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## **Information Gaps: Myth or Reality?**

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## Information gaps: myth or reality?

Benjamin M. Compaine

*The rising importance of information technologies is said to threaten ever wider gaps between groups in society. This article considers to what extent the warnings are valid. The author traces the history of the introduction in the USA of the telephone, electricity and other innovations and finds that all have followed the same pattern – access was limited in the early stages. He concludes that there is no need to act precipitously to improve access to information technologies and, in any case, the type of action needed is not at all obvious. As the world's work force becomes wealthier and technology costs decline, the differences in all aspects of living standards will decrease.*

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A paper presented to a 1979 conference in the Netherlands warned:

If information bases are centralized and distribution facilities are limited, *as they will inevitably be* [emphasis added] then the concept of freedom as we know it is seriously threatened.

If policy resolutions are neglected:

then the information revolution may effectively enslave rather than serve people . . . We must not end up with two classes, an information rich and an information poor; a small technological elite attempting to cope with a large, semi-skilled unemployed majority.<sup>1</sup>

Disraeli said that 'As a general rule the most successful man in life is he who has the best information.'<sup>2</sup> The Bible,<sup>3</sup> numerous pundits, self-proclaimed sages, scholars and journalists have voiced similar truisms and expanded them to include groups, institutions and entire societies. Ever since the ancient Greeks told us that 'knowledge itself is power', that theme has created a mini-industry of those who, today, warn that the rise of an information society will promote widening gaps between those individuals and societies that are information rich and those that are information (and usually economically) poor.

Whether these warnings are sound, or are merely good copy for the mass media, or are the creation of some academics with little tie to the real world, or are serving to further the political and social agenda of a cadre with a particular ideology is the subject of this article. There is evidence that this 'information gap' theme has struck a certain intuitive, popular

chord and that it has been placed on the public policy agenda to some degree. Is this topic indeed a budding issue in which the political, if not the economic, stakes might be considerable?

### Is there an issue?

The concept of an information gap is ill-defined from the start. It may refer to the access individuals have to information or the ability of individuals to have the tools – intellectual or tangible – to manipulate, analyse, and synthesize information. In a sense, it is a moving target, because as society has evolved from an agrarian to an industrial and on to an information-intensive one, the importance of having access to and know-how for using information has increased.

To a large extent, the information or knowledge gap issue has been perceived by the academic community. Former NBC newsman and current Stanford University professor, Elie Abel, predicts there will probably be less common sharing of knowledge by the advantaged and disadvantaged within society, thus eroding the common database which makes the American system of democracy possible. Looking at the increase in user-supported information services (cable, electronic databases, and so forth), Abel sees:

a danger that sooner rather than later many Americans will be priced out of the market – debarred from the benefits promised by the new technologies because they cannot afford to pay for them . . . The affluent

<sup>1</sup>T.R. Ide, 'The information revolution', in J. Berting, S.C. Mills and H. Wintersberger, eds, *The Socio-Economic Impact of Microelectronics*, Pergamon Press, Oxford, 1980, p 40.

<sup>2</sup>Benjamin Disraeli (Earl of Beaconsfield), *Endymion*, Longman, Green & Co, London, 1881, p 155.

<sup>3</sup>Proverbs 24:5.

<sup>4</sup>Elie Abel, 'Looking ahead from the twentieth century', in Robert W. Haigh, George Gerbner and Richard B. Byrne, eds, *Communications in the Twenty-First Century*, John Wiley & Sons, New York, 1981, p 8.

On the one hand, he believes that in democracies every person can become his or her own data collector and publisher for the price of the telephone and computer service bill. Like the Xerox machine previously, open electronic publishing allows any group or individual to offer their message on a new 'universal information grid'. Still, asks Dizard, is full information access one of our basic rights in post-industrial society, or is it simply a long range goal left to the play of economic and social forces? He adds that the degree to which 'we extend our concept of education to include greater access to [computer and related] information resources' will shape the way our democracy evolves.<sup>9</sup>

Oliver Grey, an urban planner with the Urban Coalition, sees danger in that the 'lure of maximum profits and the action of public officials, large corporations, and new interest groups, may prevent any significant minority from intruding into CATV and result in the development of a new technological elite'.<sup>10</sup>

Although the information gap theme is often expressed as an issue within Western society, a related subject is gaps among societies. Much of the rhetoric has been related to a 'New World Information Order' and to such World Information Order as UNESCO's 1978 policy statements as UNESCO's 1978 Report of the International Commission for the Study of Communication Problems (the MacBride Commission). The problems caused by the export of films and television programmes from the West, mostly from the USA, is a topic frequently raised. Many of these critics have a political axe to grind. Kaarle Nordenstren, who teaches mass communication courses in Finland, notes that 'A critical approach to these popular theories reveals that they contain more ideological manipulation than social science.'<sup>11</sup>

Most authors in the field have determined that the West has for too long tried to persuade those in the developing countries which technologies were appropriate to purchase, often at a disservice to those countries that did not have a suitable degree of technical sophistication. Herbert Schiller is

would be even better informed than they are today; the lower orders could be even less well informed.<sup>4</sup>

Herbert Schiller, on the communications faculty of the University of California and perhaps the most cited writer on this subject, expresses his concern within a broader social context:

The central questions concerning the character of, and prospects for, the new information technology are familiar criteria: for whose benefit and under whose control will it be implemented?

This theme is picked up by others who differentiate between information and knowledge. While information technology may allow decentralization of information, they say, the real problem of knowledge monopoly is overlooked. What the modern computer enthusiasts monopolize, say Professors James Carey and John Quirk, is not the data itself but the approved, certified, sanctioned, official mode of thought. . . . Rather than creating a 'new future', modern technology invites the public to participate in a ritual of control where fascination with technology masks the underlying factors of politics and power.<sup>5</sup>

Yet another member of academe brings the issue firmly into the 'new literacy' arena.<sup>6</sup> Melvin Webber says that it was fairly easy to make the leap from pre-industrial to industrial status in part because the necessary skills were not difficult to acquire. His contention is that the same may not be true today: the requisite skills take longer to learn; extensive education is necessary to become competent at the information-handling jobs which tend to be cognitively difficult. Thus, there is the danger that 'the spatial gap between lower-class districts and middle-class ones may become too wide and thus too difficult for the typical person to bridge'. He asks, 'Can we be assured that the communications media of the next decades will accomplish for the underprivileged youth of the year 2000 what the free library and the free public school did for immigrant youth of 1900?'<sup>8</sup>

Wilson Dizard, a former US Foreign Service Officer now teaching in Washington, DC, straddles the fence.

## 'Is full information access one of our basic rights?'

- <sup>4</sup>Herbert I. Schiller, *The Mind Managers*, Beacon Press, Boston, 1973, pp 174-175.
- <sup>5</sup>James W. Carey and John J. Quirk, 'The history of the future', in George Gerbner, Larry P. Gross and William H. Melody, eds, *Communications Technology and Social Policy*, Wiley Interscience, New York, 1973, p 501.
- <sup>6</sup>For a description of the notion of a new literacy, see Benjamin M. Compaine, *Information Technology and Cultural Change: Toward a New Literacy*, Program on Information Resources Policy, Harvard University, Cambridge, MA, 1984.
- <sup>7</sup>Melvin Webber, 'Urbanization and communication', in Gerbner, *op cit*, Ref 6, p 303.
- <sup>8</sup>Wilson P. Dizard, *The Coming Information Age*, Longman, New York, 1982, p 119.
- <sup>9</sup>Oliver Grey, 'Minorities and the new media: exclusion and access', in Gerbner, *op cit*, Ref 6, p 322.
- <sup>11</sup>Kaarle Nordenstren, 'New international directions: nonaligned viewpoint', in Haigh, *op cit*, Ref 4, p 193.

sceptical of such persuasive efforts, even those encouraging these countries to use communications satellites. He feels that most benefits will accrue to 'our own already privileged population'. Schiller asks:

Can the intolerable inequities that presently disfigure both domestic and international distribution be maintained? . . . Will the television programs, films and other entertainment produced in a small number of Western factories continue to preempt world screens and stages? . . . Will U.S. data banks, plus a few more in Europe and Japan, provide the patterned information on which social, political, and technological decisions will be based in Latin America, Africa, and Asia? . . . In sum, will 'interdependence' continue to be defined as binding relationships between unequals?<sup>12</sup>

If the information gap notion were simply the musings of a bunch of ivory tower noodlers, there would not be an issue. For the most part, the academic community has been the primary constituency of this idea. Nonetheless, other players have paid some attention, sometimes with far-reaching implications.

On the society-to-society level of discourse, UNESCO has gained high visibility. The MacBride Commission Report, debated at the General Conference of UNESCO in 1980, has become the primary document describing the need and blueprint for a new international information order. However, that report was viewed by the West in general and the USA and the UK in particular as a suspect document, produced by the so called non-aligned movement that placed national sovereignty above the needs of the free flow of information – commercial and news. Moreover, with the actual or proposed withdrawal of US and UK support of UNESCO, that body is not likely to be a significant player on the international scene for the immediate future.

On the domestic scene the perceived problem, in limited form, has surfaced in the US Congress. In his maiden speech to the Senate in 1983, New Jersey Senator Frank Lautenberg warned that computers threatened to create a new class of poor people, those without access to computers for learning. In this speech, Lautenberg described the 'potential for new and

distressing divisions in our society', based on a gap between children in wealthy school districts, where there is money to provide computers, and children in poor districts.<sup>13</sup> To address this perceived gap, Lautenberg introduced legislation to provide \$600 million in federal funds for computer education in state schools, with half the total going to the poorest districts. With much the same end in mind, Representative Timothy Wirth proposed a bill that would have provided \$3 billion over 10 years.

Concerns over local telephone rate increases after the breakup of AT&T have sometimes been couched in information-gap language. By July 1983, seven months after the breakup, 13 bills had been introduced in Congress to protect the concept of a universal telephone service. At one hearing, Representative Edward Markey said that if telephone service becomes a luxury, the USA could witness the creation of 'an information aristocracy and underclass'.<sup>14</sup>

This review of who has staked out what turf in the information gap area, meant to be suggestive rather than exhaustive, has yielded elements of fears, speculation, and arm-waving. For the most part, it has found a lack of empirical analysis or any semblance of rigour in looking at historical developments in information technology or political responses. The 'gap' proponents have said little on how they have measured or propose to measure the assumed gaps or even to provide a baseline from which to track prospective trends.

### Diffusion of technologies

Up to this point in history, all evidence indicates that technologies have been crucial factors in the spread of both access to information and the skills to use information. The original printing press was the first step in making information more widely available at lower prices. The big change came with the harnessing of the steam engine to the rotary press in the 1830s, combined with improvements in paper-making technology and the ability – via the railways – to reach wider audiences with the printed

## 'The proponents have said little on how to measure the information gap'

<sup>12</sup>Herbert I. Schiller, 'The free flow doctrine: will it last into the twenty-first century', in Haigh, *op cit*, Ref 4, p 189.

<sup>13</sup>Jane Perlez, 'Computers pose a peril for poor, Lautenberg says', *The New York Times*, 8 June 1983, p B-1.

<sup>14</sup>David Burnham, 'In Bell system breakup, small is expensive', *The New York Times*, 31 July 1983, Sec 4, p 8.

## 'Innovations start with a small vanguard of adopters'

<sup>15</sup>Thiél de Sola Pool, ed. *The Social Impact of the Telephone*, MIT Press, Cambridge, MA, 1977, pp. 28, 32, 142.  
<sup>16</sup>Thomas Comberford Martin, *Forty Years of Edison Service, 1882-1922*, Press of the New York Edison Company, New York, 1922, p. 78.  
<sup>17</sup>Richard B. Duboff, *Electric Power in American Manufacturing, 1889-1958*, Arno Press, New York, 1979, Table 12, p. 50.

product. More recently, film and broadcasting have further broadened access to all types of information. Moreover, compared to 100 years ago, a far greater proportion of the population has the skill to make sense of the information and to learn how to seek it out. Those who raise the spectre of widening gaps therefore appear to assume a discontinuity in the historical trend, a burden which they have not overcome in their arguments.

Joseph Schumpeter was fond of noting that the achievement of technology was that it brought the price of silk stockings within the reach of every schoolgirl, as well as of a queen. Sociologist Daniel Bell adds, more to the point, that technology has not only raised the standard of living but 'it has been the chief mechanism of reducing inequality within Western Society'. In *The Coming of Post-Industrial Society*, Bell quotes Jean Fourastié, who calculated that by 1948 the Chief Justice of the Court of Accounts in France earned about four and a half times as much as an office boy on an hourly basis. In 1800, this disparity was 50 to 1.

Historically, innovations do indeed start with a small vanguard of adopters who tend to be better off economically than the population at large. Commercial interests are often among the leaders. But the market created by this vanguard often starts a process which leads to greater interest, higher volume, thus lower cost, reduced skill levels needed, and ultimately mass utilization — sometimes referred to as an 'S' curve of diffusion because of the shape of the graph of adoption plotted over time. In some cases specific public policies were implemented to affect the timing and direction of the diffusion, and these policies changed over time to meet new conditions. In other instances, the public policies were either indirect or non-existent. Electricity, the automobile, telephone and television are among the technological innovations in the past century that have followed a path of starting on a small scale at a high price, used by those who saw value in the technology or who could afford to experiment with new technology. In each case, as the volume of use

increased, the cost of providing the product decreased, with prices following. The rate of adoption by consumers varied, being shortest for the television and longest for the telephone. The circumstances of the development of each are not perfectly comparable, as the nature of the product, the regulatory regime, and the requirements for infrastructures varied somewhat. Still, the following vignettes serve as a reminder that the computer and the related information technologies may have more similarities to than differences from their historical cousins.

*Telephone.* In the case of the telephone, the early entrepreneurs recognized that they could not afford to wire whole cities at once, so they chose first to wire affluent neighbourhoods and business districts.<sup>15</sup> The telephone companies in the USA swiftly found ways to reduce the cost to users, however, such as the introduction of metered service, pay phones for those who could not afford their own lines, and the building of minimal systems, sometimes laid down and maintained by farmers themselves. Meanwhile, government policy shifted from promoting unfettered competition to regulated monopoly. The combination of technological improvements and the public policies of universal service through nationwide cost averaging helped bring the monthly price of local service from the equivalent of two weeks' pay for the average worker in 1896 to about two hours' pay today.

*Electricity.* Electricity, too, was initially expensive. Again, the pattern was for the first users to be businesses and wealthy residences. According to a 1922 account by the Edison Company, Andrew Carnegie had an electric range installed in his house in 1896. Still, this was seen as little more than an expensive toy for the wealthy customer.<sup>16</sup> By 1912, less than 4% of electricity consumption was for residential use. Railways alone accounted for 20%.<sup>17</sup> However, it has been the case with many technological innovations that the vision of the inventor or early proponent of the product or service



was a factor in the rate of diffusion. As with Henry Ford's automobile, Edison's aim was for low cost and durability. His early light bulbs cost \$1.25 to make, but he was selling them for \$0.40. In building up volume, he was able to bring down his average unit cost in three years to \$0.37, and then in one year made up his previous years' deficits.<sup>18</sup>

The cost of generating and distributing electricity fell almost from the start of commercial applications until the 1970s. Still, in 1983, a resident of Hartford, Connecticut, paid 8.8 cents on average for a kilowatt of electricity, compared to 11 cents in 1905. Adjusting for the change in living costs, this translates into 39 minutes of work for the 1905 workers and less than one minute for those of 1983.<sup>19</sup> Meanwhile, the proportion of electricity consumed by residences had increased to 35%.<sup>20</sup>

*Automobile.* Once again the diffusion of the automobile in society went through stages, starting with adoption by wealthy urban groups, then the middle class, and ultimately the general population. In the process, the industry itself had to adjust to its customers, its labour force, and a changing industrial structure. The automobile was, at first, regarded as a plaything, certainly not a revolution. Yet it gradually changed from being a status symbol to being a useful product.

Henry Ford had a vision of the automobile for the average worker. His work in reducing manufacturing cost through production lines and the introduction of branch assembly plants led, among other ramifications, to:

- lower prices, which led to a broader market that spread beyond the USA's borders;
- a sharp increase in labour productivity and higher wages;
- perhaps least recognized but of substantial significance, a precipitous decline in the need for skilled workers and for mechanical skills among owners of automobiles.<sup>21</sup>

The magnitude of the decline in the price of automobiles is seen in comparing relative prices over the years.

In 1908, a Buick cost about \$1500, or the equivalent of more than 2.5 years' wages for a production worker. Even after mechanization, the price never fell much below \$1000. Today, a comparable wage earner must work about six months to pay for a \$10 000 automobile. Used automobiles bring the price down to a level of affordability for almost anyone.

*Radio and television.* In the mass media, history shows that the colonial press was structured for the educated elite. A series of cultural and technological developments which started to emerge in the 1830s created the conditions for the mass audience penny press. The spread of newspapers, like many cultural innovations, followed an 'S' curve.

In the earliest days of radio, a user had to have a modest technical bent to use the medium, tinkering with the crystal set. With improvements in the technology and the development of programming, the radio spread rapidly. Instalment plans allowed households of modest means to purchase a radio. Even during the Depression the number of radio sets grew.

Television followed a similar pattern. As with other innovations, prices came down rapidly as production volume increased. In 1950 a small black and white television cost about \$3000 in 1984 dollars. Today, a larger screen colour model can be had for \$300 and even less.

### Microcomputers in schools

The best data on which fears such as those expressed by Senator Lautenberg can be based come from a survey conducted between December 1982 and January 1983 by the Center for Social Organization of Schools.<sup>22</sup> Among its many findings was that two-thirds of the schools in the wealthiest school districts in the USA had microcomputers, compared to 41% in the least wealthy districts.

This information is subject to various interpretations. Senator Lautenberg and others think the difference among districts is cause for concern. On the other hand, one could take the position that the survey was taken barely five years after the introduction

<sup>18</sup>John W. Oliver, *History of American Technology*, The Ronald Press Company, New York, 1956, p 350.

<sup>19</sup>Raymond R. Beauregard, 'Memories on energy more myth than reality', *The New York Times*, 3 July 1983, Sec 11, p 18. (Mr Beauregard is an economist with Northeast Utilities.)

<sup>20</sup>Calculated from *U.S. Statistical Abstract*, 1984, Table 1003, p 586.

<sup>21</sup>James M. Laux and Patrick Fridenson, *The Automobile Revolution: The Impact of an Industry*, University of North Carolina Press, Chapel Hill, NC, 1982, p xiv.

<sup>22</sup>'School Uses of Computers - Reports from a National Survey', No 1, Center for Social Organization of Schools, The Johns Hopkins University, April 1983, p 3.



century the gradual spread of tax-supported public education and public libraries had a variety of indirect effects, including providing a larger body of literate customers. Near the end of the century the subsidization of postal rates for printed material in the USA was about as targeted a programme as government has enacted. (The withdrawal of these subsidies in the 1970s has had no measurable impact on magazine circulation, though some publishers had feared it would.)

The automobile was developed with virtually no direct government intervention or subsidy. However, government has played a crucial role in providing the infrastructure – the highway system – financed by taxes roughly tied to usage. In addition, rather than direct subsidy of automobile ownership, in the past three decades governments have adopted a policy of providing subsidized mass transit.

The telephone's early years were characterized by private development. The industry has passed through eras of monopoly during the time of Bell's early patents, to a period of competition, then government-approved and regulated monopoly, and now a period of regulated competition. The role of government to encourage cross-subsidies and nationwide cost averaging to promote universal service was pursued decades after telephone service began.

For broadcasting, there have been few direct economic subsidies to users. In this case, policies involved the conditions of ownership of licences, regulations covering broad areas of programming and the like.

Hand-held calculators are an example of an application of technologies that has had a widespread impact in a short period of time but with virtually no government role (save the funding of the space and defence research that lead to the development of much of the underlying technology).

There are indeed all sorts of 'gaps' in and among societies. Many are related to the state of an economy. Poorer people and societies have fewer and older automobiles than the better off ones. The poor eat fewer

steaks, rely more heavily on public education, are less able to afford designer jeans. They are less able to subscribe to magazines or purchase books.

The issue is not one of information or knowledge gaps, any more than it is one of a protein gap or transportation gap. If there is an issue, it is: What priorities should a society have in making decisions on what are necessities, what are frills, and what falls in a debatable middle ground? A second question is: What mechanisms can be implemented to address any problems?

The matters of books, magazines and education have been addressed by public libraries and public education. Concerns about protein have been addressed with food stamps. And nothing has been done about designer jeans for reasons that need not be dwelled on. Whether cable television should fall into the book or designer jeans category is debateable.

### Fine tuning

Clearly there is a role for public policy to fine tune areas not adjusted by themselves. The determination that telephone service should be universal – a consensus that did not spring full grown with Bell's first call – led to policies of nationwide averaging and a two-tier pricing structure, one for businesses and one for residences. That this structure may be in the process of being dismantled (it is not a certainty) with so far barely a yawn from the majority of subscribers may be an indication that telephone service has indeed become so cheap that the complex policies that were appropriate 40 years ago are no longer needed.

This then may suggest the direction for policy. There is evidence, only lightly drawn on in this article, that national economies that are growing with participation from a broad spectrum of the work force reduce or eliminate the need for targeted programmes and government subsidies. In the industrialized economies, the creation of a broad middle class has narrowed greatly the proportion of the population that *needs* subsidies (as

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**'The creation of a broad middle class has narrowed the numbers that need subsidies'**

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opposed to the vast array of middle-class subsidies, such as deduction of interest from taxable income – the perks that a wealthy economy can rationalize). As seen in the figures representing the constant dollar price of electricity, automobiles, telephone service and television sets, the combination of declining costs, thanks to improvements in technology, and a wealthier work force has lessened the difference in life style between the poorer and richer in society. Today, with many manufacturing jobs being transferred to the developing industrial nations, there are signs that a similar process is taking place on a global scale.