

29 A LONGITUDINAL STUDY INTO PERCEPTIONS OF THE EFFECT OF IT ON TRAINING, HUMAN RELATIONS AND PRODUCTIVITY IN THE CONSTRUCTION INDUSTRY AS A FUNCTION OF POSITION, AGE, EXPERIENCE AND GENDER

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Abstract

The general aim of this longitudinal study was to provide an insight into the effectiveness of Information Technology (IT) in computerised maintenance management, with particular emphasis on the effect IT has on training, human relations and productivity as a function of position, age, experience and gender. The study follows up on previous work carried out by Clarke (2000) into the differing perceptions of management and support staff regarding the introduction of a computerised IT system into a large public service asset management organisation in Australia. The empirical data was collected through structured interview within a large public sector asset management organisation. The data was collated and examined under the broad categories of training, human relations and productivity as a function of position, age, experience and gender. Results obtained from this study were statistically analysed to measure the significance of variations in perceptions between management and support staff, younger and older, inexperienced and experienced together with female and male staff.

The analysis revealed that all groups perceived IT as beneficial in terms of training, human relations and productivity but that there were some significant differences in relation to the specific categories of position, age, experience and gender. These were

- 1. Older staff were less satisfied than younger staff with respect to training for the new I.T. system*
- 2. Male staff members perceived I.T. to have a greater influence on both staff morale and their control of occupational performance*
- 3. There was a difference between managers and support staff in the level of satisfaction with their control of occupational performance under the new I.T. system.*

The overall level of satisfaction supports previous researchers findings regarding the benefits of IT in terms of other quantitative and qualitative outcomes, in industry. Further research is suggested in the areas of satisfaction with the perceived level of control in occupational performance, particularly in the perception of the level of control of occupational performance as differentiated by personality traits, with consequences for productivity

Keywords: *Information Technology(IT), construction, effectiveness, management, maintenance, asset management, perception, satisfaction, psychology*



INTRODUCTION

Information Technology is considered by researchers and practitioners to be extremely useful in terms of increasing both quantitative and qualitative outcomes (Mathews, 1994). Mathews identified IT as being the fifth paradigm shift in the industrial revolution. "Information technology is having pervasive effects throughout the economy that are entirely analogous to the previous paradigm shift" (Mathews, 1999, p.84). This paradigm shift has resulted in the transformation of a plethora of existing organisations within the building construction industry. Mathews purports most programs of organisational change end up in failures. Bodi states that, "there is a gap in the training market in terms of providing a conceptual understanding of systems and how to use them for the organisations benefit" (Bodi, 1987, p.7). Bodi further states that, "A poor interface may undermine an otherwise well-designed job" (Bodi, 1987, p.13). Coleman and Joseph purport that educational institutions, in Australia, are criticised for failing to have a high commitment to training (Coleman & Joseph, 1986). This study focuses on a number of evaluative aspects of IT's implementation, namely the phenomenological perspectives of asset managers and support staff, younger and older subjects, inexperienced and experienced staff together with female and male subjects in relation to effects of IT on training, human relations and productivity in terms of both qualitative and quantitative outcomes. Lansbury purported that in order to optimise IT's benefits for staff effective planning, consultation and implementation by management in co-operation with other employees is necessary (Lansbury, 1986). Gately, suggested a polarisation of skill levels would occur, as a result of the implementation of IT, in an investigation of banking, retailing and data processing (Gately, 1984). Chishti, Martin and Jacoby claim, in a study of IT's effects on a diverse range of Australian companies, that a "negative effect on the mental health and morale of employees was reported by a noticeable percentage of respondents" (Chishti et al, 1997, p.11). This claim supports the 'resistance to change' theories because organisational change may force managers and support staff, alike, to move from their comfort zone and may impact on their mental health (Lansbury, 1983). These results could, potentially, have an impact upon morale within the building construction industry, also, if the results were generalised. This study aims to identify any trends that occur between the groups, as categorized by position, age, experience and gender. These trends, if they are evident, may lead to other research topics in fundamentally important areas to building and construction, with regard to IT

METHODOLOGY

The aim of this study was to identify trends in such fundamental phenomenological facets as efficiency of training in Information Technology (IT), effects of training for IT on human relations in the work place, perceived effect of IT productivity, as functions of position within the organization, age, experience and gender. Data used was collected during the study by Clarke & al, (1999).

The data collected in the 1999 study was categorised into the broad headings of training, human relations and productivity and was then differentiated by position, age, experience and gender. Where the positions were either asset managers or support/ancillary staff and subjects with age of 40 years or greater were categorised as being older subjects, whilst subjects with at least ten years of experience of more were considered experienced. The study, by Clarke et al (1999) developed a framework technique together with procedures for statistical analysis that have been utilized in this study.

Subjects

The fifty five participants used in this study were the same subjects utilized in the Clarke, 2000 study (N=55). Participants were randomly selected from a computerised maintenance management environment within a large public sector asset management organization.

Materials

The materials used in this study were adopted from the previous study by Clarke and included the use of a questionnaire designed to examine training, human relations and productivity as a function of IT, utilising a Likert type scale in addition to dichotomous response and short answer type questions as well as a structured interview.

Procedure

The procedure adopted to collect the data for the Clarke, 2000 study was that participants were briefed on the background to the study and were then invited to complete the questionnaire individually, followed by a structured interview administered by one of the two researchers.

A Lickert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree) was used to indicate satisfaction with the following seven psychological indicators, categorised into groups of training, human relations and productivity.

- Training Satisfaction with Existing Training
 Perceived Effect on Future Training

- Human Relations Effect on Office Morale
 Perceived Effect on Control of Occupational Performance
 Fear of Redundancy

- Productivity Perceptions of Quality of Service
 Perceptions of Level of Output

RESULTS

Differentiation by Staff Position

Data collected from the Clarke (2000) study concerning training, human relations and productivity as a function of IT was re-analysed to differentiate responses in terms of the functional responsibilities of the people sampled.

The two categories of staff used as subjects were asset managers and support staff. Of the sample of 57, 18 (37%) were asset managers and 39 (63%) were support staff. The results are shown in Table 1 .

Psychological Indicators	Asset Managers Mean Rating	Support Staff Mean Rating	Students t Value	p Value
Satisfaction With Existing Training	2.89	2.95	0.217	0.83
Perceived Effect on Future Training of Introduction of New IT System	2.89	2.95	0.194	0.85
Effect on Office Morale	3.00	2.95	0.201	0.84
Perceived Control in Occupational Performance	4.00	3.47	2.151	0.05
Fear of Redundancy	3.11	3.39	0.94	0.35
Perceptions of Quality of Service	3.67	3.54	0.38	0.70
Perceptions of Level of Output	3.78	3.56	0.63	0.53

Table 1 – Perceptions of Staff as Differentiated by Staff position

Differentiation by Age

Results of the analysis, in this study, of data collected concerning training, human relations and productivity as a function of IT and as differentiated by age are shown in Table 2 below. The differentiation with age assumes that a person less than 40 years is categorized as being young and a person equal to or greater than 40 years of age is categorized a being old, for the purposes of this study. Of the sample of 57 subjects, 23 (42%) were in the young category and 32 (58%) were in the old category (2 unknown).

Psychological Indicators	Younger Subjects	Older Subjects	Students t Value	p Value
Satisfaction With Existing Training	3.48	2.63	0.715	<0.05
Perceived Effect on Future Training of Introduction of New IT System	2.96	2.94	0.065	0.95
Effect on Office Morale	2.91	2.97	0.23	0.82
Perceived Control in Occupational Performance	3.48	3.72	0.98	0.33
Fear of Redundancy	3.52	3.19	1.18	0.24
Perceptions of Quality of Service	3.52	3.75	0.74	0.46
Perceptions of Level of Output	3.56	3.63	0.18	0.86

Table 2 – Perceptions of Staff as Differentiated by Age

Differentiation by Experience

Results of the analysis, in this study, of data collected concerning training, human relations and productivity as a function of IT and as differentiated by experience are shown below. Experience is based on a minimum of ten years, so the subjects with ten years experience or more are considered to be experienced while those with less than ten years experience are considered inexperienced. Of the sample of 57 subjects, 36 (65%) were inexperienced and 19 (35%) were experienced (2 unknown).

Psychological Indicators	Inexperienced Subjects	Experienced Subjects	Students t Value	p Value
Satisfaction With Existing Training	3.03	2.33	1.67	0.10
Perceived Effect on Future Training of Introduction of New IT System	2.94	2.90	0.16	0.87
Effect on Office Morale	2.97	2.95	0.10	0.92
Perceived Control in Occupational Performance	3.61	3.74	0.49	0.63
Fear of Redundancy	3.36	3.21	0.52	0.61
Perceptions of Quality of Service	3.69	3.26	1.33	0.19
Perceptions of Level of Output	3.64	3.53	0.33	0.74

Table 3 – Perceptions of Staff as Differentiated by Experience

Differentiation by Gender

Results of the analysis, in this study, of data collected concerning training, human relations and productivity as a function of IT and as differentiated by gender are shown below. Of the sample of 57, 21 (38%) were female and 34 (62%) were male (2 unknown).

Psychological Indicators	Female Subjects	Male Subjects	Students t Value	p Value
Satisfaction With Existing Training	3.00	2.77	0.78	0.43
Perceived Effect on Future Training of Introduction of New IT System	2.86	3.00	0.49	0.63
Effect on Office Morale	2.62	3.11	2.17	<0.05
Perceived Control in Occupational Performance	3.29	3.79	2.01	<0.05
Fear of Redundancy	3.19	3.38	0.68	0.50
Perceptions of Quality of Service	3.43	3.82	1.29	0.20
Perceptions of Level of Output	3.64	3.53	0.33	0.74

Table 4 – Perceptions of Staff as Differentiated by Gender

The significance of the results can be summarized as below, with the psychological indicators grouped into three major areas, Training, Human Relations and Productivity.

Training	Psychological Indicators	Position	Age	Experience	Gender
	Satisfaction With Existing Training	N	Y	N	N
	Perceived Effect on Future Training of Introduction of New IT System	N	N	N	N
Human Relations	Effect on Office Morale	N	N	N	Y
	Perceived Control in Occupational Performance	Y	N	N	Y
	Fear of Redundancy	N	N	N	N
Productivity	Perceptions of Quality of Service	N	N	N	N
	Perceptions of Level of Output	N	N	N	N

Table 5 – Significance of Four Variables in Study (Y = Significant at 0.05 Level)

DISCUSSION

Effect of I.I. on Training

The overall level of satisfaction with both the existing I.T. system and the staff's perception of its effect on future training was high. In the case of the training given for the introduction of the existing I.T. system there was no difference in response between management and support staff, between experienced and inexperienced staff and between males and females. There was however a statistically significant difference between younger staff members (satisfaction level of 3.48) and older staff members (satisfaction level of 2.63). The difference observed between younger and older subjects may be because younger people accept and adjust to change more readily than older people.

As far as the staff were concerned, their expectations of the effect the I.T. system would have on future training was similar across the four groupings studied.

Effect of I.T. on Human Relations

The introduction of the new I.T. system does not appear to have had an effect on the staff's fear of redundancy, with all four groupings recording similarly high values.

With regard to office morale the female staff members recorded a lower satisfaction level (2.62) than their male counterparts (3.11), and this was found to be statistically significant. There was no distinction between responses with regard to a staff members position, age or experience.

The male staff members also recorded a significantly higher satisfaction level (3.79) regarding the perceived level of control that the new I.T. system gave them when compared to their female colleagues (3.29). Age or experience does not appear to effect this perception of control

Effect of I.T. on Productivity

The overall level of satisfaction amongst the subjects in this study, with regard to the perceived effect of the introduction of the I.T. system on Quality of Service and Level of Output , was high (typically rating over 3.5). There was no discernible difference between the categories of position, age, experience or gender.

CONCLUSIONS

The study carried out by the authors has produced the following conclusions with regard to the effect of the introduction of a new I.T. system into a large organisation working in the construction industry.

1. Older staff were less satisfied than younger staff with respect to training for the new I.T. system
2. Male staff members perceived I.T. to have a greater influence on both staff morale and their control of occupational performance

3. There was a difference between managers and support staff in the level of satisfaction with their control of occupational performance under the new I.T. system.

The asset management organization studied had recently introduced an IT system that was subject to a staged implementation system involving implementation, involvement, training and development or refinement. Consequently the introduction of the system took a considerable amount of time and in hindsight it would have been preferable to resample after two years, rather than one. The system had not been completely introduced and refined, and further study will be needed to verify these results.

General staff perceptions of IT were reasonably high in terms of training, human relations and productivity. Whilst the level of satisfaction concurs with a multiplicity of previous research findings, the differences identified between the groups warrant further investigation, especially in the areas of satisfaction with training for new IT implementations, level of perceived control in occupational performance, level of quality of service provided and level of output as a result of IT.

The aspect of perceived control in occupational performance was observed to have a statistically significant difference between both managers and support staff and female and male subjects whereas differences in levels of satisfaction with the effects on office morale were only statistically significant between the groups differentiated by gender. The highlighting of this area is considered to be an important outcome of this study and further supports previous research suggesting this is an area that should be subject to further investigation. There is a possibility that perception of control is related to certain characteristics of personality and this could provide a part explanation for the results recorded. In addition there may be gender specific differences influencing perception of control and office morale.

The empirical investigation results analysed in this study revealed a plethora of interesting results principally conforming with the theoretical hypotheses derived from previous research together with most of the results observed in the study by Clarke (2000).

The observed differences between all four groups, differentiated by position, age, experience and gender, of the level of perceived control in occupational performance warrant further investigation as this could be an area of importance in terms of increasing dissatisfaction within the area of human relations within the workplace as a result of IT. It is considered that a great deal of further research is necessary in this area within the construction maintenance management field, particularly concerning the perceived level of control in the work environment.

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