Web is positively and directly related to how easy those stories and pictures are to find and thus, by extension, the reduction of the social distance between each person accessing those files.

Finally, ‘a number of individuals browsing the internet’ becomes a ‘system’ or ‘an audience’ and that’s what attracts revenue through advertising. Advertisers know that the skill of reducing the distance between people and things (products being advertised) on the internet is worth paying for, and there lies a clear revenue stream for journalism.

**SYSTEMS THINKING**

This brings us to consider the general concept of ‘systems thinking’ in relation to journalism and what other effects this might bring. Journalism has long been considered by some observers outside the newsroom as an individual discipline working with found artefacts: that a writer just reports an event or situation which he or she encounters; or a photographer merely captures an image from the world by virtue of being there and nothing else. But those with professional experience of newsrooms and journalistic practices – or observers who have studied from the inside – understand that journalism is an expert system (see Miguel, 1999, as noted earlier), the components or inputs of which can be separated from its products or outputs.

Systems thinking (sometimes referred to as *systems engineering*) ‘focusses on a variety of elements, analysing, designing, and organizing those elements into a system that can be a product, a service, or a technology for the transfer of information or control’ (Pressman, 2005: 122), and recognises the production inputs of journalism as well as the layered nature of all its outputs.

This helps us to understand that everything we do in journalism is ‘produced’ and interconnected, and that an improved understanding of the production inputs, connections and layers can lead to improvements in the product. Thus, the value of a ‘good story’ can be measured not merely by the nature of the event or situation encountered by the journalist as *newsgatherer* (reporter or photographer), but by what the journalist as *producer* or storyteller (reporter, photographer or sub-editor/producer) does with the story (cf. Deuze, 2005, noted earlier). This allows a different and perhaps challenging and disruptive way of understanding the ‘award-winning story or picture’ and challenges students and educators to reemphasise the systems at work in journalism, especially from now on.

Journalists of the past and present have been able to incorporate systems thinking unconsciously into our work when we assiduously gathered, nurtured and jealously guarded our contact books, which were fundamentally written-down and searchable databases of ‘vertices’ in networks. Each vertex was a person and the edges were represented by the organisational or personal links between each one, as well as their phone numbers and more recently their email addresses or social media ‘handles’. Journalists often would be hired on the basis of their networks of contacts and promoted as these grew and matured. For generalist reporters, ‘disassortatively mixed’ networks have been more highly valued but for specialist reporters working on what are known as rounds (within finance, sport, politics, education, crime or the courts, for example) ‘assortatively mixed’ networks are more highly prized.

Systems thinking has also been clearly present, if again nascent, in the ways sub-editors and line-up producers have assembled newspaper layouts and broadcast bulletins into recognisable packages which had meaning and could be reproduced again and again.

More broadly, the hiring and other human resource practices of journalism enterprises represent systems at a much more abstracted level. The range and connection nature and capacity among journalists which an editor assembles can influence the success or failure of the whole system. More disassortatively mixed staff might be beneficial for a mainstream, mass-market publication servicing a diverse audience or one which is widely distributed such
as a global wire service or a multinational such as News Corp. But more assortatively mixed staff would be better for a specialist local sports magazine, or a website servicing the automotive, craft or scientific sectors.

The challenge now is to make that systems thinking explicit in journalism education for several reasons. The first is that students should be able to predict their path through journalism by the way they build up their networks and how they mix their contacts (vertices) and thus to target potential employers more effectively. The second is more prosaic: without a clear understanding and application of systems thinking and knowledge in the broadband world, all the contacts and all the award-winning nous, grit, creativity and flair will count for nothing.

**CONCLUSIONS**

This article has suggested that a ‘key performance indicator’ for journalists is now an ability to optimise where and how a digital file of text, audio, video or other computer code is placed on any relevant computer network based on Reed’s Law of Group-Forming Networks. This is supported by historical data which highlights the importance of control of the ‘engineered’ and ‘engineering’ aspects of journalism, and the capacity of journalists (reporters and editors) to move from participant-follower to actor-driver. This seems to have had more effect on productivity and revenue performance than other business inputs. It is similarly supported by contemporary data that journalists are being called upon to understand and use systems as part of their daily employment, whether or not they are part of large media enterprises or smaller concerns. In fact, the comparative ascendency of small-to-medium sized journalism workplaces suggests that effective network management is essential for all journalists seeking employment.

Finally, network science strongly supports this article’s suggestion that the journalist’s ability to construct an assortatively mixed network of contacts, content and audience members is the key to commercial viability and return on investment. Broadband is essential for the fast and efficient movement of large multimedia files and as such is an important part of journalism and journalism education.

**REFERENCES**


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ENDNOTES

1. Understood as the opposite of participant-follower, not in the information technology sense referring to device drivers.


