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ABSTRACT

This paper draws on an extensive review of literature associated with telecommuting and looks at features that might affect the offering and take-up of distance education, particularly distance education involving computer applications, telecommunications and web-based, off-campus delivery of courses or components of courses. The issue is discussed from the perspective of the individual, the organization (the educational institution) and the wider community. The aim of the paper is to put forward a possible research model for the evaluation of distance education. Includes two figures: a task model and a research model. (Contains 43 references.) (Author)

TOWARDS A RESEARCH MODEL FOR DISTANCE EDUCATION – CONTRIBUTIONS FROM THE TELECOMMUTING LITERATURE

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ABSTRACT

This paper draws on an extensive review of literature associated with telecommuting and looks at features that might affect the offering and take-up of distance education, particularly distance education involving computer applications, telecommunications and web-based, off-campus delivery of courses or components of courses. The issue is discussed from the perspective of the individual, the organisation (the educational institution) and the wider community. The aim of the paper is to put forward a possible research model for the evaluation of distance education.

INTRODUCTION

The paper begins with a review of the benefits, costs and risks associated with telecommuting (Gray et al., 1993; Turban and Wang, 1995; Ford and McLaughlin, 1995; Ellis and Webster, 1997) and suggests that several of the matters here have direct relevance to the distance education decision. This theme is continued by an examination of the enablers, drives and constraints (Mokhtarian and Salomon, 1994; Tung and Turban, 1996) which provides some insight into the factors that are likely to influence the acceptance of this form of education.

Parallels are drawn between educational and work-place tasks the understanding of prescribed material, assignments, experiences and acquisition of knowledge on one hand and the components of a job on the other. Using a theoretical task model to encompass the component, co-ordinative and dynamic themes of complexity (Wood, 1986), the task characteristics of uncertainty and equivocality (Daft and Macintosh, 1981) and the organisational issues of resources and scheduling of work (Thompson, 1967), a set of attributes for educational tasks is developed. It is proposed that this model form a central component of a research model for the evaluation of the suitability of educational tasks to distance education.

In respect of the personal attributes of the individual, there are parallels with the telecommuting literature too. These are most likely to be in the areas of personal characteristics such as the ability to get information required, knowing when advice is needed, the ability to solve one's own problems and good self-management (Venkatesh and Vitalari, 1992; Gray et al., 1993; Wheeler and Zackin, 1994; Mokhtarian and Salomon, 1996a) and the home environment (Yap and Tng, 1990; Mannering and Mokhtarian, 1995).

To some extent the role of the academic is analogous with that of the supervisor. As the supervisor controls allocation, timing and resources for tasks (Starr, 1971), the academic controls task content, timing and the required resources. Accordingly, this literature, as it relates to telecommuting, offers some assistance in studies of distance education.

Telecommuting literature also provides some pointers to demographic influences on the preference to telecommute age, gender, time in the work-place, job type, education, transport, presence of small children and the number of cars in the household (Mokhtarian and Salomon, 1997; Belanger, 1999; Dick and Duncanson, 1999) some of these seem to have relevance to the decision to engage in distance education.

ADVANTAGES AND DISADVANTAGES

For the Individual

The telecommuting literature (Olson, 1983; Rice, 1987; Ford and Butts, 1991; Gray et al., 1993; Mokhtarian and Salomon, 1994; McQuarrie, 1994; Turban and Wang, 1995) suggests the following as potential advantages and disadvantages of telecommuting each item is discussed with a view to its applicability to the student undertaking distance education, using some form of information and communications technology to aid him in the associated tasks. First, the advantages...

Reasons associated with travel to work such as reduction in commuting stress, saving money and time and helping the environment some relevance to distance education; not having to attend on a regular basis may reduce travel costs for the student, particularly if long distance travel is involved. In this context it should be noted that reduction of living costs maybe a significant factor for the potential student. Also, this area might be broadened to include those for whom travel would be impossible, such as those living abroad or in remote areas.

Better able to manage one's own affairs eg. more independence, flexibility, control of the physical working environment, to study or pursue personal interests particular relevance perhaps to the post-graduate student in the sense of better managing work commitments.

To be able to work if sick, disabled or look after a sick child or other dependent potentially increases the possibility of education for those who may be disabled or extensively involved in the care of dependent children or other relatives.

To reduce the stress experienced in the office relevant perhaps to those who might find the campus environment threatening or intimidating.

To spend more time with one's family covered above.

To get more work done campus life offers many distractions for the student; while mostly seen as an advantage, some students may benefit from the possibility of removing themselves from these distractions.

...and the disadvantages.

More difficult to work at home due to less help available, motivational problems, increased family conflict and distractions one might expect these to be serious impediments to distance education for many people, requiring particular personal attributes for them to be overcome.

Viewed negatively by management, being "out of sight and out of mind if we interpret "management to mean academic staff, there could well be a feeling among distance students that those with physical access to the academic staff get enhanced help and assistance.

Exploitation by management missing out on overtime or having to work extra time to cover peak periods "management in this sense could be interpreted as the university administration which supplies resources and occasional casual work to supplement student incomes.

Travel time can be used productively, to run errands, or provides a break between home and the office travel is seen as a time for completing assignments, reading, study, etc.

The office is nicer/better equipped than a home office would be a significant issue for potential distance students may be the need to equip a home study area with a PC and appropriate software, telephone line, communications software.

The social interaction found at the conventional workplace missing out on the extra-curricular activities that take place on campus could be viewed by many as a serious impediment to distance education.

The professional interaction found at the conventional workplace getting to know one's fellow students, easy access (formal and informal) to academic staff. At a more strategic level, a diminished educational experience may result.

For the Organisation

Advantages to the organisation from telecommuting normally centre around productivity, better use of an employee's time, a wider pool of recruits on which to draw, saving on conventional office space and an

extension of working hours (Katz, 1987; DuBrin, 1991; Gray et al., 1993; Hamblen, 1999). Similar advantages could accrue to universities offering distance education increasing staff work loads and the ability to offer courses outside conventional hours may appeal to university administrations; the wider pool of students is already seen as a major driving force and there could be savings in lecture halls, tutorial rooms, laboratories and other on-campus facilities.

Disadvantages from telecommuting are to do with changing the way organisations work and function, duplicating equipment costs, absence of key personnel from the conventional workplace, morale problems and security (Ford and Butts, 1991; Filipczak, 1992; Li and Gillespie, 1994; Tamrat et al., 1996; Orlikowski, 1996; Dick and Duncanson, 1999). Re-skilling academic staff and changes to more traditional ways of teaching may present problems, there will be additional costs in supporting students' online access and the absence of students from the conventional classroom may diminish the research and teaching standing of the university.

For the Community

Potential reduction in the demand for transport infrastructure, reduction in pollution and benefits to local or rural communities are often cited as possible effects of telecommuting (Blanc, 1988; Mokhtarian et al., 1995; Nilles, 1996). There is some scope for these benefits from distance education, perhaps the most significant may be the reduction in the subsidies required for public transport. Against this, business activity in the city centres and university towns may fall, travel may increase in outlying areas and energy consumption in the home may rise (Gray et al., 1993).

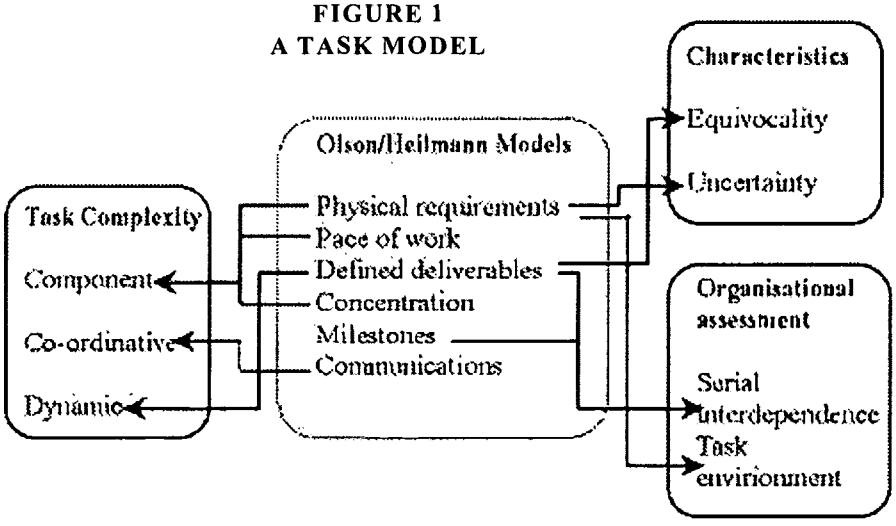
ENABLERS

There is a long list of electronic enablers which facilitate telecommuting PCs and laptops, printers, modems, copiers, fax machines, cellular telephones, answering machines, high speed communications links and access to e-mail and the Internet (Hotch, 1993; Tung and Turban, 1996). While clearly not all are required for all tasks, this list is a useful starting point for the types of electronic assistance that would facilitate distance education. At present much of this equipment is made available free of charge to students in the traditional campus environment considerable expense would be incurred by the student in equipping himself with such technology. On the other hand many universities are moving to requiring (or expecting) students to have such technology available at home.

TASK SUITABILITY

The following model, constructed from the telecommuting and task literature, outlines various aspects of task properties that make task suitable for telecommuting.

FIGURE 1
A TASK MODEL



Based on original models of task suitability for telecommuting (Olson, 1983; Huws et al., 1990) the model suggests support for these properties from the task related literature.

The original telecommuting models suggested that tasks may lend themselves to telecommuting if physical requirements (for resources and equipment) are kept to a minimum, the staff member is in a position to control the pace of his work, the work has defined deliverables, required concentration, has specific milestones set and has minimal need for communications with one's supervisor or fellow employees. There are obvious parallels here to those tasks which are likely to be part of distance education assignment writing, research, understanding course notes and lecture material and examination preparation.

In terms of task complexity (Wood, 1986), in general terms as the degree of complexity rises, the task becomes less suitable (or more difficult) for telecommuting. The same may be said of distance education. Component complexity is a function of the number of distinct acts that are required to perform the task and the number of information cues to be processed in performing these acts. Component complexity is also affected by the task being dependent on completion of other tasks. The type of task may have relevance here too some concepts may be difficult to explain or demonstrate without "hands on experience for example dissection, modelling and instrument operation. Co-ordinative complexity refers to the form and strength of relationships and the sequence of inputs. Wood suggests that the more complex the timing, frequency, intensity and location requirements, the greater the knowledge and skill the individual must have to be able to perform the task. Changes in the acts and information required or in the relationships between inputs and products Wood calls dynamic complexity. This too can create shifts in the knowledge or skills required.

To illustrate, if we consider component complexity, tasks with minimal component complexity may be those such as reading a study guide, notes or a text book and answering a series of "review questions. At the other end of the scale, research using multiple resources, including hard copy and electronic journals, text books and the Internet, discussions with a colleague and writing up a summary of the research may present difficulties for the distance education student. Likewise co-ordinative complexity could range from one person completing an assignment to working as part of a team, with each member responsible for various components and then the team having to link them together to produce a final product.

The task characteristics (Daft and Macintosh, 1981; Daft et al., 1987) of equivocality (ambiguous meanings or instructions) and uncertainty (about what is required or how to go about it) are relevant to tasks involved in distance education too considerable difficulty might be expected to be experienced by the student if tasks are not clearly explained with no ambiguity and specified to reduce uncertainty.

Similarly, the environment in which the tasks take place (Thompson, 1967) may have some relevance to their suitability serial dependence refers to the need to wait on others (academic or student) in order to commence or complete one's own work. Also relevant is the degree of "networking and team building that educational tasks are designed to include.

PERSONAL ATTRIBUTES

Successful telecommuters display certain traits (Gray et al., 1993). According to the authors, these traits are:

> the ability to make sound decisions, know where to get the information that leads to that decision making process or completion of the task and know when they need advice;
>
> the ability to solve their own problems this might require a knowledge of the organisation, the tasks or the technology and an analytical approach to problem solving; and
>
> good self management self motivation, time management, the ability to assess their own work and to be able to put these skills together to deliver quality work on time.

There is considerable support for these traits in the literature see also (Venkatesh and Vitalari, 1986; Mokhtarian and Salomon, 1996b; Lewis, 1998). Confidence in working within the electronic community (Venkatesh and Vitalari, 1986; Hesse and Grantham, 1991; Trevino and Webster, 1992) may also be an important attribute the telecommuter is isolated from "help , and runs the risk of being seen as incapable of working with the required tools, or being seen as incompetent if he/she does not hold the necessary skills.

Other aspects identified in various studies by Mokhtarian and others include the need for self discipline, household interaction problems and aversion to risk (Mokhtarian and Salomon, 1994), susceptibility and aversion to stress (Mokhtarian and Salomon, 1997), (see also (Trent et al., 1994)) and the desire to get more work done (Mokhtarian et al., 1994).

For the distance student, knowing where to get relevant information and when to seek advice would seem to have particular importance, as does the ability to solve his own problems the added reliance on information technology and communications equipment gives this aspect added weight. Under-graduates are more likely (perhaps than there post-graduate counterparts) to have motivational problems and will need to develop time management skills to enable work of an appropriate quality to be delivered on time. On the subject of the household environment, the telecommuting issues (Mannering and Mokhtarian, 1995) of presence of small children, number of people in the household and family orientation may also have some effect on the preference to study at a distance.

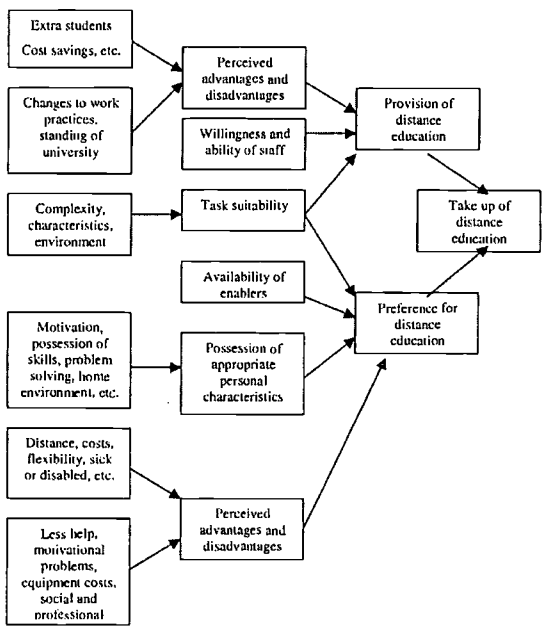
THE SUPERVISOR

The supervisor has a enigmatic role in telecommuting on one hand, without the supervisor's approval of individual instances, telecommuting is unlikely to take place while on the other, the attitude of the supervisor does not seem to affect the preference to telecommute (Dick, 2000). Nevertheless, if we align the role of the supervisor with that of the academic, some issues do arise. It has already been noted that one of the disadvantages of telecommuting to the organisation relates to changes to the way of working. Academic staff will need to learn new skills, particularly IT related ones. They will need to be prepared to "formalise presentations and the learning experience imparted to a considerable degree and to correspond with students by the, perhaps unfamiliar media of e-mail, "chat rooms and "bulletin boards. These changes will not be easy and are likely to involve universities in considerable upheaval.

A RESEARCH MODEL

The above suggests that the following model may be useful in the evaluation of distance education as an alternative for students and universities.

FIGURE 2
A RESEARCH MODEL



CONCLUSION

Many education institutions are considering, or have already implemented, distance education programmes. Research on these programmes is just beginning. There is a need for the evaluation of such programmes against a sound research model. The essential contribution of this paper is to bring the telecommuting related literature together in a manner which allows the development of a preliminary research model for studies of the provision of distance education from the educational institution perspective and for the desire to partake in distance education from an individual perspective. The model brings together the tasks (and the related issues of scheduling and control of work), personal characteristics of the individuals, the perceived advantages and disadvantages of undertaking a course of study in this way and the necessary underlying technology.

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