

NEW MEDIA INDUSTRIES: A QUANTITATIVE RESEARCH STUDY

First Draft

BACKGROUND

The South East of England's creative and cultural industries provide jobs for 560,000 people and contribute an annual turnover of £46.5 billion pounds. The sector has grown more than any other region with employment increasing by 28.4%, almost double the average for England as a whole. At the same time the rich heritage and cultural resources play an important part in our quality of life, contributing to the sustainability of the natural and built environment and developing a skilled and inclusive workforce [Creative and Cultural Industries 2002].

As part of the support for this sector of the industry the South East England Development Agency (Seeda) has set up wired agencies across the region as a model of professional networking, brokerage, business advice and support.

Wired Wessex is one of these business support agencies for some 500 small new-media businesses, all engaged in computing, software design, games development, web design, interactive TV and video etc in the Hampshire area. These businesses are all at the convergence of the computing, media and telecommunications industries and thus are at the cutting edge of skills needs and professional development. Wired Wessex delivers events and services to assist and support the development of individuals in this new industry with a strong use of web delivery, as befits the user group. This web delivery includes a site www.wiredwessex.com, specific focussed email delivery as well as forums for discussion. Currently, both Seeda and the European Union fund Wired Wessex.

This quantitative research piece is part of a larger project that will both quantitative and qualitative. It is postulating that a successful economic cluster is also a successful 'community of learners' by exploring Wired Wessex as both an economic cluster and a community of learners; the hypothesis being that a 'community of learners' brings about knowledge exchange and thus innovation, learning and creativity.

The project is designed to gain an understanding of the career, educational and experiential pathways of this group of new professionals. It will attempt to identify the impact of

legitimate peripheral perception [Lave and Wenger 1998], along with any activity that can be used to identify a community of learning [Wenger 1998].

It will also seek to identify the appropriateness of its role as a 'cluster' – evidence of increasing the productivity of companies; driving the direction and pace of innovation; and stimulating the formation of new businesses within the cluster.

SUMMARY OF RELEVANT LITERATURE

An information economy

The birth and development of a post-industrial society has been much analysed [Bell, Porat]. Manuel Castells [1996] suggests that the rise of the network society cannot be understood without the interaction of the information technology and the old societies attempt to retool itself and that this interaction depends on the relationships between an excessive number of independent variables. I have suggested elsewhere [Turner 2002a, 2002b] that much of this analysis centres around the changes in wealth, research and development and the ownership of knowledge and intellectual property that a post-industrial society brings about. This analysis has paralleled a theoretical critique that has charted the development of a post-modern view of the world. Lyotard [1984] in particular has focussed on the post-modern role of knowledge and information; despite others' views [Barnett 2000] that postmodernism is a dangerous road to go down it is clear that postmodernism will impact on industries that are essentially about knowledge, information and signs. Others, notably Maskell and Robinson [2001] and David Noble [1998] have articulated concerns about a process that accelerates the move toward the automation, de-professionalisation and de-skilling of the workforce.

New groups in the workforce

As part of the development of a post-industrial economy new groups in the workforce seem to be emerging. New-media businesses engaged in computing, software design, games development, web design, interactive TV and video etc are coming into existence. These businesses are all at the convergence of the computing, media and telecommunications industries and thus are at the cutting edge of skills needs and professional development.

There is a whole range of issues implicit in the emergence of a new workforce or new 'professional groups', not least that of training and development. Who are the people working in this new area, what are their qualifications, how are they keeping up to date in a fast moving highly technological industry, how much do they learn from each other, do they indeed constitute a 'community of learners', how does that community of learners actually work?

This group of 'new professionals' seems to be key to the economy. The companies they work for all seem small, most of the individuals are young, they bring together a wide and disparate range of skills and they are part of that new post-industrial, high added value, knowledge based economy that has developed in the US but is not yet fully apparent in the United Kingdom. If the economic impacts of this new industry are important, then some understanding of these workforce issues will be essential.

Communities of learners

The issue of learning amongst such professional groups is contested, with newer analysis from Becher [1999] , Eraut [2000] and Brown and Duguid [2000] making a powerful case that we have tended to misrepresent learning by not taking seriously the learning inherent in being and doing [Knight 2001]. Becher [1999 p196] makes clear that "the strategies for informal learning ...all involve some form of personal contact with fellow professionals, leading to the acquisition of new information or the establishment of potential means of doing so".

This seems to fit well with the models of learning identified by Lave and Wenger [1991] and Wenger [2000] and emerging developments in communities of learners and distributed learning [Thorpe 2001]. Work on a large ESRC project on the emergence of a 'Virtual Society' [Woolgar, 2002] and in particular work on the new media industries in London [Wittel et al 2001] all point to a convergence of thinking in relation to communities of learners and a role for information technology.

Economic Clusters

At the same time, there is much work on the physicality of clusters of industries. Work by Jane Jacobs [1961 p50] on cities in the United States suggests an 'organised complexity' which brings about "an intricate ballet in which the individual dancers and ensembles all have distinctive parts which miraculously reinforce each other and compose an orderly whole". Johnson [2001] goes on to suggest that "Neighbours learn from each other because they pass each other...Sidewalks allow relatively high bandwidth communication between total strangers and they mix large numbers of individuals in random configurations". Michael Porter [1998], a key theorist in this area, suggests that clusters are geographic concentrations of interconnected companies, specialized suppliers, service providers, and associated institutions in a particular field. They arise because they increase the productivity with which companies can compete. The development and upgrading of clusters is an important agenda for governments, companies, and other institutions.

Cluster development initiatives are an important new direction in economic policy, building on earlier efforts in macroeconomic stabilization, privatization, market opening, and reducing the costs of doing business. Clusters foster high levels of productivity and innovation and lays out the implications for competitive strategy and economic policy. Economic geography in an era of global competition poses a paradox. In theory, location should no longer be a source of competitive advantage. Open global markets, rapid transportation, and high-speed communications should allow any company to source any thing from any place at any time. But in practice, location remains central to competition.

Today's economic map of the world is characterized by clusters: critical masses in one place of linked industries and institutions--from suppliers to universities to government agencies--that enjoy unusual competitive success in a particular field. The most famous examples are found in Silicon Valley and Hollywood, but clusters dot the world's landscape. Porter [1998] explains [<http://www.isc.hbs.edu/econ-clusters.htm>] how clusters affect competition in three broad ways: first, by increasing the productivity of companies based in the area; second, by driving the direction and pace of innovation; and third, by stimulating the formation of new businesses within the cluster. Geographic, cultural, and institutional proximity provides companies with special access, closer relationships, better information, powerful incentives, and other advantages that are difficult to tap from a distance. The more complex, knowledge-based, and dynamic the world economy becomes, the more this is true. Competitive advantage lies increasingly in local things-knowledge, relationships, and motivation-that distant rivals cannot replicate. It seems clear that it is the learning that comes from the local 'community of learners' that brings about a 'cluster'.

HYPOTHESIS TO BE INVESTIGATED

The particular piece of quantitative research being described here will explore the relationships between the members of Wired Wessex, their use of their membership webpage, their attendance at regular networking events and their own perceived levels of entrepreneurial awareness, learning and creativity. It hypothesises that those who attend networking events and those who make use of the webpage will have different but increased levels of creativity, learning and entrepreneurial awareness when compared to those who make use of neither.

DESIGN AND RATIONALE FOR THE ENQUIRY

The theories relating to communities of learners [Lave 1991, Wenger 1998, Becher 1999] and economic clusters [Porter 1998] are becoming well articulated. They are at a sufficient level

of specificity to allow concepts to be identified, variables to emerge and measures to be developed; what Merton [1967] called ‘theories of middle range’. Bryman and Cramer [1999] stress that “concepts form the linchpin of social research” and Lazarsfeld’s [1958] views the search for underlying dimensions as an important ingredient. He suggests that a useful starting point is one of imagery, with the researcher forming an image from a theoretical domain. Thus from the theoretical domains of ‘communities of learners’ and ‘economic clusters’, which I am postulating have a close relationship, three concepts of importance for this piece of research emerge:

- Creativity
- Learning
- Entrepreneurial awareness

All three of these concepts are contested. Creativity, according Amabile (1996) could be measured by three assessment techniques: creativity tests (such as personality inventories, biographical inventories, behavioural test, etc.), objective analysis of products, and subjective judgments. Mumford and Gustafson (1988) list three general criteria that researchers use to measure creativity: the overt production criteria (assessing the frequency with which innovative products are generated); the professional recognition criteria (assessing the awards given to an individual's new ideas or products); and the social recognition criteria (assessing by the judgment of knowledgeable others). However due to the complexity of the creative process and the stability of personal creative abilities, the majority of creativity literature focuses on the product as the practical metric of creativity, instead of the process of generating creative outcomes (Amabile 1983). In work in the information technology industry Agarwal and Prasad [1998] look at the to the extent that creativity equals innovation. This piece of work that is being undertaken with Wired Wessex will focus on individual’s self-perception of their or their companies creativity in terms of artefacts or products that their company has designed.

Learning within the context of professionals developing themselves has been much discussed, and indeed the work by Becher, Eraut, Lave, Hall and Wenger all identify measures of communities of learners, including professional involvement, networking, course attendance. Most of the organisations with in Wired Wessex are small or micro. Entrepreneurial awareness is a facet of survival for many of these organisations and dimensions such as getting hold of finance, understanding marketing, identifying their customers are all mission critical and outwith many of the individual’s world view’ as new media developers who are

keen to be creative and develop new products rather than concern themselves with financial and business matters.

Within all three of these concepts there are thus a number of dimensions that need to be drawn out. It is clear that this is one of the most taxing parts of the design; Bryman and Cramer [1999 p64] suggest that “the search for dimensions can provide an important aid to understanding the nature of concepts and...can be an important step in moving from the complexity and abstractness of many concepts to possible measure of them”.

This piece of research is attempting to measure the relationships between clusters and communities of learners; and the ways that networking through web communities and networking through meetings can aid the process. It is very much a piece of survey/correlational design, there is no manipulation of any of the variables and the data relating to the variables will all be collected at the same time. The data will come from a mapping exercise of the existing Wired Wessex Membership Database and a Questionnaire which will be both emailed and posted to individuals.

Thus, following Hall [1968]; from each of the concepts a set of dimensions are drawn, from which a set of indicators can be selected. These indicators will form the questions in a questionnaire or be generated from a database ‘map’ of the Wired Wessex membership.

Figure 1 The Concepts and some Dimensions and Indicators

Concept	Dimension	indicators
Entrepreneurial Awareness	Size of company	Number of staff in company
	Type of business area	Standard Industrial Classification
	Financial awareness	Success in gaining finance
	Marketing awareness	Success in growing customer base
Learning	Professional updating	Event attendance
	Experience in the industry	Years of experience
	Information seeking	Web page hits

	Academic background	Qualifications
Creativity	New Products developed in the company	Success in developing new products
	New technologies used in the company	Success in using new technologies

DESCRIPTION OF DATA GATHERING

John Tukey [1977] legitimises the role of exploratory data analysis and this project will be a blend of exploratory mapping which will then move to analysis of some of the key variables that can be used to measure the concepts and dimensions of the population in order to test the hypothesis.

Mapping exercise

Thus the first stage of this quantitative project will be to map the existing membership of Wired Wessex in order that a Population can be identified. There are now some 500 members of the organisation recorded on a Web based SQL *Members Database* that can be explored though Access or SPSS.

Figure 2 An entry in the Members Database

ID	Organisation name	Address	Postcode	Organisation e-mail	Organisation Telephone	Website	Description	Turnover
472	Hornet Computer Solutions Ltd	11 Avondale Road Newport Isle of Wight UK	PO30 1HE	sales@hornetcs.co.uk	01983 537322	http://www.hornetcs.co.uk	Hornet Computer Solutions Ltd is a internet base company which cover a wide range of computer IT and computer components. We cover most of the UK, and have a hard working team on call, for all our clients needs.	45

Data from the Membership Database

The current web page allows an analysis of web page traffic; this data will be transferred to the Members Database. At the same time, there are detailed records of members who have attended the regular monthly networking events; these will also be transferred to the Membership Database.

Questionnaires

From this Database, using mail-merge and email software, Questionnaires will be sent to a random stratified 1:4 sample to give a total of 100 responses allowing for a drop out rate. The questionnaires will be both E-mailed and posted to enable a response that is most appropriate for the individual company. In each company there are contact names who receive the regular email briefings, attend events etc.; these will be the individuals contacted by email and letter. The stratification will ensure that companies which are:

event-attendees

web-users

use both,

use neither

are equally represented in the final survey population.

The questionnaire will be Pre-tested with a small group amongst the Board members and staff of Wired Wessex: some ten individuals with a range of different experiences and qualifications

DATA TO BE COLLECTED

There are thus two sources of data being collected – that which is available through the Membership Database and the more specific attitudinal material being gathered through the questionnaires. The questionnaire will also collect other individual pieces of data such as age, experience, and qualifications. From this it will be possible to produce a range of indicators with their measures for each company as shown below:

Data from the Membership Database

Figure 3 The indicators from the membership database

Indicator	measure	Scale
Staff come to events	Number of events attended	Ratio
Staff use the web site	Average number of hits a	Ratio

	month	
The size of each company	Number of employees	Ratio
Value of the company	the turnover of each company by £	Ratio
The areas of work of each company	standard industrial classifications	Nominal Category

Data from the questionnaires

The questionnaires will focus on the three concepts – entrepreneurial awareness, learning needs and creative outcomes. There will also be questions that focus on the age, experience, qualifications and gender of respondents.

There will be a set of multiple-item measures; individuals will be asked rate on a 1-5 Likert scale their positions in relation to each of the measures. There will be four measures for each concept giving a set of possible categories ranging from 4-20 for each concept. These indicators can then be used separately or summated to give a single score for each of the three concepts.

Clearly these response are in theory ordinal; on the other hand most of the multiple-item measures created by researchers are treated by then as interval variables because they allow a large number of categories to be stipulated [Bryman and Cramer p59]. Thus we will use the categories from these measures as interval variables. There will be four multi-item measures for each concept being explores. Thus:

Figure 4 Indicators from the Questionnaire

Concept	measure	Scale
	Age in years	Ratio
	Experience in the industry in years	Ratio
	Gender	Dichotomous
	Qualification	Nominal Category
Entrepreneurial awareness	How successful have you have been in obtaining external finance for your company	Ordinal/interval
	How successful have you been in increasing customer base	Ordinal/interval

	How successful have you been in making profits	Ordinal/interval
	Do you feel your company is more successful than your competitors	
Creativity	How successful have you been in producing innovative products during the past year	Ordinal/interval
	How successful have you been in making use of the latest technology	Ordinal/interval
	Do you think you have missed out on some new products in the past year	Ordinal/interval
	Do you think your competitors have produce more innovative products than your company	Ordinal/interval
Learning	How successful have you been in learning new ideas from your competitors	Ordinal/interval
	Do you feel you learn more quickly than other people in your company	Ordinal/interval
	Do you think you talk to many other people in your company	Ordinal/interval
	Do you get many ideas form other people you meet outside your company	Ordinal/interval

METHODS OF ANALYSIS

This piece of quantitative research is exploring whether the attendance at events and the use of a Web page for information enables a ‘community of learners’ that is economically more effective and thus could be seen as a cluster.

We therefore will spend much time analysing differences or relationships between the three main concepts, in this case our dependent variables, – creativity, learning and enterprise – and the independent variables or comparison groups of event-attendance or web-use. We are also interested in whether the dependent variables have any relationships with other factors such as

age, experience, qualifications. There may also be relationships between event-attendance or web-use and these other variables.

The research is looking at the way in which sub-groups from a larger population of members of Wired Wessex may or may not have different behaviours or attitudes after attending events or using the web. Thus we are looking in the main at unrelated samples of participants, also referred to as *independent or uncorrelated groups* or *between-subjects* design. There will be times when the analysis looks at other relationships – age and creativity or experience and creativity - when this will not be the case.

Statistical Package for the Social Sciences – SPSS

The data will be analysed using the Statistical Package for the Social Sciences – SPSS. There will be 21 variables in a sample population of some 100. The variables listed here will be entered into SPSS using a unique identification number which will also link to the Membership Database allowing data to be moved between the two. The 4 multi-item variables in Entrepreneurial awareness, Creativity and Learning will be conjoined to form three further single indicators for each of the concepts, as well as allowing them to remain separate.

Variables in SPSS	
Number of events attended	Entrepreneurial Awareness 1
Average number of hits a month	Entrepreneurial Awareness 2
Number of employees	Entrepreneurial Awareness 3
the turnover of each company by £	Entrepreneurial Awareness 4
standard industrial classifications	Creativity 1
Age of respondent in years	Creativity 2
Experience in the industry in years	Creativity 3
Gender	Creativity 4
Highest Qualification	Learning 1
	Learning 2
	Learning 3
	Learning 4

Figure 5 Variables in SPSS for Wired Wessex Project

Parametric tests

This research has been designed to ensure that as far as possible these data are interval or ratio measures; the Likert attitude data, whilst ordinal to purists, are being used as interval scales on the grounds that 'parametric tests can also be used with ordinal variables since tests apply to numbers and not what they signify' [Lord 1953]. It is clear that parametric tests are routinely applied to attitude variables of these sort and thus the analysis used here will use parametric tests.

Reliability

Before analysis starts it will be useful to test the data for reliability. Internal reliability is particularly important with the sort of multi-item scales that are being used here and thus we shall use *split-half reliability* and *Cronbach's alpha* to test for this. SPSS Statistics *_Scale_ Reliability* allows us to use both these tests in which both *r* and *alpha* need to be high to be reliable.

Bivariate analysis

Bivariate analysis allows us to explore whether the differences between variables are significant or not. This research is exploratory and thus we shall first need to get a sense of the data by using *t-test*, *chi-square* and *anova* analysis for the main sets of comparisons we are interested in:

Dependent	Independent attitudes	Independent -
event-attendance	creativity	Age
web-use	enterprise	Experience
	learning	Qualification

Figure 6 variables to be analysed

SPSS allows simple and effective production of these basic tests of difference by way of Crosstabs:Statistics, T Test, and One-way ANOVA. The outcomes of these tests of difference will give a sense of the direction for the analysis and we will then use those tests of

relationship between the data: Contingency tables and Chi-square, Correlation and Regression.

Contingency tables and Chi-square

SPSS Crosstabulation produces a Contingency table and the associated Chi-square test. This will allow us to see whether there really is a relationship and whether it has arisen by chance. This will be important analysis but it will not tell us the strength of the relationship and thus a more useful and powerful tool will be Correlation analysis

Correlation and Regression

Correlation measures both the strength and direction of the relationships between a pair of variables and will be essential here. As we will have interval data we shall be able to use *Pearson's Product Moment Correlation Coefficient- r* and the *Coefficient of determination- r^2* . SPSS *Correlate_Bivariate* will produce a matrix of correlation coefficients for the variables selected, including the statistical significance for each coefficient. From this we shall be able to explore the relationship – if any – between event-attendance or web-use and creativity, enterprise or learning. If r is low then scatter is greater and the relationship is implausible; and r^2 – which shows how far the variation in one variable is accounted for by the other and can be expressed as a percentage will appear very low.

It is important to interpret both r and the significance level when using correlation coefficients. The two measures must be used together; thus if $r = 0.7$, $p < 0.01$ and $r^2 = 49\%$ then a relationship exists, is significant and accounts for 49% of the variation.

Regression has become one of the most widely used techniques in the analysis of data in the social sciences and is a powerful tool for summarising the nature of the relationship between variables and for making predictions of likely values [Bryman and Cramer 1999]. SPSS *Statistics_Regression_Linear* produces a wide range of tests and measures including r , r^2 , F $Beta$ and the coefficients, along with the significance p . This will allow us to test the pairs of variables in **Figure 6**. to identify the most powerful relationships.

Multivariate analysis

Bivariate analysis allows us to test for differences and relationships between a pair of different variables. Multivariate analysis allows the researcher study a number of variables and “to discount the alternative explanations of a relationship that can arise when a survey/correlational design has been employed” [Bryman and Cramer 1999 p234]. Thus we

will be able to test for spuriousness, intervening variables, moderated relationships and multiple causation. We shall be looking at several factors – thus *Factorial* analysis - and trying to remove factors that might bias results, and identifying factors that are important.

SPSS allows us to perform multivariate analysis through *Contingency tables* **Statistics:Crosstabs** and as an initial ‘cut’ at the data we will be able to draw out some relationships between the three concepts and variables such as age, experience, event attendance etc. However, they will have a limited role in this analysis because with a sample of some 100 and a wide range of variables it is very possible that the frequencies will be small in many of the contingency cells.

Partial correlation coefficient analysis

One of the main ways in which we shall analyse this data will be thorough *partial correlation coefficient analysis*. This will allow us to test the relationship between two of our variables whilst holding one or more others constant. Partial correlation coefficients are first computed by calculating Pearson’s *r* for each of the possible relationships involved. SPSS enables this: **Statistics_Correlate_Partial** producing a table giving the various variables having taken out one control variable. Thus it is possible to look at the correlations for Events attendance, Experience, Learning and Entrepreneurial awareness, whilst controlling for Age. We shall need to correct for missing cases.

Similarly, SPSS allows *multiple regression* as a method for conducting multivariate analysis and Bryman and Cramer [1999] suggest that it is “the most widely used method for conducting multivariate analysis, particularly when more than three variables are involved”.

The strength of multiple regression is in the way that it can be used to establish the relative importance of independent variables to the dependent one. As we will have different units of measurement we shall need to standardise the units involved to produce a *standardised regression coefficient* or *beta weight*. This is easily computed in SPSS **Statistics_Regression_Linear** and shows by how many standard deviations the dependent variable will change for a standard deviation change in the independent variable. Thus the relationships of the variables Event-attendance and Web-use can be tested against the dependent variables Creativity Enterprise or Learning.

SPSS provides a large number of outputs for **Regression** showing the impact as each variable is entered, a summary of *R* and *R*² and *F* and valuably how the measures change as each variable is added to the analysis. The output includes *anova*, the regression coefficients and the variables that were excluded as having no effect. At the same time, we will be able to get

the *F ratio* to get a sense of the statistical significance of the relationship as a whole and the *t value* for each.

Principal Component analysis

We have a wide range of factors in this study – particularly if we return to the unbundled measures for creativity, enterprise and learning. If we are able to analyse the fashions in which individuals have scored their attitudes we might be able to identify whether there are any relationships between the responses that would suggest that they are either so similar that they are effectively measuring the same thing or whether they are importantly discriminatory. Factors such as age, experience, qualification may or may not have strong relationships with creativity, enterprise or learning. SPSS Data Reduction _ Factor allows us to do this, analysing all the attitude measures to identify that could be removed to good effect if further work is to be done.

CONCLUSIONS

This piece of quantitative research has been designed to identify reliably the relationships between the key variables of creativity, enterprise, learning, web-use, event-attendance, age, experience and qualifications as evidence in one particular group of new-media workers.

If it does identify any such relationships then further work of a more qualitative nature will need to take place.

References

- Abelson, Robert. (1995). *Statistics as Principled Argument*. Hillsdale:Lawrence Erlbaum
- Agarwal, R., & Prasad, J. (1998). A Conceptual and Operational Definition of Personal Innovativeness in the Domain of Information Technology. *Information systems research*, 9(2), 204-215.
- Amabile , T. M. "The Social Psychology of Creativity: A Componential Conceptualization", *Journal of Personality and Social Psychology* (50), 1983,
- Amabile, T. M. *Creativity in Context*, Harper, Boulder, Colorado, 1996.
- Barnett, Ronald.(2000) *Realizing the University in an age of supercomplexity*. SRHE and Open University. p4.
- Becher, Tony (1999). *Professional Practice: Commitments and Capability in a Changing Environment*. Transaction Publishers: 1999.
- Bell, Daniel. (1973) *The Coming of Post-industrial society: A Venture in Social Forecasting*. New York: Basic Books.
- Brown, John Seely and Duguid, Paul (2000). *The Social Life of Knowledge*. Harvard, 2000.
- Bryman, Alan and Cramer, Duncan (1999) *Quantitative data analysis: a guide for social scientists*. London:Routledge.
- Castells, Manuel. (1996) *The Rise of the Network Society*. London: Blackwell.
- Creative and Cultural Industries: an economic impact study for South East England* (2002). Research report by David Powell Associates for South East England Cultural Consortium and South East England Development Agency.
- Eraut, M.(2000) Non-formal learning in and tacit knowledge in professional work. *British Journal of Educational Psychology*, 2000, 70 pp 113-136.
- Hall, R.H. (1968) Professionalization and bureaucratization. *American Sociological Review* 33:92-104
- Jacobs, Jane. (1961). *The Death and Life of Great American Cities*. New York, Vintage.

Johnson, Steven. (2001) *Emergence: the connected lives of ants, brains, cities and software*. London, Penguin

Knight, Peter. (2001) Review. *Higher Education Quarterly*, 55, No 1, January 2001, pp100-102.

Lave, Jean and Wenger, Etienne. (1991). *Situated learning: Legitimate Peripheral Participation*. Cambridge: CUP.

Lazarsfeld, P.F. (1958). Evidence and inference in social research. *Daedalus* 87: 99-130

Lord, F.M. (1953) On the statistical treatment of football numbers. *American Psychologist* 8: 750-1.

Lyotard, Jean-Francois.(1984) *The Post-modern Condition: a report on knowledge*. Manchester: UP.

MacCrimmon, K.R. and Wagner, C (1994). Stimulating Ideas through Creativity Software. *Management Science*, Vol. 40, No. 11, November 1994, pp. 1514-1532.

Maskell, Duke and Robinson, Ian (2001). *The New Idea of a University*. London: Haven Books.

Merton, R.K. (1967) *On Theoretical Sociology*. New York: Free Press.

Mumford, M. D. and Gustafson, S. B.(1988) "Creativity Syndrome: Integration, Application, and Innovation", *Psychological Bulletin* (103:1), 1988, pp. 27-43.

Noble, David (1998). Digital Diploma Mills: the automation of higher education. *First Monday*. Vol 3(3), Jan.

Porat, Marc. (1977) *The Information Economy: Definition and Measurement*. Washington: US Department of Commerce.

Porter, Michael E. (1998). Clusters and the New Economics of Competition. *Harvard Business Review*, November-December pp. 357-376.

Thorpe, Mary (2002). From independent learner to collaborative learning: New communities of practice in open, distance and distributed learning. In Lea, Mary and Nicoll, Kathy. Eds (2002) *Distributed learning: social and cultural approaches to practice*. London: RoutledgeFalmer. pp 131-151.

- Tukey, John. (1977) *Exploratory Data Analysis*. Reading,MA: Addison-Wesley
- Turner, C.M.D (2002a). *Professionals in the Academy*. Paper for Kings College London.
- Turner, C.M.D (2002b). Communities of learners in the new-media industries. *Proceedings of the Bristol Business School Teaching & Learning Conference*. 24-25 September 2002
- Wagner, C. (1996) Creative Behavior through Basic Inferences: Evidence from Person-Computer Interactions, *The Journal of Creative Behavior*, Spring.
- Wenger, Etienne (1998). *Communities of Practice: Learning, Meaning and Identity*. Cambridge, 1998.
- Wenger, Etienne (2000). Communities of practice and social learning systems. *Organization*. 7 (2): 225-246.
- Wittel, Andreas; Lury, Celia and Lash, Scott. (2001) Real and virtual connectivity: new media in London. In Woolgar, Steve. (2002) *Virtual Society? Technology, Cyberpole, Reality*. Oxford: University Press
- Woolgar, Steve. (2002) *Virtual Society? Technology, Cyberpole, Reality*. Oxford: University Press.