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**THE RELATIONSHIPS BETWEEN E-MAIL
USE AND EMPLOYEES' PERCEPTIONS OF
ROLE STRESS AND JOB PERFORMANCE.**

A thesis presented in partial fulfilment for the degree of
Master of Arts in Psychology at Massey University
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ABSTRACT

A group of employees from a large educational institute (n=167) participated in this study which aimed to examine the impact of e-mail use on employees' perceptions of role stress and job performance. The study also aimed to investigate the possibility that role stress mediates the relationship between e-mail use and job performance. Participants completed a self-report questionnaire, which included measures of e-mail use, role stress and job performance. Data was examined as outlined by Baron and Kenny (1986) to explore the potential mediating effects of role stress. Results did not support a mediating model, but indicated several bi-variate relationships. The greater use of e-mail for routine purposes was found to be associated with higher perceptions of role overload and lower perceptions of role conflict. Also, the greater use of e-mail for bulletin board purposes was found to be associated with lower perceptions of resource inadequacy and higher perceptions of job performance. Post hoc hierarchical multiple regressions were conducted to test for possible moderating relationships, of which only two were found to be significant. Overall, by incorporating various uses of e-mail, this study builds on previous research, which has found e-mail use to be unrelated to perceptions of overload. In addition, this piece of research illustrates the need to explore further the individual and organisational consequences of the bulletin board use of e-mail within organisations. Limitations and other potential areas for future research are also highlighted.

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CHAPTER 1 : INTRODUCTION

Occupational stress is a well-researched topic in the area of Industrial/Organisational psychology. There are numerous models researchers can draw on for theorising, and designing practical solutions for workplace stress. A common theme across occupational stress theories is the role of organisational factors in the stressor-strain relationship. Research has found several organisational factors to be related to the stress process, including work schedules, workloads and career security factors (Jex, 1998). More recently, the role of computers as a stress producer has become a focus of contemporary research, as the number of jobs replaced with, or supported by information technology increases (Kahn & Cooper, 1991). Recent times have seen an expansion of computer-mediated communication into several aspects of organisational functioning. Technologies such as electronic mail (e-mail) have profound effects on the way in which employees conduct their jobs. E-mail systems have been established in organisations to increase or facilitate organisational performance and have been found to impact on employee performance and perceived productivity (Batten, 2000; Hollingshead, McGrath, & O'Connor, 1993; Rice & Shook, 1988; Sproull, & Kiesler, 1991). However, such systems are often implemented without examining unanticipated consequences for individual employees. Industrial/Organisational psychologists are involved in the study of organisational problems for long and short-term difficulties for employees, as well as job design and productivity related issues (Frese, 1987). In light of this, it is surprising that there has been little interest among Industrial/Organisational psychologists in dealing with the topic of electronic communication systems in organisations.

The present study is an exploratory investigation of the effects of e-mail use on employees' experiences of role stress and performance. This research is theoretically based on Kahn, Wolfe, Quinn, Snoek, and Rosenthal's (1964) model of Organizational Role Stress. Within this model Kahn and Colleagues (1964) identify several organisational factors that are antecedents to role stress. Changes in technology are incorporated in this model as possible antecedents. The current study proposes to

investigate the impact of e-mail use on employees' experiences of role stress, based on the premise that e-mail has altered patterns of information exchange and working relationships within organisations (Sproull & Kiesler, 1986). To fully capture the impact of e-mail use on employee role stress, two additional role stress variables have been included in the present study, extending beyond Kahns' et al. (1964) original model. This research measures employees' experience of Role Isolation and Resource Inadequacy (Pareek, 1983), in addition to the more common role stress constructs, Role Conflict, Role Ambiguity and Role Overload.

Previous research has documented the individual and organisational consequences of role stress (Abramis, 1994 a; Beehr, Jex, Stacy, Murray, 2000; Jex, 1998). The outcome of interest in the present research is employee performance. This study will examine the impact of e-mail use on employees' perceptions of performance, and will investigate a possible mediating role of role stress on the relationship between e-mail use and performance. The proposed relationship is illustrated in the model depicted below.

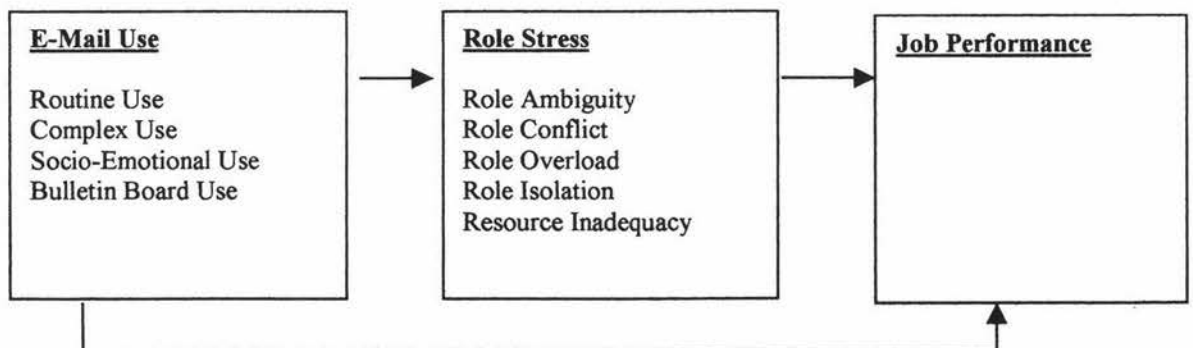


Fig One: Model of the proposed mediating role of role stress on the relationship between e-mail use and performance.

In summary, the above model suggests role stress may mediate the relationship between e-mail use and job performance. The introductory chapters of this thesis aim to

outline the rationale for this study. Chapter two provides a brief definition of e-mail and discusses some of the organisational advantages that e-mail provides. This is followed by a discussion of the potential problems that may be associated with the use of e-mail systems, and also a description of the various uses of e-mail in organisational contexts. Chapter three, provides a definition of role stress and introduces Kahn and colleagues (1964) model of Organizational Role Stress. Incorporated in this chapter, is a description of each individual role stressor examined in the present study, and a discussion of potential relationships between e-mail uses and role stressors. In chapter four, the literature regarding the link between role stressors and job performance is reviewed. This is followed by a summary and integration of the material included in previous chapters, finally research questions and hypotheses are presented.

CHAPTER 2: E-MAIL USE

2.1 DEFINITION OF E-MAIL

"An electronic mail system uses computer text processing and communication tools to provide a high speed information exchange service" (Sproull & Kiesler, 1986 p 1493). Sproull and Kiesler (1986) define three general features that are characteristic of the process of electronic mail. Firstly, e-mail is asynchronous, in other words initiators and recipients of the conversation do not need to attend the communication simultaneously (Sproull & Kiesler, 1986). Secondly, electronic mail is fast. Messages can be transmitted usually in just a few seconds, and replies can be sent equally as fast (Sproull & Kiesler, 1986). Lastly, e-mail is text based. An e-mail system can be used to send information to recipients in a number of ways, including individually addressed mail, bulletin boards, and conferences (Sproull & Kiesler, 1986). The key difference between bulletin boards and electronic conferences is that messages are presented chronologically on a bulletin board. Whereas conferences display messages relating to a certain topic in one grouping regardless of the order in which they were received (Sproull & Kiesler, 1986).

2.2 E-MAIL AND JOB PERFORMANCE

When implementing new systems, a primary goal for many organisations is enhanced employee performance and/or increased productivity. The advantages associated with installing an e-mail system are numerous. E-mail is cost effective, it facilitates international contact, and the delivery of messages is fast by comparison to other text-based modalities (Stirton, 1996). Also, e-mail has the ability to transmit large files of information to numerous users, and can aid in increasing employee participation, thus improving the quality of ideas (Hollingshead, et al., 1993; Wellman, Salaff, Dimitrova, Garton, Guila & Haythornthwaite, 1996). In addition, e-mail increases the flow of information between employees, (Sproull & Keisler, 1991), and has been linked to perceptions of increased productivity (Batten, 2000). Kraut and Atwell (1997) found

that when holding variables such as tenure and organisational position constant, heavier users of e-mail had better organisational knowledge than lighter users. Kraut and Atwell (1997) purport that e-mail has distinct qualities that facilitate organisational knowledge. One such property is the "cc" command, which allows employees to electronically forward messages to achieve additional readers (Kraut, et al., 1997). In addition, the authors found that heavy e-mail use was also associated with higher levels of organisational commitment. Kraut and Atwell (1997) measured employee use of other communication mediums such as the telephone and memos, and found that the described effect is not true across all communication mediums. In other words, those employees who had heavy communication volume through other media were less committed than those who were simply heavy e-mail users. The authors suggest that e-mail can increase employee knowledge and commitment to managements' strategic direction (Kraut & Atwell, 1997).

Another advantage associated with e-mail, is that it provides communication links between all organisational members, thus supporting or promoting co-operation and communication (Andressen, 1991; Page, 1999). This means that, employees who do not normally meet may be able to pass work related information regardless of their place on the organisation's hierarchy (Symon, 2000). Many authors have claimed that e-mail systems contribute to status equalisation in organisations, and that e-mail has an instrumental role in the flattening of organisational hierarchies (Baron, 1998; Page, 1999; Sproull & Kiesler, 1991). This democratising effect may be due to the equality of access, and because electronic communication holds fewer reminders of status differentials (Page, 1999; Sproull & Kiesler, 1991). According to Sproull and Keisler (1991) it is likely that the fear of evaluation or criticism declines when employees communicate via e-mail. Also, e-mail can aid in removing stereotypes and biases as audio cues and information regarding appearance is omitted when communicating via e-mail (Sproull & Kiesler, 1991). As a result, employees may feel less inhibited about communicating with strangers, as they may perceive that there is less risk of intrusion. In this way, e-mail provides a shield that can protect users from interpersonal revelation (Baron, 1998; Welman, 1997).

However, despite claims that e-mail can cultivate democracy (Spears & Lee, 1994), other authors have argued that computer mediated communication such as e-mail does little to overcome social barriers (Hallowel, 1999; Kraut & Atwell, 1997; Mantovani, 1994). Mantovani (1994) argues that e-mail communication patterns reflect established preferences and respects status barriers and pre-existing communication clusters. Kraut and Atwell (1997) further this argument suggesting that e-mail often only supplements communication between prior acquaintances and therefore acts to exacerbate inequalities that already exist in knowledge and communication within the organisation.

E-mail facilitates the transfer of large volumes of up to date information to employees both internally and externally (Rice & Shook, 1988). Features such as electronic distribution lists and conferences allow information to be transmitted to a wide range of people very quickly (Rice & Stenifield, 1991). When implementing an electronic mail system in an organisation, these effects are known as efficiency effects, which are planned for, and often result in productivity gains (Sproull & Keisler, 1991). According to Sproull and Kesilser efficiency effects, also known as first level effects, are predictable, quantifiable, immediate or obvious. Second level effects on the other hand, remain unforeseen and may not be immediate but can amplify over time (Sproull & Keisler, 1991). These authors argue that the second level effects are more important than the first level effects; they assert that new technology such as e-mail force individuals to focus their attention on different things, and come in contact with different people. Such changes in interactions as a result of e-mail may cause unanticipated problems for both the individual employee and the organisation as a whole. Two of the more pertinent potential problems are that of information overload and social isolation.

2.3 POTENTIAL PROBLEMS ASSOCIATED WITH E-MAIL

2.3.1 Information Overload

Information overload occurs when information is presented at a rate that is too fast for individuals to assimilate (Rice & Steinfield, 1991). Often the receipt of too much information can hinder employees' ability to effectively meet the goals of the organisation (Loose, 1989). According to Kerr and Hiltz (1982) e-mail can lead to information overload as the pace and sheer volume of information can overwhelm employees. Often, messages are not presented sequentially and employees may have to cope with multiple topic threads simultaneously (Hiltz & Turoff, 1992). To deal with the volume of information received via e-mail, employees may employ various coping strategies. Miller (1960) suggests that employees will filter and often omit information as the primary mechanism for coping with information overload. This is particularly true when large volumes of information are distributed to employees via electronic distribution lists or electronic conferences (Finbolt & Sproull, 1990).

Information that is in excess of that which is needed or desired by the individual, forces recipients to delegate information processing, increasing the likelihood of strategic information misinterpretation (Symon, 2000; Zmud, 1991). Ruggieri Stevens and McElhill (2000) refer to the incorrect or unsuccessful processing of information as information pathologies, which arise from imperfections in the flow of information. Such information pathologies can have implications for both individual and organisational performance. According to Ruggieri Stevens and McEihill (2000) an explosion of information distributed via e-mail may encourage some organisations to rely less on information as they do not have the resources required to deal with the volume of data presented to employees. However, it is an oversimplification to assume that information overload is caused solely due to the volume of quantitative information. Much of the communication received by electronic mail may be unsolicited or even irrelevant (Ruggieri Stevens & McEihill, 2000). Boothroyd (1999) argues that e-mail is a push technology, where information that is of little relevance to

work related tasks is pushed onto employees. In other words the irrelevance of information as well as the volume of information received contributes to information overload and can therefore decrease the clarity of communication (Boothroyd, 1999). This argument is supported by Klinf & Jewett, (1994) who suggest that the frequent use of large distribution lists results in employees receiving information that is inappropriate. However, unsolicited information can increase employees' effectiveness (Hiltz & Turoff, 1985). Communications regarding unexpected topics, from unexpected sources may provide information that aids job performance. Whilst attending to this information may decrease employees efficiency in the short term, overall effectiveness can be enhanced by unexpected e-mail (Hiltz & Turoff, 1985).

Kraut and Atwell (1997) suggest two further reasons why e-mail may contribute to employees' perceptions of overload. They maintain that communication is a resource consuming process and examine the different levels of employee attention required to initiate and receive communication via e-mail. Kraut and Atwell (1997) propose two disruptive impacts of heavy communication. The first is information overload, which can result from an increase in the information received and also from an increase in requests for information (Kraut & Atwell, 1997). The second disruptive impact is communication intrusion, which is disruptive to employees as excessive information distributed via e-mail can lead to an increase in interruptions in the working day (Kraut & Atwell, 1997). Both overload and intrusion occur as initiators and recipients of the e-mail experience the communication differently (Kraut & Atwell, 1997). Each party to the communication brings with them different goals, and assumptions (Kraut & Atwell, 1997). Kraut & Atwell (1997) purport that the initiator of an electronic message starts the communication at a time that is most convenient to them. In contrast, the recipient receives this message at a random time, and often the communication will be a request for information that may benefit the initiator not the recipient (Kraut & Atwell, 1997).

While the notion that an increased volume of e-mail will lead to employee overload is intuitively appealing, little empirical research has addressed the relationship between e-mail use and overload while keeping constant communication via other mediums. One

exception is Kraut and Atwells' (1997) study. These authors hypothesised that employees who communicate heavily in one medium will tend to communicate heavily in all modalities. To hold constant the use of other media, the authors constructed a scale that measured the combined frequency of use of all communication. The findings of this research indicate that communication across all media are inter-correlated, and that employees who communicated more across all media types indicated greater problems with overload and interruptions. On top of this, the researchers concluded that although e-mail increased the volume of information that employees receive, it did not increase their perceptions of feeling overloaded or interrupted over and above their amount of communication by other mediums (Kraut & Atwell, 1997). This research however, did not consider the type of electronic mail received by employees or the various uses for which e-mail was used for within the organisation. The current study proposes that different usage of electronic communication may impact differentially on employees' feelings of overload.

2.3.2 Social Isolation

Social isolation is another unanticipated consequence that may occur as a result of computer-mediated communication. Brigham and Corbett (1997) found that often employees sharing adjoining offices communicated via e-mail rather than through face-to-face meetings. It is argued that e-mail use within organisations has altered communication patterns resulting in decreased face to face and telephone conversations (Sarabaugh-Thompson & Feldman, 1997). A reduction in these interpersonal interactions can result in a reduction of social relationships at work, which will act not only to socially isolate employees, but may also have detrimental effects on overall communication and organisational effectiveness (Hallowell, 1999; Tourish & Hargie, 2000).

Another factor that can contribute to individuals' feelings of isolation is the limited ability of e-mail as a communication mode to reveal social cues. Without social cues employees can easily misinterpret messages resulting in confusion and further isolation

(Hallowell, 1999). The lack of context cues and feedback associated with e-mail can leave employees feeling frustrated, (Spears & Lea, 1992). Also, some employees may find it difficult to communicate successfully as they lack the shared language, or culture associated with the use of e-mail in their particular organisation (Marcharnt, 2000). In addition, Hallowell (1999) believes that employees may use e-mail as a mechanism for avoiding work colleagues. In contrast to this perspective, Taha and Caldwell (1993) argue that e-mail will lead to decreased social isolation as the use of e-mail can increase an employees' number of social contacts. Sproull and Keisler (1986) support this argument, suggesting that electronic mail is a good technology for enhancing sociability within the organisation. The authors provide two main reasons why electronic mail can facilitate sociability and organisational attachment. Firstly, as electronic mail is asynchronous, recipients can read entertaining messages on their own time without the need to reciprocate (Sproull & Keisler, 1986). This means that even busy employees or those employees who lack social skills can participate in affable communication (Sproull & Keisler, 1986). Secondly, because e-mail reduces reminders of social norms that discourage "goofing off" employees may find it easy to be sociable via e-mail (Sproull & Keisler, 1986).

2.4 DIFFERENT E-MAIL USES

E-mail is used for a variety of purposes in organisations. Steinfield, Jin and Ku (1988, as cited in Ku, 1996) identify four dimensions of e-mail use within an organisational setting: routine use, complex use, bulletin board use and socio-emotional use. Routine use is used to describe the simple exchange of information (Ku, 1996). Several authors believe that e-mail will be mainly used in organisations for routine tasks, as it is an inappropriate medium for socio-emotional content (Daft & Lengel, 1984). This argument is based on the assumption that because e-mail transmits fewer social cues than other modalities, it cannot facilitate the level of social presence required for some interpersonal interactions (Ku, 1996). E-mail lacks cues relating to kinetic gestures, paralinguistic tone and physical proximity (Ku, 1996). As a result, communicators may feel that e-mail is cold and less personal than other modalities (Ku, 1996). Authors

who subscribe to the belief that e-mail is inappropriate for purposes other than routine use, cite Media Characteristics Model in support of their argument. This model suggests that individuals decide among alternative media based on the various attributes of the media and the nature of the communication (Ku, 1996). Incorporated in the Media Characteristics Model is the concept of a Media Richness Hierarchy (Lengel & Daft, 1988) which ranks the richness of modalities based on characteristics such as their capacity for immediate feedback, natural language and multiple cues (Ku, 1996). Under this model, e-mail is less rich than face-to-face communication and therefore would be less suitable for tasks involving highly interpersonal interactions such as negotiating or bargaining (Ku, 1996).

Similar to routine use, complex use can also be classified as the task related use of e-mail. Negotiation and bargaining are categorised as the complex use of e-mail (Ku, 1996). Whilst Ku (1996) suggests that e-mail is used within organisations to facilitate bargaining, Marcua (2000) argues that electronic negotiations are substantially less effective than face-to-face negotiations. She argues that expectations of reciprocity are more rigid in electronic negotiations. She furthers this argument, asserting that when employees can view an entire exchange documented on a computer screen, they become less willing to be flexible, and engage in the normal give and take associated with more personal communications (Marcua, 2000).

Socio-emotional use is the third identified dimension of e-mail use (Ku, 1996). Numerous studies have found socio-emotional content in electronic messages (Batten, 2000; Ku, 1996; Rice & Love, 1987). Research has found that employees will use e-mail for social purposes such as arranging social activities and taking a break from work related tasks (Ku, 1996). Baron (1998) believes e-mail to be an ideal tool for the establishment and maintenance of social relationships. Baron (1998) asserts that characteristics of e-mail such as the promotion of informal speech, the short transmission time and the sociability of the medium, promote e-mail as an effective social tool. Researchers who view e-mail as appropriate for the transmission of socio-emotional content also draw on the Media Characteristics Model to explain their

perspective. Carlson and Zmud (1999) argue that employees who gain experience with e-mail, by using it extensively over a period of time may perceive e-mail as a rich channel and use it accordingly. Carlson et al. (1999) argue that by using e-mail frequently, employees are more likely to develop positive feelings towards it and use e-mail to refer to shared experiences.

Bulletin board use is the fourth dimension of e-mail use identified by Stenifield, Jin and Ku (1988, as cited in Ku, 1996). This dimension is based on the ability of e-mail systems to distribute information to a large number of employees simultaneously.

There is little doubt that e-mail systems have enhanced information exchange and processing within organisations. This technology has also altered patterns of information exchange and working relationships (Sproull & Keisler, 1991). According to Bikson and Eveland (1990) technological systems such as e-mail are not an exogenous force acting upon employees, but are instead part of a complex web of interpersonal and task reactions. The unanticipated consequences associated with e-mail are more to do with altered interpersonal reactions, patterns and work procedures than with the increase in communication efficiency (Sproull & Keisler, 1991). Because e-mail alters interpersonal relations it should not be considered a simple medium of communication (Brigham & Corbett, 1997). Rather e-mail should be viewed as an agent of organisational power. It represents a technological framework in which the behaviour of employees can be judged (Brigham & Corbett, 1997). According to Brigham et al., (1997) e-mail not only enframes employees' communication it moulds their perceptions of reality, and shapes their values. The authors further this argument suggesting that e-mail acts to both mediate and reinforce the boundaries of employees' knowledge, practices and responsibilities. Given this view of e-mail, it is reasonable to argue that the use of e-mail may impact on employees' roles within organisations. In fact, Brigham and Corbett (1997) investigated how people and technology influence each other in an organisational setting. Their case studies revealed that e-mail led to the decentralisation of decision-making, with many decisions being made by groups of

individuals and also an increase in the centralisation of power as e-mail use allowed for greater accountability and long distance control by management.

To summarise, many authors argue that e-mail use within an organisational context brings numerous benefits to both the individual and the organisation, including increased communication, co-operation and status equalisation (Andressen, 1991; Page, 1999; Sproull & Keisler, 1991). However, alongside these benefits are potential problems such as information overload and social isolation. The identification of such benefits and potential problems associated with e-mail use, illustrates that e-mail systems have the potential to impact on employees' inter-personal relationships, work procedures and work patterns. Taken together, e-mail may impact on employees' roles within organisations. Of interest in this research is the influence that e-mail systems may have on employees' perceptions of role stress. The following chapters introduce Kahns' et al., (1964) model of Organizational Role Stress. This is followed by a discussion of the potential relationships between various e-mail uses and individual role stressors.

CHAPTER 3: ROLE STRESS

3.1 DEFINITION OF ROLE STRESS

Role stress is a widely studied construct in the area of Industrial/Organisational psychology (Bowers, Weaver & Morgan, 1996). Role stressors can be defined as "individual level stressors which occur as a result of functions required in the process of individual performance, or those stressors that are directly associated with the role we play or the tasks we have to accomplish within the organisation (Ivancevich, & Matteson, 1980 p110). Ivancevich and Matteson (1980) argue that role stressors account for the majority of stress experienced in the workplace. This may be explained by the fact that role stressors are chronic in nature and therefore, their impact on the employee is thought to be constant (Beehr, 1995). The two most commonly studied role stressors are role conflict and role ambiguity, which fit into a broader model of role stress devised by Kahn, Wolfe, Quinn, Snoek, and Rosethnal (1964).

Kahn and colleagues are generally given formal recognition for introducing role concepts into organisational research (King & King, 1990). Although this model was devised in 1964, much contemporary research is based on this model (e.g. Fried & Tiegs, 1995; Peterson, Smith, Akande, & Ayestaran, 1995; Schaubroek, Ganster, Sime, & Ditman, 1993). According to King and King (1990), Kahn and colleagues provide an extensive conceptualisation of role stress and the negative consequences associated with role conflict and role ambiguity. Kahns' et al., (1964) model provided a strong impetus for future research; the well known scales of role conflict and ambiguity devised by Rizzo, House and Litzman (1970) are largely based on Kahns' et al., model, which has become the basis of hundreds of studies of role stress (Abramis, 1994). In a review of Kahns' et al., model, King and King (1990) found that the theoretical bases for the constructs to be well explicated. Yet King and colleagues (1990) suggest that the definitions of role conflict and ambiguity be clarified, and that the authors consider expanding the theoretical framework to formalise the implied relationships between organisational dysfunction and individual dysfunction. This appears to be a valid suggestion as nearly all of the outcome variables in the model centre on the individual

as the level of analysis, often the influence of the organisation is implied or of secondary concern (King & King, 1990). In sum, the model is theoretically sound and widely used.

3.2 MODEL OF ORGANISATIONAL ROLE STRESS

Kahn et al. (1964) present a role episode model in which the role occupant (the focal person) and the role senders constitute a role set. Both the focal person and the role senders interact cyclically in an organisational context that is influenced by organisational factors, personality factors and interpersonal relations (King & King, 1990). Within this model the role senders' expectations for performance are categorised as role pressures, which act as role forces when perceived by the focal person (King & King, 1990). Such forces act to influence the focal persons' behaviour. Within this model role stressors are conceptualised as having both an objective and subjective component (Kahn et al., 1964). In other words, role stressors arise from both verifiable conditions in the work environment and also the internal states of the focal person (King & King, 1990).

In their theoretical model of role stressors in organisations, Kahn et al (1964) identify several organisational factors that can be considered antecedents to role conflict and ambiguity. Some of these contextual factors can be classified as ecological as they reflect the relation of a certain position to the organisation, for example an employees' rank in the organisation's structure (Kahn, et al. 1964). Other contextual variables may characterise the organisation as a whole, examples of these variables include, size, and the type of services or products the organisation produces (Kahn, et al. 1964). Kahns' et al (1964) model asserts that certain organisational variables can act to either promote or eliminate role conflict and ambiguity (King & King, 1990; Rogers & Molnar, 1976).

The authors identify organisational complexity as a determinant of role ambiguity, suggesting that as organisations become more complex and the division of labour

becomes more differentiated and additional levels of supervision are required. As a result, more employees from diverse specialist functions become involved in co-ordination and planning activities, who may not be adequately trained in all areas of organisational functioning (Kahn, et al., 1964). The size and complexity of the organisation may exceed individuals' comprehension and therefore contribute to role ambiguity (Kahn, et al., 1964). Managerial philosophy can also contribute to employees' experience of role ambiguity. In circumstances where information is restricted by management, employees may struggle to gain adequate information about issues of concern (Kahn, et al., 1964). Organisational change is another important determinant of role ambiguity identified by Kahn and colleagues (1964). Organisations can experience change for many reasons including growth and changes in technology. Both of these changes can act as antecedents to role ambiguity (Kahn, et al. 1964). According to Kahn and colleagues (1964) changes in technology often require rearrangements of workgroups and impact on the social structure of the organisation. This forces employees to revise role expectations.

Much empirical research draws from Kahns' et al., (1964) model. Of particular interest to this research is a study by Rogers & Molnar (1976) who examined organisational antecedents of role conflict and ambiguity in administrators. Several intra-organisational variables were researched including organisational services, accountability, administrative autonomy, and formalisation. In addition inter-organisational variables were examined including the amount of contact between the participants' organisation and other organisations. Results from their study showed that intra-organisational variables as a whole, were related to role ambiguity in top-level administrators (Rogers, & Molnar, 1976). Rogers and Molnars (1976) study indicates that factors internal to an organisation may act as antecedents to role ambiguity as proposed in Kahns' et al., (1964) theoretical model. The present study incorporates various e-mail uses as possible organisational antecedents to role stress. The following chapters outline more clearly the individual role stressors included in the current research.

3.3 INDIVIDUAL ROLE STRESSORS

3.3.1 Role Ambiguity

Role ambiguity occurs when an employee is not clear about the expectations that other individuals have regarding their role (Kahn, et al., 1964). Role ambiguity may result when the role occupant receives deficient or uncertain information, or when the role occupant lacks understanding of the cues available to them regarding role behaviours (Kahn et al., 1964; King & King, 1990; Pareek, 1983). Kahn and colleagues (1964) identified two types of role ambiguity. Firstly, task ambiguity, which "results from a lack of information concerning the proper definition of the job, its goals and the permissible means for implementing them" (Kahn et al., 1964, p.94). Task ambiguity can be further subdivided into three specific forms, which are: 1) ambiguity about the employees' responsibilities and what is required. 2) ambiguity regarding the behaviours necessary to meet responsibilities, and 3) ambiguity regarding the role senders, more specifically whose expectations should be met. The second type of role ambiguity is related to the socio-emotional aspects of performance, which can be categorised as ambiguity relating to the consequences of behaviour and the effects of behaviour on the well being of the individual and the organisation.

3.3.2 Role Conflict

Role conflict is defined by Kahn et al., (1964) as "The simultaneous occurrence of two or more sets of pressures, such that the compliance with one would make more difficult compliance with the other" (p 19). Kahn and colleagues identify four different types of role conflict. Firstly, intra-sender conflict occurs when demands from a single member of the role set are incompatible (Kahn, et al, 1964). Intra sender conflict may result when an employee is directed by superiors to access information that is unavailable through the normal organisational channels, yet at the same time the superiors disallow violations of the normal channels (Kahn, et al., 1964). Inter-sender conflict is the second category of role conflicts identified by Kahn and associates (1964). This

conflict occurs when pressures from one role sender directly oppose pressures from other senders. For example, this conflict can occur when a middle manager faces pressures from their superiors to tightly monitor subordinates, whereas the subordinates place pressure on the manager for looser supervision (Kahn, et al., 1964). A third type of conflict identified by the authors is inter-role conflict. Such conflict is generated when the pressures that are associated with belonging to one group, (i.e. the organisation) conflict with pressures stemming from a distinct group, for example a family unit, or a religious group (Kahn, et al., 1964). According to Kahns' et al., (1964) model, employees may also face person-role conflict, which differs from the other three mentioned conflicts, as person role conflict is not a sent role conflict. In other words, person-role conflict arises when role requirements violate the individual's moral values (Kahn, et al., 1964).

Much of the role conflict described above can be conceptualised as the result of inadequate role sending or a lack of agreement and co-ordination among role senders (Kahn, et al, 1964). When this occurs the employee receives several expectations from role senders that contain incompatible demands, which fail to take into account the needs and abilities of the employee.

3.3.3 Role Overload

One sub form of role conflict is role overload (McGrath, 1976). Kahn and colleagues (1964) argue that role overload is a complex form of conflict that develops from the above aforementioned conflicts. Role overload is a condition that occurs when an individual feels that they are faced with obligations, commitments or requirements that when taken together, require them to do more than they are capable in the time available (Peterson, Smith, Akande, Ayestaran, 1995; Sales, 1970). Role conflict and overload are similar, in that each stressor implies a decision-making choice between alternatives (McGrath, 1976). In regards to role conflict, the decision may be between honouring role pressures from one source as opposed to another (McGrath, 1976). In contrast, individuals experiencing role overload, must choose when to respond to one

set of demands over another, which involves decisions regarding the sequencing of different responses to role demands (McGrath, 1976). Both role conflict and role overload demand that a 'choice' be made by the individual. In the case of role ambiguity, the 'choice' to be made by the employee is of a different nature entirely (McGrath, 1976). If employees do not know what is expected of them, their choice of behaviours can only be regarded as a hypothesis of what may be expected (McGrath, 1976).

Kahn and associates (1964) outline some circumstances in which overload is likely to occur. These authors assert that in conditions where there is low role integration, an absence of role power, or substantial variations in expected output, role overload is more likely to result. McGrath (1976) argues that role overload produces less stress than role conflict and ambiguity, leading to less negative interpersonal and intrapersonal consequences, except when role overload causes secondary states. He defines two states that can be caused by role overload. Firstly, role overload can lead to a substantial reduction in the quality of work performance, and secondly role overload can lead to a rejection of some of the employees' role demands (McGrath, 1976). When role overload leads to either of the two circumstances described, the impact in terms of employee stress and possible negative consequences, is just as great as with role conflict or ambiguity. Sales (1970) supports this argument suggesting that role overload is stressful because of both the volume of work faced by the employee and also because of the general failure that overload implies.

3.3.4 Role Isolation

Role isolation is a construct that has received substantially less attention in the literature. However, the importance of this stressor should be examined in light of the research question. Role isolation occurs when individuals feel that employees occupying other roles are psychologically distant (Pareek, 1983). According to Pareek (1983) the most important criterion of perceived role-role distance is the ease of interaction between roles and also the ease in which these interactions occur. He

maintains that when the linkages between employees are strong, the role-role distance is perceived as low. Alternatively, when there are no linkages or weak linkages, the role distance can be measured by the gap between the desired and existing linkages (Pareek, 1983).

As mentioned previously, there are indications in the literature regarding e-mail, which suggest that e-mail may impact on individuals feeling of isolation. Some authors have suggested that the use of e-mail can lead to increased feelings of isolation (Halowell, 1999; Sarabaugh-Thompson & Feldman, 1997; Tourish & Hargie, 2000). They argue that e-mail use has led to altered communication patterns resulting in decreased face-to-face meetings and a reduction of social relationships at work. In addition it is suggested that the lack of social cues available when communicating via e-mail, leads to misinterpretation and further isolation of some individuals (Spears & Lea, 1992). On the other hand, there is literature to suggest that the use of e-mail can lead to decreased isolation. The main tenet of this argument is that the lack of social cues aid in removing stereotypes and biases and therefore employees feel less inhibited to communicate with strangers. As a result employees with more limited social skills can participate in the communication and all employees can increase their social contacts (Sproull & Keisler, 1986).

3.3.5 Resource Inadequacy

Resource inadequacy is another role stressor, and occurs when employees feel that they do not possess enough resources to perform their roles satisfactorily (Pareek, 1983). Resources can include a lack of supplies, staff, or information in the system (Pareek, 1983). Additionally a lack of knowledge, experience or education can also lead to feelings of resource inadequacy (Pareek, 1983). Like role isolation, resource inadequacy has received less attention in contemporary psychological literature than constructs such as role ambiguity and role conflict. However, there is evidence in the literature concerning e-mail, which suggests that electronic communication systems may impact on individuals' feelings of resource inadequacy. Firstly, e-mail increases

the flow of information between employees (Sproull & Kiesler, 1991) this may contribute to reducing employees' perceptions that they lack information from organisational systems. Also, as previously mentioned, Kraut & Atwells' (1997) study found that high e-mail users have better organisational knowledge than those employees who use e-mail less frequently. According to Pareek's (1983) definition of resource inadequacy a contributing factor to employees' perception of this role stressor, is a lack of knowledge.

Lastly, e-mail is thought to contribute to status equalisation in organisations (Page, 1999; Sproull & Kiesler, 1991), this too may impact on employees' perceptions of resource inadequacy. The rationale here, is that because of the equality of access and the fewer reminders of status differentials, employees may find it easier to request resources such as information and more tangible resources like funding. Sproull and Kiesler (1991) found that employees tend to use informal language when communicating via e-mail and that there were no real differences in terms of content and style between subordinates and superiors communications. In addition, Sproull and Kiesler (1991) argue that communication via e-mail can reduce employees' perception that they are intruding on those with whom they are communicating. Employees may be more likely to request resources from a superior via e-mail as e-mail provides a shield from interpersonal revelation. If this is the case, the use of e-mail can contribute to perceptions of lower resource inadequacy.

To summarise, Kahns' et al., (1964) model of Organizational Role Stress identifies several organisational factors which can be considered antecedents to role stress. Changes in technology are one such factor. As outlined, e-mail use in organisations can impact on individuals working relationships and work patterns. This may mean that employees are forced to revise their role expectations. The preceding chapters have introduced individual role stressors and have outlined ways in which e-mail practices may contribute to role stressors. The following chapters will discuss theorised relationships between role stressors and job performance.

CHAPTER 4: ROLE STRESS AND JOB PERFORMANCE

4.1 INTERFERENCE THEORY

There are various ways that the link between role stress and performance has been conceptualised. The most commonly used theory describing the mechanisms by which job stressors may affect performance is Interference theory. The main tenet in Interference theory is that job stressors act to interfere with job performance or antecedents of job performance causing a negative monotonic relationship between stressors and performance (Abramis, 1994; Jex, 1998). The foundations of Interference theory are found in Information Processing Theory (Miller, 1960) which asserts that job related stressors can lead to information overload for employees (Abramis, 1994). When information overload occurs, employees may omit relevant information required for performance, process incorrect information, or use escaping strategies to avoid stressors (Miller, 1960). Such behaviour can obviously have deleterious effects on job performance, as improper handling of information can result in employees missing information required for adequate performance (Abramis, 1994).

In addition, employees' work tasks may become more difficult when performed under the presence of stressors (Frese, 1987). According to Freese (1987) every stressor an employee is presented with requires a coping attempt. As people have finite cognitive resources, stressors can reduce the available processing capacity that is required for the original work task. Employees may need to exert much greater effort in evaluating stressors and enacting a suitable coping strategy to reduce the adverse effects of the stressor (Cohen, 1980). The more cognitive resources individuals employ towards coping with stressors, the less resources are available to them for the monitoring of behaviours that are pertinent to job performance (Freid, Ben-David, Ties, Vital, Yeverechyahu, 1998).

Expectancy theory can also be used to explain why role stressors may interfere with job performance (Abramis, 1994; Jex, 1998). Expectancy theory suggests that the

following three variables should be multiplied to determine job performance: the value of performance, the expected probability that effort will lead to performance, and the motivation strength of the individual (Vroom, 1964). According to Beehr and Bhagat (1985) role stress may result in employee uncertainty regarding whether effort will lead to performance or whether performance will result in meaningful outcomes. In times of such uncertainty, employees may reduce effort leading to an impairment of performance (Beehr & Bhagat, 1985; Jex, 1998).

Kahn and colleagues (1964) make more specific statements concerning how role conflict and ambiguity in particular can affect job performance. According to these authors, communication processes and the distribution of information are key criteria for organisational effectiveness. Each member of the organisation must obtain certain information for acceptable role performance (Kahn, et al., 1964). However when role conflicts are present, employees may alter their attitudes towards those role senders that they perceive to be creating the conflict (Kahn, et al., 1964). This change in attitude may extend towards the individuals' job and the organisation in general, resulting in a reduction of the employees' co-operative orientation towards others (Kahn, et al., 1964). Not only can this limit the information that is obtained for individual performance, but can also limit the achievement of organisational objectives, as the co-ordination of behaviours necessary for performance may be reduced. Role ambiguity can also lead to decrements in performance. Kahn et al., (1964) suggests that ambiguity regarding role expectations can lead to employees' general dissatisfaction with their job, and to feelings of futility. The authors purport that once role expectations are unclear, an employee's sense of effectiveness will diminish, making it difficult for that employee to act appropriately, thus the job stressor interferes with successful performance.

4.2 MOTIVATION AND COMBINATION THEORIES

In contrast to interference theories, motivation and combination theories predict a different type of relationship between job stressors and performance (Abramis, 1994). Motivator theory suggests that job stressors can be activators that challenge employees, motivating them to perform well, thereby producing a positive monotonic relationship between stressors and performance (Abramis, 1994). In particular role overload may motivate employees to perform, as it makes sense that those employees with the most work to do accomplish the most (Jex, et al., 2000). However whilst employees may accomplish much under conditions of overload, the quality of their work may be compromised (Jex, et al., 2000). In contrast to the previous two theories discussed, combination theory does not assume a monotonic relationship between stressors and job performance. Instead, combination theory purports that at low to moderate levels, job stressors may be activating or motivating for employees, however, at higher levels such stressors are de-motivating or interfering (Abramis, 1994). Combination theory asserts an inverted "U" shaped relationship between stressors and job performance.

4.3 EMPIRICAL EVIDENCE

Whilst each of these models has an intuitive appeal, empirical research has found the link between job stress and performance to be inconsistent (Beehr, Jex, Stacy, & Murray, 2000; Freid, et al, 1998; Jex, 1998). Several meta-analytic investigations have been conducted in an attempt to summarise the impact of role stressors on job performance. The most widely cited meta-analysis was conducted by Jackson and Schuler (1985), which investigated close to 100 studies examining the correlates of role conflict and role ambiguity. Various performance indicators were used including objective measures, as well as self and supervisor ratings. Jackson and Schulers' (1985) findings indicate that the evidence supporting negative associations between role stressors and various indicators for job performance is weak. For example, correlations between role conflict and performance when measured objectively (i.e. sale volumes and profits) was only -.11. Similarly the correlation between objective performance

and role ambiguity was only -.12. However, when performance was measured through self-assessment a stronger relationship was found between role ambiguity and performance $r = -.37$, than role conflict $r = -.03$. Similar results were found by Tubre, Sifferman & Collins (1996, as cited in Jex, 1998) whose study also suggests that role ambiguity is more strongly related to performance than role conflict, and that the strongest correlations between role ambiguity and performance occur when performance is rated through self assessment.

Research investigating the relationship between role overload and performance is far less common than research focussing on role conflict and ambiguity. However, there are three investigations which characterise contemporary research in this area. Firstly, Jamal (1984) examined the relationship between role overload and the supervisory performance ratings of hospital nurses in Canada. Jamal (1984) used three measures of performance to investigate how overload impacts on overall job performance, motivation and the level of care provided by the nurses. Results indicated that role overload was negatively related to all of the job performance measures. A second study also conducted by Jamal (1985) investigated the relationship between role overload and the performance of mid-level managers and blue-collar workers. Both groups of employees were sourced from the same organisation and performance was measured by supervisory ratings. The results from this study revealed that high levels of role overload were correlated with decreases in both work quality and quantity of performance. This result was consistent across both samples (Jamal, 1985).

In contrast to Jamal's (1984; 1985) findings, Beehr et al. (2000), found that role overload was not related to the performance of college students employed selling books door to door. In this study, the number of sales demonstrations and the dollar value of the sales generated measured performance. However, when the authors controlled for the effects of other stressors measured in the study, they found that role overload was actually positively correlated with performance (Beehr, et al., 2000). Beehr et al., (2000) explain that this effect may occur, as those individuals experiencing the most overload may also be those with the largest workload. Also, this effect may be

dependent on the nature of the job. Beehrs' et al., (2000) study examined sales positions, therefore being overloaded may be a result of high demand for the product being sold (Jex, 1998). Overall the research suggests that role overload can have negative effects on employee performance, yet in some circumstances, experiences of role overload may accompany high levels of performance (Jex, 1998).

4.4 METHODOLOGICAL CONCERNS

The reasons for such inconsistent results may be due to both conceptual and methodological concerns. Firstly, the use of performance as a criterion in psychological studies regarding role conflict and ambiguity has been relatively rare (Beehr, et al., 2000). According to Beehr et al., (2000) much of the research investigating relationships between stressors and performance has focused on physical not psychosocial variables and has originated from human factors literature. Whilst this research is of value, it is largely based on blue-collar jobs and may not generalise to white collar jobs (Beehr, et al., 2000). In addition, job performance is multi-faceted which may mean that different stressors have different effects on performance. The likelihood of discovering these effects may be dependent on the performance measure used by the researchers (Beehr, et al., 2000). Jex (1998) asserts that most studies tend to measure effectiveness rather than actual job performance. That is, much research has measured the result of job performance or an external assessment of performance (Jex, 1998).

The use of such measures, particularly objective measure raises several methodological issues. First and foremost, employees may have limited control over performance indicators (Jex, 1998). Several factors independent of the individual may influence performance indicators. (Jex, 1998). Another factor which may limit researchers ability to assess the link between stressors and job performance is that of low performance variability (Jex, 1998). Often the variability in performance levels in organisations may be restricted, which may be a result of either true or artifactual

restriction (Jex, 1998). Artifactual restriction is due to measurement error, whereas true restriction occurs when performance ratings are accurate but there is a lack of variation in actual job performance (Jex, 1998). True restriction in performance variability can occur for many reasons including low organisational standards for performance, and the degree to which organisations will excuse employees for low levels of performance (Jex, 1998). Whatever the cause, low variability in performance can weaken the relationship between stressors and performance (Jex, 1998).

Another explanation for the inconsistent associations found between role stressors and job performance is that there may be other factors that moderate this relationship. Much research that has investigated moderators of the stressor-performance relationship have focussed on either contextual moderators such as organisational level and tenure, or personal factors such as higher order need strength (Freid, et al., 1998). However, research has not sourced statistically reliable moderators of the stressor performance relationship (Freid, et al., 1998). Freid and associates (1998) suggest that rather than examining possible moderating factors, it is important to investigate the possible interactive effects of role conflict and ambiguity on performance. The authors challenge the assumption that one particular stressor will impact on job performance independently of other stressors that may be present in the individuals environment (Freid, et al, 1998). That is, individuals may be able to utilise prior experience and personal capabilities to cope with a single stressor without exceeding their cognitive capacity, and thus can still perform effectively (Freid, et al, 1998). Results from Fried and colleagues study (1998) showed that simultaneous increases in both role conflict and ambiguity were associated with lower levels of performance, and that role conflict was not associated with job performance when role ambiguity was at low levels. The research by Freid and colleagues (1998) suggests that employees may find it most difficult to perform effectively when more than one role stressor is present concurrently.

To summarise, evidence suggests that the relationship between role stress and performance can be characterised as weak. However, there are several methodological flaws in this area of research that may contribute toward the inconsistent results. Firstly, performance measures employed by many researchers may not be adequate for detecting the nature of the stressor-performance relationship. As mentioned by Jex (1998) performance measures that focus on the results of performance or an external assessment of performance, may be measuring effectiveness rather than actual job performance. Results from Jackson & Schulers' (1985) meta-analysis indicate that role ambiguity was most strongly related to self-report measures of performance rather than ratings from peers, supervisors or objective measures. There are two possible explanations for this finding. Firstly, as the employee reports both measures, same source bias may mean that results are due to methodological bias, (Jex, 1998). However, the findings may also result as ratings from external sources, such as peers and supervisors could be deficient indicators of actual job performance (Jex, 1998; Mabe & West, 1982). In addition, employees' perceptions of their own performance may be an important issue for researchers to consider (Jex, 1998). According to Jex (1998) even if role stressors do not lead to actual decreases in performance, it may still have negative implications for performance. This is because, employees who perceive that their performance is at a low level may lose confidence which may in turn lead to lower performance in the future (Jex, 1998).

The current research aims to investigate a possible mediating role of role stress on the relationship between e-mail and job performance. The present study utilises self-report measures of performance instead of an external assessment, as a means of reducing the methodological flaws which have identified in past research.

4.5 SUMMARY AND HYPOTHESES

There are two overall aims of this research. The first aim is to determine what influence various e-mail uses have on organisational role stress. The second aim is to

investigate the possibility that role stress mediates the e-mail- performance relationship, as proposed by the model depicted below.

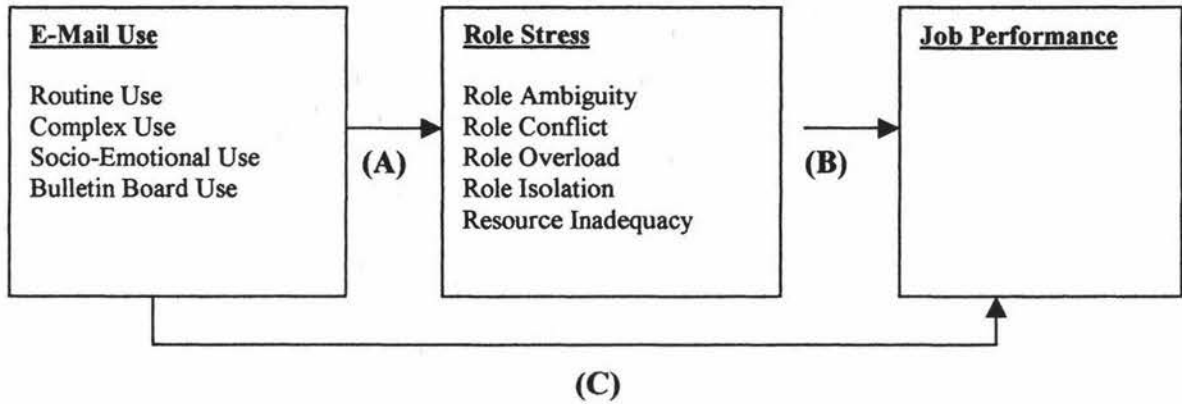


Fig Two: Model of the proposed mediating role of role stress on the relationship between e-mail use and performance.

A mediating variable is one that accounts for the relationship between a predictor and its criterion (Baron & Kenny, 1986). Baron and Kenny (1986) identify three conditions that must be met in order for a variable to function as a mediator. The research questions and hypotheses for the current research will be structured according to Baron and Kenny’s model. According to Baron and Kenny (1986) variations in the level of the independent variable need to significantly account for variation in the suspected mediator variable. Therefore, the current research requires that e-mail use be correlated with role stressors, the possible mediator, as illustrated by arrow A. Evidence from both the theoretical and empirical research reviewed, make it possible to generate more specific predictions about e-mail use and individual role stressors.

Firstly, it is expected that the greater use of e-mail for routine purposes will be associated with higher perceptions of role overload. The rationale behind this hypothesis is that e-mail when used for routine purposes, contributes to the increased flow of information between employees. The ease of access and asynchrony associated with e-mail means that employees can send information regarding routine tasks

regardless of the recipients readiness for the communication (Ruggeri Stevens & McEhill, 2000). Overload can be the result of an increase in the information received and also from an increase in requests for information (Kraut & Atwell, 1997). To further this argument it is also expected that greater use of e-mail for socio-emotional purposes and bulletin board purposes will be associated with higher perceptions of role overload. E-mail of this nature, may be unsolicited or irrelevant to work tasks, which may cause employees to feel that they are receiving more information than is desired. When employees perceive obligations or commitments require them to do more than they are capable of role overload may occur (Peterson, Smith, Akande, Ayestaran, 1995).

Hypothesis 1. The greater use of e-mail for routine purposes will be associated with higher perceptions of role overload.

Hypothesis 2. The greater use of e-mail for socio-emotional purposes will be associated with higher perceptions of role overload.

Hypothesis 3. The greater use of e-mail for bulletin board purposes will be associated with higher perceptions of role overload.

Similar predictions can be made about role ambiguity. It is predicted that the greater use of e-mail for complex purposes will be associated with higher perceptions of role ambiguity. According to several authors, (Kahn et al, 1964; King & King, 1990; Pareek, 1983). Role ambiguity is likely to result when the role occupant receives deficient or uncertain information, or when the role occupant lacks understanding of the cues available to them regarding role behaviours. The complex use of e-mail involves activities such as bargaining and negotiating (Ku, 1996). It is argued that e-mail may be an unsuitable medium for such communications, as e-mail cannot facilitate the level of social presence required for complex interactions. E-mail lacks cues relating to kinetic gestures, paralinguistic tone and physical proximity (Ku, 1996). As a result, employees who use e-mail for complex uses may find that they lack information concerning role senders' expectations. Therefore it is expected that, the complex use of

e-mail can lead to employees receiving deficient information or lacking understanding of the cues available to them and thus experiencing role ambiguity.

Hypothesis 4. The greater use of e-mail for complex purposes will be associated with higher perceptions of role ambiguity.

Specific predictions regarding the influence of e-mail use on role isolation can also be made. It is expected that the bulletin board use of e-mail will be associated with decreased perceptions of role isolation. The bulletin board use of e-mail allows information to be distributed to large groups of employees simultaneously. This means that employees who use e-mail for bulletin board purposes have access to information that they may otherwise have been excluded from. Access to such information, may decrease the perceived role-role distance and therefore reduce perceptions of isolation. Likewise it is predicted that the socio-emotional use of e-mail is associated with reduced feelings of role isolation. Sproull and Kiesler (1986) argue that e-mail containing socio-emotional material can enhance sociability within organisations and that even employees with limited social skills can participate in affable communication when communicating via e-mail. In this way, e-mail containing socio-emotional material may act as social glue within organisations (Page, 1999) and therefore employees who use e-mail for this purpose are less likely to experience role isolation.

Hypothesis 5. The greater use of e-mail for bulletin board purposes will be associated with lower perceptions of role isolation.

Hypothesis 6. The greater use of e-mail for socio-emotional purposes will be associated with lower perceptions of role isolation.

It is expected that greater bulletin board use of e-mail will be associated with lower employee perceptions of resource inadequacy, which results when employees feel that do not possess enough resources to perform their roles satisfactorily (Pareek, 1983). Resources can include a lack of knowledge or information in the system. As mentioned the bulletin board use of e-mail allows employees access to information that they

otherwise may not receive. Therefore it is expected that those employees who use e-mail for this purpose will perceive lower levels of resource inadequacy than those employees who do not.

Hypothesis 7. The greater use of e-mail for bulletin board purposes will be associated with lower perceptions of resource inadequacy.

The second condition that must be present when identifying mediating variables is that variations in the mediator significantly account for variations in the dependent variable (Baron & Kenny, 1986). To meet this requirement, role stress variables must be correlated with work performance as illustrated by Arrow B (see page 31). Whilst research investigating the relationship between role stress and job performance has provided inconsistent results, there is evidence to suggest that these results may be due to methodological rather than conceptual flaws. Meta-analyses conducted by Jackson and Schuler (1985) have found role conflict and role ambiguity to be negatively related to performance, providing support for interference theory. Therefore, it is expected that the role stressors incorporated in this study will be negatively related to performance. In addition, it is expected that role ambiguity will be more strongly related to job performance, than Role conflict based on Jackson and Schulers' (1985) findings.

Hypothesis 8. High levels of role stressor variables will be negatively related to job performance.

Hypothesis 9. Role ambiguity will be more strongly related to job performance than role conflict.

The last condition outlined by Baron and Kenny (1986) is that when paths A and B (as shown in Figure two) are controlled for, a relationship that was previously significant between the independent and dependent variable, decreases in magnitude or becomes no longer significant. The authors also purport that the best demonstration of mediation occurs when path C is zero (Baron & Kenny, 1986). Put simply, the third condition indicates the way to test for mediation. Baron and Kenny (1986) recommend

a series of regression models to test for mediation should the first two conditions of the model be met.

In the current research, path C (Refer to Figure two) indicates the relationship between e-mail use and job performance. Given the advantages associated with e-mail and previous research linking e-mail use to increased perceptions of productivity (Batten, 2000) it is expected that the routine, socio-emotional and bulletin board use of e-mail will be associated with higher perceptions of job performance. It is not predicted that the complex use of e-mail will be positively related to job performance, based on Daft and Lengels' (1984) argument that e-mail can not facilitate the level of social presence required for complex interactions.

Hypothesis 10. The greater use of e-mail for socio-emotional, routine and bulletin board purposes will be associated with higher perceptions of job performance.

4.5.5 Summary of Hypotheses

Hypothesis 1. The greater use of e-mail for routine purposes will be associated with higher perceptions of role overload.

Hypothesis 2. The greater use of e-mail for socio-emotional purposes will be associated with higher perceptions of role overload.

Hypothesis 3. The greater use of e-mail for bulletin board purposes will be associated with higher perceptions of role overload.

Hypothesis 4. The greater use of e-mail for complex purposes will be associated with higher perceptions of role ambiguity.

Hypothesis 5. The greater use of e-mail for bulletin board purposes will be associated with lower perceptions of role isolation.

Hypothesis 6. The greater use of e-mail for socio-emotional purposes will be associated with lower perceptions of role isolation.

Hypothesis 7. The greater use of e-mail for bulletin board purposes will be associated with lower perceptions of resource inadequacy.

Hypothesis 8. High levels of role stressor variables will be negatively related to job performance.

Hypothesis 9. Role ambiguity will be more strongly related to job performance than role conflict.

Hypothesis 10. The greater use of e-mail for socio-emotional, routine and bulletin board purposes will be associated with higher perceptions of job performance.

CHAPTER 5: METHOD

5.1 RESEARCH DESIGN

Data was collected by a cross-sectional survey method. Survey materials were sourced from the business and industrial/organisational psychology literature.

5.2 PARTICIPANTS

Subjects were obtained with the consent of the Chief Executive Officer of the Universal College of Learning (UCOL), who arranged access for the researcher to three campuses (Palmerston North, Wairarapa, Levin). UCOL is a large educational institution situated in the Manawatu. All employees of UCOL have access to e-mail, which is used as a primary means of intra-organisational communication. Every employee of UCOL was invited to participate in the research (N=395). Of these 226 employees did not return a questionnaire, giving a response rate of 42.7%. Two cases were deleted from analyses due to extensive missing data. This resulted in a pool of subjects of 167. A sample description is provided in the Results section.

5.3 MEASURES

5.3.1 Biographical Information

Information was sought on participants' age, gender, ethnicity, and education. Questions were modelled on the 1991 New Zealand Census of Population and Dwellings (Department of Statistics, 1993). In addition participants were asked to provide information on their organisational role, length of employment, and campus in which they were situated. Responses were coded as follows:

Age: Participants were asked to provide their age in years.

Gender: Gender was coded '1' for males and '2' for females.

Organisational Role: Participants indicated their role at UCOL from a choice of Academic, which was coded as '1', Administration which was coded as '2'. Student support was coded as '3' and Management was coded as '4'. Participants who indicated that their role was one other than the four categories provided were coded as '5'

Campus: The Palmerston North campus was coded as '1', the Wairarapa campus as '2', and the Levin campus as '3'.

Tenure: Participants were asked to indicate how long they had been employed by UCOL in years and months, which was subsequently used to calculate organisational tenure in months.

Highest Educational Qualification: Participants indicated their highest educational qualification from a choice of the following categories: 'No school qualification', 'School certificate passes', 'School qualifications, University Entrance and above', 'University degree, Diploma or certificate' and 'Higher University degree'.

Ethnicity: Participants indicated the ethnic group with which they most identified from a choice of 'New Zealander- European decent', 'New Zealander- Maori decent', 'Pacific Islander', 'Asian', or 'Other'.

5.3.2 Type of E-Mail Use

Type of E-mail use was measured by Kus' (1996) Social and Non-Social uses of Electronic Messaging Systems in Organizations scale. This measure consists of 10 items designed to assess how often participants use electronic mail systems for certain purposes. Included in this measure is four sub-scales each developed to assess a different use. The first subscale consists of four items that measure routine use (e.g. I

use e-mail to co-ordinate project activities). The second scale, which has two items, measures complex use (e.g. I use e-mail to resolve conflicts or disagreements). The third subscale, also made up of two items, is designed to measure socio-emotional use (e.g. I use e-mail to get to know someone), and the fourth bulletin board use, consists of two items (e.g. I use e-mail to keep track of company news). Participants were asked to respond to statements representing their possible use of e-mail while at work. A five-point likert scale was used to determine the frequency that participants used e-mail at work for the purpose outlined in the statement. Responses ranged from 1 (Never) to 5 (Very often). Item scores for each subscale were then totalled to give a score for each of the four purposes assessed by the measure. Measures of internal consistency have previously produced alpha coefficients ranging from .52 to .72 for these subscales (Ku, 1996). In the present study, alpha reliability for these scales ranged from .48 to .81. These were considered within acceptable range, because alpha is a function of both the average correlation among items and the number of items, and therefore tends to be conservative (Nunnally, 1978). When the number of items in a scale is small, Nunnally (1978) suggests the mean inter-item correlations are a better estimate of internal consistency, and recommends that these should be no less than .25. All scales met this criteria.

5.3.3 Amount of E-mail Use

Participants were also asked to indicate how many messages they sent and received on an average day.

5.3.4 Role Stress

Participants' perceptions of role conflict and role ambiguity were measured by Rizzo, House and Lirtzmans' (1970) Role Ambiguity and Role Conflict scales. These self-report scales are the most widely used measures for assessment of role conflict and ambiguity (Jex, 1998). Role ambiguity was assessed by six items (e.g. I know what my responsibilities are; I know exactly what is expected of me). Role conflict was measured by eight items (e.g. I receive incompatible requests from two or more people;

I do things that are apt to be accepted by one person and not accepted by others.). Participants were asked to respond to statements representing their perceptions of their work roles and what they had to do at work. A seven-point scale was used to determine the extent of their agreement or disagreement with the statements. Participants' responses ranged from 1 (Strongly agree) to 7 (Strongly disagree). Whilst there has been some debate over the psychometric properties of these scales, (King & King, 1990) Kelloway and Barling, (1990) conducted a confirmatory factor analysis and found support for the construct validity and generalizability of the two scales. In addition, Netemeyer, Johnston and Burton (1990) examined the validity of the scales through structural equation analysis, and found that the measures meet some established thresholds for convergent and discriminant validity. Despite criticism of these scales, there has been little effort by researchers to develop alternative methods (Jex, 1998). The reliability coefficients quoted by House et al., (1970) for role conflict are .816 for their first sample and .820 for the second sample. The reliabilities for role ambiguity as cited by House et al., are .780 and .808. In the present study, the alpha co-efficient for the role ambiguity scale was .91. The alpha co-efficient for the role conflict scale was .82.

Role overload, role isolation, and resource inadequacy were measured by sub scales from Pareeks' (1983) Organizational Role Stress measure. Each sub scale contained five items. Participants were asked to indicate the frequency with which the idea expressed in each statement defined how they felt about their job. Responses ranged from 1 (Never or hardly ever see things this way) to 5 (Very frequently or always see things this way). Test- retest reliabilities for the complete Organizational Role Stress scale ranged from .37 to .73 (Pareek, 1983). In addition, each item from the instrument was correlated with the total score on the measure for five hundred respondents. All but two correlations (not provided) were significant at the .001 level, demonstrating high internal consistency (Pareek, 1983). In the present study the alpha co-efficient for the role overload scale was .90. The role isolation scale achieved an alpha co-efficient of .87, and the resource inadequacy scale had a co-efficient of .86.

5.3.5 Job performance

Job Performance was assessed by a self-report measure developed by Dolan, Arsenault, and Abenheim (Personal communication with author, Shimon L. Dolan, May 26th, 2001). Participants were asked to respond to a series of statements regarding their satisfaction with various aspects of their performance including: overall performance, problem analysis and problem solving capacity, initiative, job knowledge, and attitudes as well as co-ordination (Dolan et al., 1981). This is a subjective measure assessing qualitative aspects of performance, which has an alpha co-efficient of .82 (Dolan et al., 1981). The alpha co-efficient for the current study was .80.

5.4 PROCEDURE

Prior to the commencement of the research, permission was sought and granted from Massey University Human Ethics Committee, UCOL's research committee and the Chief Executive of UCOL. After ethical approval, a covering letter (see appendix A) inviting employees to participate in the research was distributed to all employees accompanied by a copy of the questionnaire (see appendix C). The questionnaire was distributed through UCOL's internal mail system, this process was facilitated by UCOL's research co-ordinator. The covering letter outlined the purposes of the research, the participants' rights in completing the survey and made clear to participants that participation was voluntary and that their responses would remain anonymous. Contact details for the researcher were also outlined in the covering letter. Participants were supplied with a freepost envelope, addressed to the researcher at the School of Psychology, Massey University. Three weeks after the initial questionnaire was distributed, a reminder letter (see appendix B) with an additional copy of the questionnaire was circulated to all employees allowing those individuals who had not completed a questionnaire the opportunity to participate. A total of 151 questionnaire were received from the initial distribution, an additional 16 questionnaires were returned following the second posting.

CHAPTER 6: RESULTS

6.1 DATA SCREENING

Once questionnaires were returned to the researcher they were processed and coded. Prior to conducting the main analyses, the data was screened for the accuracy of data entry, missing values and fit between variable distributions and the assumptions of multivariate analysis. The data was screened by examining the minimum and maximum scores for each variable, thus checking for the presence of idiosyncratic data entries. In cases where data for one or two items on variables were missing, the missing value was substituted with the sample mean for that particular item. Tabachnick and Fidell, (1996) suggest that this is a conservative way of dealing with missing data as the mean for the distribution as a whole does not change when using this method.

6.2 DATA ANALYSES

All data from questionnaires was entered into an Excel data file and subsequently converted into a Statistical Package for Social Science (SPSS) data file. The analyses of data was conducted using SPSS version 10, which was used to calculate measures of central tendency, such as the means and standard deviations. Also Pearson's product moment correlations were calculated to assess relationships among variables.

Following these analyses, independent samples t-tests were conducted to evaluate if there were differences between means in terms of demographic variables (gender and campus) on each of the various e-mail uses, role stressors and job performance variables. Similarly one way analyses of variance (one-way ANOVAs) were conducted to see if group means between organisational role groupings differed significantly from each other.

6.3 SAMPLE DESCRIPTION

Table one presents participants' demographic information. As it can be seen from table one, participants were sourced from three campuses, situated in Palmerston North (N=134), Wairarapa (N=26) and Levin (N=3). Of these participants 118 were female and 49 were male. Those who agreed to participate in the research had ages ranging from 19 to 65 years (M=41.09, SD=10.19).

Participants were asked to indicate the length of time they have been employed at UCOL. Organisational tenure ranged from 1 month to 368 months (M= 65.31, SD=69.77). Participants were also asked to indicate their role at UCOL, from which 52.7 percent said their role was academic. A further 26.9 percent identified themselves as administration, and 12.0 per cent as student support. From the remainder of participants, 6.6 percent identified management as their role at UCOL, and 1.8 percent said that their role was other than those categories provided.

The ethnicity of the participants was determined by using categories derived for the New Zealand Census (1991). Eighty-five percent of participants described themselves as a New Zealander of European descent, and 8.4 percent as New Zealanders of Maori descent. A further 1.8 percent identified themselves as Asian, and 0.6 percent of participants said that they were of Pacific Island descent. The remainder of participants said they were of other ethnic groups (1.2 percent) or of both European and Maori descent (3.0 percent).

Participants were asked to indicate their highest educational qualification. Just over five (5.4) percent had no formal High school qualifications and 6.0 percent had School certificate passes. A further 3.6 percent had school qualifications such as, a University Entrance, Higher School Certificate or University Bursary qualification. Nearly 22 percent of respondents indicated that they held a Trade certificate, or a Professional certificate or diploma. Of the remainder, 37.7 percent had a University Degree, Diploma or Certificate and 25.7 percent had a higher University Degree.

Table 1**Summary of biographical information of participants (N=167)**

	Number of Respondents	Percentage of Respondents
<u>Gender</u>		
Females	118	70.7
Males	49	29.3
<u>Campus</u>		
Palmerston North	134	81.7
Wairarapa	26	15.9
Levin	4	2.4
<u>Role</u>		
Academic	88	52.7
Administration	45	26.9
Student Support	20	12.0
Management	11	6.6
Other	3	1.8
<u>Educational Qualification</u>		
No School Qualification	9	5.4
School Certificate Passes	10	6.0
University Entrance +	6	3.6
Trade & Professional Qualification	36	21.6
University Degree, Diploma, Certificate	63	37.7
Higher University Degree	43	25.7
<u>Ethnicity</u>		
New Zealander- European descent	142	85.0
New Zealander – Maori descent	14	8.4
Asian	3	1.8
Pacific Islander	1	.6
Other	2	1.2
European & Maori descent	5	3.0

6.4 GENDER AND CAMPUS COMPARISONS

Independent samples t-tests were conducted to evaluate any significant differences in group means on study variables. Table 2 and 3 present the results.

Table 2

T-Test results for Gender across study variables (N=167).

Variable	Men (N =49)		Women (N=118)		t
	M	SD	M	SD	
Resource Inadequacy	11.43	4.03	11.53	4.53	-0.13
Role Isolation	12.27	4.76	11.82	4.76	0.54
Role Overload	11.40	3.92	11.08	4.25	0.44
Role Ambiguity	17.41	7.11	15.07	6.17	2.13*
Role Conflict	30.48	8.50	30.37	8.40	0.08
Routine E-mail Use	12.84	3.60	15.08	3.12	-4.04***
Complex E-mail Use	4.43	1.74	4.53	2.08	-.299
Socio-emotional E-mail use	4.67	1.64	5.16	1.64	-1.76
Bulletin Board E-mail use	5.53	1.52	6.32	1.76	-2.76**
Work Performance	33.55	3.44	34.70	3.00	-2.16*

*p<.05, **p<.01, ***p<.001

Table 3**T-Test results for Campus Groupings across study variables (N=167).**

Variable	<u>Palmerston North</u>		<u>Wairarapa</u>		t
	<u>(N=134)</u>		<u>(N=26)</u>		
	M	SD	M	SD	
Resource Inadequacy	11.28	4.36	11.96	4.38	-0.73
Role Isolation	11.81	4.82	12.35	4.43	-0.52
Role Overload	11.04	4.16	11.15	4.13	-0.12
Role Ambiguity	15.55	6.33	16.73	7.18	-0.85
Role Conflict	31.13	8.22	28.65	9.01	1.38
Routine E-mail Use	14.79	3.32	12.71	3.29	2.93**
Complex E-mail Use	4.66	2.05	3.54	1.27	2.69**
Socio-emotional E-mail use	5.14	1.61	4.46	1.77	1.94
Bulletin Board E-mail use	6.12	1.58	5.85	2.43	0.74
Work Performance	34.30	3.27	34.58	2.96	-0.40

*p<.05, **p<.01, ***p<.001

As it can be seen from the table, women reported using e-mail for routine purposes (M= 15.08, SD= 3.12) significantly more than men (M= 12.84, SD= 3.60), $t(167) = -4.04$, $p < .001$. Likewise, it was found that women used e-mail for bulletin board use (M=6.32, SD=1.76) more than men (M=5.53, SD=1.52), $t(167) = -2.76$, $p < .01$. In addition, significant sex differences were found in work performance. Womens' self reported work performance (M=34.70, SD=3.0) was found to be significantly higher than mens' self reports of performance (M=33.55, SD=3.44), $t(167) = -2.16$, $p < .05$. In contrast, t-tests indicated that men experienced significantly higher levels of role

ambiguity ($M= 17.40$, $SD=7.11$) than did women ($M=15.07$, $SD=6.17$), $t(167)=2.13$, $p<.05$.

An inspection of the grouping categories for the campus variable resulted in the exclusion of the Levin campus from group analyses due to the small number of respondents ($N=4$). Participants belonging to the Palmerston North campus reported significantly higher use of e-mail for routine purposes ($M=14.79$, $SD=3.32$) than those participants from the Wairapara campus ($M=12.71$, $SD=3.29$), $t(160)=2.93$, $p<.01$. Similarly, employees from the Palmerston North campus used e-mail for complex purposes ($M=4.66$, $SD=2.05$) significantly more than those employees from the Wairarpa campus ($M=3.54$, $SD=1.27$), $t(160)= 2.69$, $p<.01$.

6.5 COMPARISONS BETWEEN ROLE GROUPINGS

A one-way ANOVA was used to compare differences in mean scores between groups belonging to each occupational role. Four roles were included in the analyses, the fifth role identified as 'other' was eliminated from group analyses due to the low number of respondents belonging to this group (N=3). Table three presents the results. As it can be seen from table three, there were significant differences between role groupings in terms of the role overload variable $F(167)=3.93, p<.05$. Also significant differences existed between role groups in terms of the complex use of e-mail $F(167)=3.46, p<.05$. To further find out which groups these differences originated from a series of post hoc ranges tests were undertaken for 'multiple comparisons among group means to reduce Type 1 error (Norusis, 1989). There were significant differences between Academic and Student support employees in terms of role overload $F(3,160)=3.14, p<.05$. Similarly there were significant differences between academics and management's complex use of e-mail $F(3,160)=1.79, p<.05$.

Table Four**ANOVA results: Differences between organisational role groupings (N=167).**

	<u>Academic</u>		<u>Administration</u>		<u>Student Support</u>		<u>Management</u>		F
	N=88		N=45		N=20		N=11		
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Resource Inadequacy	12.28	4.68	10.67	4.11	10.30	4.10	10.65	2.94	2.14
Role Isolation	12.22	4.99	12.38	4.84	11.00	4.35	9.82	2.44	1.22
Role Overload	11.99	4.39	10.47	4.08	8.85	2.91	11.83	2.71	3.92**
Role Ambiguity	16.35	7.09	16.03	6.49	13.80	5.46	13.54	2.91	1.28
Role Conflict	30.42	8.80	29.10	7.80	33.87	8.74	28.73	5.18	1.66
Routine E-mail Use	13.86	3.57	15.29	3.38	14.47	2.84	15.56	2.73	2.20
Complex E-mail Use	4.12	1.83	4.82	2.23	4.55	1.79	5.91	1.87	3.46*
Socio-Emotional E-mail use	4.78	1.57	5.23	1.67	5.65	1.98	4.64	1.20	2.15
Bulletin Board E-mail Use	6.07	1.75	6.24	1.73	6.15	1.76	5.45	1.57	.63
Job Performance	34.45	3.12	34.27	3.41	34.90	2.90	33.55	3.45	.46

*P<.05, **P<.01

Table five: Inter-correlations between study variables (N=167)

	1	2	3	4	5	6	7	8	9	10	11
1 Age	1.00										
2 Tenure	.45**	1.00									
3 Total Education	.20*	.17*	1.00								
4 Resource Inadequacy	.06	.05	.06	1.00							
5 Role Isolation	.10	.05	.02	.68**	1.00						
6 Role Overload	.01	.13	.15	.65**	.51*	1.00					
7 Role Ambiguity	-.06	.01	.06	.49**	.48*	.43**	1.00				
8 Role Conflict	.04	-.05	-.08	-.62**	-.54	-.54**	-.40	1.00			
9 Routine e-mail use	-.17*	.14	.11	.11	.08	.17*	.01	-.22**	1.00		
10 Complex e-mail use	-.19*	.10	.04	-.01	.000	.07	-.03	-.13	.52	1.00	
11 Socio-emotional e-mail use	-.31**	-.07	-.15	.06	-.000	.04	-.03	-.05	.41**	.50*	1.00
12 Bulletin Board use	.06	.16*	.01	-.17*	-.10	-.13	-.14	.01	.27**	.29*	.25**
13 Work Performance	.08	-.05	-.08	-.15	-.14	-.07	-.31**	.07	.12	-.02	-.02

p<.05, **p<.001

6.6 RELATIONSHIPS BETWEEN THE VARIABLES

An inspection of the correlation co-efficients presented in table five reveal that the demographic variables investigated are interrelated. Participants' age was positively related to organisational tenure ($r=0.45$, $p<.001$), and total education ($r=0.20$, $p<.05$). Also, organisational tenure and education were positively related ($r=.17$, $p<.05$). In addition, participants' age was related negatively to three out of the four different uses of e-mail: Routine use ($r=-.17$, $p<.05$), complex use ($r=-.19$, $p<.05$), and socio-emotional use ($r=-.31$ $p<.001$).

The bi-variate data indicate that the various role stressors measured are interrelated. Resource inadequacy was positively correlated with role isolation ($r=.68$, $p<.001$), role overload ($r=.65$, $p<.001$), role ambiguity ($r=.49$, $p,.001$), and negatively related to role conflict ($r=-.62$, $p<.001$). Role isolation was found to be positively related to role overload ($r=.51$ $p<.05$) and role ambiguity ($r=.48$, $p<.05$). Finally, role overload was positively related to role ambiguity ($r=.43$, $p<.001$), and negatively related to role conflict ($r=-.54$, $p<.001$).

The various e-mail uses were also inter-related. That is, each use was correlated with the other three identified e-mail uses. Routine use was positively related to complex use ($r=.52$ $p<.001$), socio-emotional use ($r=.41$, $p<.001$) and bulletin board use ($r=.27$, $p<.001$). Similarly, complex use was related to socio-emotional use ($r=.50$, $p<.05$), and bulletin board use ($r=.29$, $p<.05$). Finally, socio-emotional use was related to bulletin board use ($r=.25$, $p<.001$).

Bi-variate data were examined to check for possible mediating relationships. According to Baron and Kenny (1986) there are three conditions that must be met in order for a variable to be classified as a mediator. Firstly, variations in the level of the independent variable need to significantly account for variation in the suspected mediator variable. Therefore

the current research requires that e-mail use be correlated with role stressors, the possible mediator. Three correlations meet this requirement. Routine e-mail use was found to be significantly correlated with role overload ($r=.17$, $p < .05$) and negatively correlated with role conflict ($r=-.22$, $p < .001$). Also, bulletin board use was negatively related to resource inadequacy ($r=-.17$, $p < .05$).

The second condition that must be present when identifying mediating variables is that variations in the mediator significantly account for variations in the dependent variable (Baron & Kenny, 1986). To meet this requirement, role stress variables must be correlated with work performance. Only one correlation of this nature can be identified in the bivariate data. Role ambiguity was found to be negatively correlated with work performance ($r=-.31$, $p < .05$). Consequently, the data fails to meet the requirements for a mediating relationship, as the variables which meet the first requirement are different to the variable that meets the second requirement. In other words, whilst some e-mail use was found to be related to particular role stressors, (role overload, role ambiguity and role conflict) these role stressors were not found to be related to work performance. Therefore, no evidence for mediating relationships was detected in the data and subsequent regression analyses to detect for such relationships as outlined by Baron and Kenny (1986) were not undertaken.

Although not a focus of the original study, subsequent to the investigation of mediating relationships the data was analysed to investigate the possibility of moderating relationships among the variables. Baron and Kenny (1986) define a moderator as “ a qualitative or quantitative variable that affects the direction and /or strength of the relationship between an independent or predictor variable and a dependent or criterion variable” (p1174). Given the lack of evidence for mediating relationships it was thought possible that e-mail use and role stressors may interact in their relationships with performance. To test for moderating relationships a series of hierarchical regression analyses were conducted (see appendix D). This particular type of regression analysis was used because the researcher controls the entry of variables and is thus able to assess the

proportion of variance attributable to a particular variable (the moderator interaction effect) after variance due to the main effects is accounted for (Tabachnick & Fidell, 1996). Interactions were modelled using cross-product terms. This moderated strategy, where only one regression model is estimated for the whole sample, maximises power and avoids spurious effects due to differences in subgroup sizes or variances (Jaccard, Turrisi & Wan, 1990). These analyses revealed very little evidence of a moderating relationship between e-mail use, role stressors and performance, with only two of the twenty possible interaction terms demonstrating significance.

To summarise, whilst significant relationships were detected between e-mail uses and role stressors, the data did not provide support for a mediating relationship. Significant relationships were found between routine e-mail use, role overload and role conflict. Also, the bulletin board use of e-mail was found to be related to resource inadequacy and work performance. Post hoc hierarchical regression analyses did not demonstrate support for moderating relationships among the study variables.

CHAPTER 7: DISCUSSION

Electronic communication has become pervasive in organisations, and has revolutionised the process of organisational communication. Research centring on e-mail systems in organisations continues to grow, however there is limited research focusing on the impact of e-mail use on employees' perceptions of stress. The current research was exploratory, and aimed to investigate the impact of various uses of e-mail on employees' perceptions of role stress. Further, the present study aimed to investigate a possible mediating role of organisational role stress on the relationship between e-mail use and job performance. Several hypotheses were formulated, and the degree of support for each of these will be discussed in the proceeding sections. However, it is worthwhile first to comment on some of the more general findings.

7.1 RELATIONSHIPS BETWEEN E-MAIL USE AND GENDER

Results from the study showed that women ($M=15.08$, $SD=3.12$) use e-mail for routine purposes more than men ($M=12.84$, $SD=3.60$) $t(167)=-4.04$, $p<.001$. This finding is consistent with research conducted by Ku (1996) who found that gender was a better predictor of routine e-mail use than any task characteristics. Similarly women ($M=6.32$, $SD=1.76$) also use e-mail more for bulletin board purposes, than do men ($M=5.53$, $SD=1.52$), $t(167)=-2.76$, $p<.01$. This finding is not congruent with Ku's (1996) research examining predictors of e-mail use. Ku found that no personal differences or task characteristics could explain bulletin board use. A possible explanation for the relationship found between gender and these two e-mail uses may lie in the roles occupied by women within the organisation. It is possible that the roles occupied by women within the organisation, are of a lower organisational level than those occupied by the male employees. Ku (1996) suggests that organisational level is negatively related to communication via e-mail, and asserts that employees in higher levels of an organisation

tend to use face –to face communication, as they are often required to build rapport or convey ambiguous information.

7.2 RELATIONSHIPS BETWEEN GENDER AND JOB PERFORMANCE

Results from the current research suggest that women have higher perceptions of job performance than do men. Again, this finding may be partially explained by the roles occupied by women in the organisation. It may be possible that women receive more feedback on their performance at lower level jobs. In other words, occupants of lower level jobs may have more proximal work goals. As their goals are less strategic, immediate feedback may be more readily available, or the consequences of not performing may be more quickly obvious to employees in lower level jobs. Alternatively, this finding may be related to mens' higher perceptions of role ambiguity. Results from the present research suggest that men have higher perceptions of role ambiguity than women. In accordance with the interference theory of role stressors, those individuals who experience higher levels of role stress will not perform as well as those individuals experiencing lower levels of role stress. As men reported higher levels of role stress, it is not surprising that they perceived their job performance to be significantly lower than womens'. This finding provides some limited support for interference theory.

7.3 RELATIONSHIPS BETWEEN E-MAIL USE AND AGE

Lastly, age was found to be significantly and negatively related to routine, socio-emotional and complex e-mail use. These results provide support for Kus' (1996) proposition that age should be negatively related associated with all e-mail purposes as it is likely that older people will resist e-mail systems preferring to use other communication channels. Whilst Ku (1996) hypothesised that age would be related to all e-mail uses, his 1996 study revealed support for only one of these relationships. Namely, Ku found the use of e-mail

for socio-emotional material to be negatively related to age. Therefore the results from the present study, offer some merit to Kus' original hypotheses.

An overall aim of this research was to test the possibility that role stress mediates the relationship between e-mail use and employee performance. To test this proposition, Baron and Kenny's (1986) framework was used to structure the research aims and hypotheses. Baron and Kenny (1986) stipulate three conditions, which must be met if a variable is to be classified as a mediator. The following section addresses the bi-variate relationships related to the first condition outlined by Baron and Kenny (1986), which states that variations in the independent variable should account for variations in the mediator variable. That is, the following section discusses those correlations found between various e-mail uses and role stressors.

7.4 RELATIONSHIPS BETWEEN E-MAIL USE AND ROLE STRESS.

It was hypothesised that high use of e-mail for routine purposes would be associated with high perceptions of role overload (Hypothesis one), and that the greater use of e-mail for socio-emotional purposes would be associated role overload (Hypothesis two). Also hypothesis three stated that the high use of e-mail for bulletin board purposes would be associated with high perceptions of role overload. Pearson's r correlations revealed support for only one of these associations. Specifically, it was found that the greater use of e-mail for routine purposes was associated with greater perceptions of role overload, thus supporting hypothesis one. Although this correlation is weak, ($r=.17$, $p<.05$) it is of interest as it builds on previous research in the area. Kraut and Atwell (1997) found that e-mail use in general, was not associated with employees' experience of being overloaded. Similarly, in the present study, the total amount of e-mail use by individuals was not correlated with perceptions of role overload ($r=.089$, $p<.05$). However, when the use of e-mail for various purposes was measured, it was found that employees reported higher levels of role overload when using e-mail for routine purposes.

Role overload was not associated with e-mail containing socio-emotional material or with e-mail that is distributed via electronic bulletin board. These findings provide partial support for Kraut and Atwells' (1997) proposition that employees find e-mail relatively non-intrusive, as it is asynchronous and does not interrupt individuals' normal work. However, a possible explanation for the relationship found between routine e-mail use and role overload is that employees may feel that they can read socio-emotional and bulletin board material at a time appropriate to them, but may have perceptions that routine, task related e-mail should be responded to more immediately.

To further this argument, it is likely employees receive more requests for information when using e-mail for routine purposes as opposed to socio-emotional uses. As Kraut and Atwell (1997) mention, requests for information may be a factor contributing to employees' experiences of overload. The recipient of the e-mail receives the communication at a random time, and often the information asked for, benefits the initiator not the recipient. Therefore, e-mail which requests information such as routine task related e-mail, might be more associated with overload when compared to e-mail used for socio-emotional purposes. However, information may also be requested from employees via electronic bulletin board, yet such use was not found to be correlated with employees' experiences of role overload. Diffusion of responsibility may provide an explanation as to why there was no relationship found between these variables. This phenomenon occurs when people in groups feel less personal responsibility when other group members are present (Smither, 1994). Employees may experience higher levels of responsibility and psychological ownership with personalised e-mail as opposed to e-mail distributed to a group. In this way, when information is requested via bulletin board, individuals may feel less responsibility to respond and therefore do not feel as overloaded by the request for information.

In contrast to this, the bulletin board use of e-mail was found to be related to lower perceptions of resource inadequacy, and therefore provides support for hypothesis seven.

Hypothesis seven states that the greater use of e-mail for bulletin board purposes will be related to lower perceptions of resource inadequacy. Again, this relationship can be characterised as weak, but is of interest because of the implication of this relationship for the management of role stress in organisations. Resource inadequacy results when employees feel they lack the resources to perform in their roles satisfactorily, which can include a lack of information. Posting relevant organisational information by electronic bulletin board is a quick, inexpensive and efficient way for management to distribute information to employees. The practice of distributing information via electronic bulletin board, may make more transparent to employees the availability of organisational resources, and therefore act as a primary intervention to reduce employee perceptions of resource inadequacy. Put simply, the findings from this research imply that the effective use of e-mail systems by management (i.e. the use of bulletin boards) may be one mechanism for addressing employees perceptions of resource inadequacy and thus reducing the role stress experienced by employees.

The results of this research did not offer support for hypotheses four, five or six. Firstly, the greater use of e-mail for complex use was not associated with higher perceptions of role ambiguity (Hypothesis four). The rationale for this hypothesis centred on the premise that e-mail does not facilitate the level of social presence required for complex interactions. Therefore, when used for complex purposes such as negotiating or bargaining, employees may feel that they receive deficient or uncertain information regarding role senders' expectations. When a role occupant lacks understanding of the cues that are available to them regarding role behaviours, role ambiguity is likely to result. The results from the present study do not support this hypothesis.

A possible explanation for the results is related to the samples' familiarity with e-mail. The organisation from which the sample for the present study was obtained promotes e-mail as the primary mode of intra-organisational communication. Each employee is provided with access to electronic e-mail systems. The use of e-mail within the particular organisation is

prevalent across organisational roles. Carlson and Zmud (1999) suggest that when groups of individuals become familiar with e-mail, they may start to perceive this medium as a rich mode of communication and use it accordingly. In this way employees may develop 'communication techniques' which aid them in overcoming the lack of cues associated with e-mail. For example employees may use symbols such as ☺ to suggest humour. In summary, the extensive use of e-mail within UCOL, may explain why the complex use of e-mail is not associated with high perceptions of role ambiguity.

As previously mentioned results did not indicate support for hypotheses five or six. Hypothesis five states that the greater use of e-mail for bulletin board purposes will be associated with lower perceptions of role isolation. This hypothesis was built on the premise that role isolation occurs when employees feel that individuals occupying other roles are psychologically distant. It was predicted that bulletin board use of e-mail would reduce feelings of role isolation by increasing the interaction between roles and also the ease with which interactions occur, these are the two most important criterion of perceived role-role distance. Another important criterion of perceived role-role distance is the strength of the linkages formed between roles (Pareek, 1983). When linkages are strong, the role-role distance is perceived as low. Whilst the bulletin board use of e-mail may increase interaction between roles, and make interactions easier, it may not be conducive to the forming of strong linkages. In this way, the bulletin board use of e-mail may not be related to either increases or decreases in role isolation.

Likewise the socio-emotional use of e-mail was not found to be related to role isolation, as predicted in hypothesis six, which states that the higher use of e-mail for socio-emotional purposes will be related to lower perceptions of role isolation. Some authors (Page, 1999; Sproull & Kiesler, 1991) argue that e-mail can enhance sociability and operate as social glue. Intuitively, it makes sense that e-mail containing socio-emotional material would decrease perceived role-role distance. In the present study this was not the case. A possible explanation for this finding may be related to pre-existing organisational

communication patterns. Mantovani (1994) asserts that communication via e-mail simply reflects established preferences, status barriers and pre-existing communications clusters. If this is the case, employees are likely to send socio-emotional material to those with whom they feel they already have strong linkages. In circumstances where perceived role-role distance is low, employees may be less likely to send socio-emotional material and therefore the use of e-mail for socio-emotional purposes does not impact on employees' perceptions of role isolation.

Another possible explanation as to why hypothesis six was not supported relates to the recipients of the socio-emotional material. E-mail when used for socio-emotional purposes can only impact on the role-role distance if senders and recipients of this material belong to the same organisation. It is possible that a large percentage of socio-emotional e-mail is directed towards individuals outside of the organisation. Therefore, the use of e-mail for socio-emotional purposes would do little to reduce perceived role-role distance and therefore role isolation.

No specific predictions were made regarding routine e-mail use and role conflict. However, results indicated a significant negative relationship ($r = -.22$) between these two variables. Role conflict occurs due to a lack of agreement and co-ordination among role senders (Kahn, et al., 1964). According to Page (1999) the routine use of e-mail aids in providing communication links between the organisations members, which support or promote co-operation. Therefore, the co-operation that is associated with e-mail use may make co-ordination among role senders easier and thus reduce individuals' perceptions of role conflict.

7.5 RELATIONSHIPS BETWEEN ROLE STRESS AND PERFORMANCE

In summary, three significant bi-variate relationships were detected between e-mail uses and role stressors. The next stage in assessing the potential of role stress as a mediator of

the e-mail - performance relationship, is to examine the relationships found between role stress and job performance variables. For a mediating relationship to be present, the role stressors that were found to be related to e-mail use must also be significantly related to job performance. Results did not support this proposition, as only role ambiguity was related to performance. This result provides limited support for hypothesis eight which states that high levels of role stressors will be negatively related to job performance. The correlation coefficient found for this relationship is $r = -.31$, $p > .05$, suggesting that those individuals who experience higher levels of role ambiguity do not perceive their job performance to be as high as those individuals who experience less role ambiguity. The results of the present study are comparable to other studies investigating the relationship between job stressors and performance. Jackson and Schulers (1985) meta analysis obtained a correlation coefficient of $-.37$ between self rated performance and role ambiguity. Results of the present study also support Tubre, Sifferman & Collins (1996, as cited in Jex, 1998) assertion that role ambiguity is more strongly related to job performance than role conflict, as no significant relationship between role conflict and performance were detected in the present study. In addition, the results support hypothesis nine, which states that role ambiguity will be more strongly related to job performance than role conflict.

The negative relationship found between role ambiguity and performance supports interference theory (Abramis, 1994), which purports that stressors interfere with job performance to cause a negative monotonic relationship between stressors and performance. However, role ambiguity was the only stressor of the five measured that was found to be associated with job performance. An explanation for the lack of significant associations detected between the other role stressors and job performance could be related to the limited variability in job performance. Scores on the job performance measure ranged from 24 to 40 with a mean of 34.36 and a standard deviation of 3.17 (potential range 8- 40). Job performance is the dependent variable; lack of variability in this construct makes it difficult to assess the impact of both role stress and e-mail on job performance.

The reasons for the limited variability in job performance could be due to artifactual restriction or true restriction in performance variability (Peters & O'Connor 1988). Artifactual restriction occurs as a result of errors in performance ratings, whereas true restriction in performance variability occurs when performance ratings are more or less accurate, but there is a lack of meaningful variation in actual performance (Peters & O'Connor, 1988; Jex, 1992). There are several reasons why true performance variability may occur. Firstly, organisations may have low performance standards, discouraging high levels of performance. Secondly, organisations may not value individual performance, or may cultivate a culture that excuses poor performance. Lastly, the availability of organisational resources can lead to limited performance variability as limited resources can introduce many situational constraints. Whilst these reasons may partially explain the lack of performance variability it is more likely that artifactual restriction contributes to the results of the present study.

As mentioned, artifactual restriction occurs when errors in performance ratings mean that true differences in employee ability are not detected. In the present study, a self-report scale measured job performance. There are several problems inherent in using self-report measures. Specifically, Peeters, Buunk and Schaufeli (1995) identify three possible sources of cognitive biases that are associated with self-report measures. Firstly, participants may engage in the selection of representative interactions. This occurs as some interactions are more pertinent to the individual, and are therefore likely to be more cognitively available than others (Peeters, et al., 1995). Secondly, biases in recall can occur due to motivated distortions such as cognitive dissonance, which impacts on individuals' recall of interactions (Peeters, et al., 1995). Finally, cognitive bias arise when the aggregation of multiple events are combined to form one single impression (Peeters, et al., 1995). Clearly, these biases could be avoided if more objective performance measures were used.

There are several reasons why the present study did not utilise objective performance measures. Firstly, the researcher did not have access to more objective data relating to performance, such as performance appraisal material. In any case, the analysis of this data would be problematic as the participants in the present study were drawn from various occupational roles within the organisation. This would make comparison of individuals' performance difficult, as the objectives associated with good performance would vary substantially across roles. In addition, several biases may impact on the evaluation of employees job performance. Performance appraisal data is prone to a number of systematic biases and distortions, such as attribution errors, recency effects, as well as leniency and severity errors (Riggio, 1996). Secondly, objective measures of performance are not without their own set of potential problems. According to Jex (1998) objective measures of job performance have serious flaws. He asserts that in many instances objective measures of job performance gauge employee effectiveness not performance. Effectiveness contrasts performance, in that effectiveness is an evaluation of the results of an employees' job performance. This is problematic as often employees lack control over key indicators of job performance. For example, changes external to the organisation may limit employees' ability to sell their product. In addition, organisations may not systematically record data relating to objective measures of performance, making it difficult for researchers to deal with missing data or data that has been falsified in organisational records.

7.6 RELATIONSHIPS BETWEEN E-MAIL AND PERFORMANCE

Problems inherent to the measurement of performance in the current research may have also limited the researcher's ability to adequately test the proposed mediating model, and to detect significant relationships between e-mail use and job performance. Whilst a few e-mail uses were found to be related to role stressors, those particular role stressors were not found to be related to job performance variables. This may be a result of the limited variability in job performance variables, or due to conceptual flaws. In any case, results

from the present study did not provide support for the proposed mediating model. As results did not support the proposed mediating model, post hoc analyses were conducted to test for possible moderating effects. A moderator is a variable that affects the direction or strength of the relationship between a predictor variable and the dependent variable (Baron & Kenny, 1986). Results did not support a moderating relationship.

Bulletin board use of e-mail was found to be related to performance. This finding provides partial support for hypothesis ten, which states that the greater use of e-mail for socio-emotional, routine and bulletin board purposes will be associated with higher perceptions of job performance. There are several plausible explanations, which may contribute to understanding this finding. Firstly, the bulletin board use of e-mail may provide new communication links to employees who previously may have had no contact with each other, which therefore acts to increase the flow of information between employees that may be useful for job performance. Secondly, the sharing of information inherent to the bulletin board use of e-mail may enhance co-ordination and communication among employees, and in turn impact positively on perceptions of job performance. Lastly, Kraut and Atwell (1997) assert that functions unique to e-mail can allow information to be distributed to a wide audience and therefore enhances organisational knowledge. It is likely that the bulletin board use of e-mail enhances organisational knowledge which can facilitate job performance.

7.7 LIMITATIONS AND AREAS FOR FUTURE RESEARCH.

A limitation associated with the current research is related to the e-mail measure used. In particular, two of the subscales included in Kus' (1996) measure of Social and Non-social uses of Electronic Messaging Systems in Organizations, consisted of only two items and did not demonstrate high levels of reliability. Whilst the alpha coefficients were acceptable according to Nunally (1978), future research should focus on scale development

and the development of alternative measures of e-mail use, as presently there are limited resources available for addressing social and non-social uses of e-mail in organisations.

In addition, interpretation of the results of the present study is restricted by the limited variability in the job performance variables. As discussed, there are potential drawbacks associated with both self-report and objective performance measures. The current research relied on self-report measures of performance as the researcher did not have access to objective performance data, and because the analysis of such data would be problematic due to the variety of organisational roles included in the present study. To gain a more accurate measure of job performance, and to minimise the biases associated with each method, a combination of job performance measures should be used in future research assessing the link between role stressors and job performance.

Sampling bias may present a third limitation of this study. Data relating to the demographic composition of UCOL employees was not available to the researcher. As a result, comparisons could not be made between the sample and UCOLs' population. It is possible that participants' responses to variables systematically differ from those employees who did not participate in the current research. Furthermore, the current study is a cross sectional correlational study. Whilst this research design allows the researcher to test for associations between study variables, it does not allow the researcher to determine causality of the relationships. In addition, care should be taken in generalising the findings of this research to other organisations. UCOL is a tertiary institution, the culture unique to educational facilities may prevent the results from this study from being generalised to corporate organisations.

Results from the present study did not reveal support for a significant relationship between the socio-emotional use of e-mail and role isolation. However, as discussed socio-emotional use of e-mail will do little to reduce role-role distance if e-mail of a socio-

emotional nature is directed at individuals outside of the organisation. Failure to identify the senders and receivers of socio-emotional e-mail is a limitation of the present research, as it limits the ability of the researcher to assess if e-mail sent between roles within the organisation impacts on employees' perceptions of role isolation. Future research should incorporate survey items relating to the senders and recipients of e-mail. In this way, researchers could identify the impact of socio-emotional material received from within the organisation, as opposed to those to that which is received from outside of the organisation. Research of this nature, may have implications for the development of organisational policy regarding social e-mail, particularly if socio-emotional e-mail sent between organisational members is in fact found to reduce perceptions of role isolation. The impact of e-mail coming from individuals outside of the organisation should also be addressed in future research. Such e-mail may potentially impact on employee productivity, particularly when this material is not task related.

Future research should also investigate further the consequences of bulletin board e-mail use. In the present study, the bulletin board use of e-mail was found to be negatively related to employees' perceptions of resource inadequacy, and positively related to employees' perceptions of job performance. Both of these relationships can be deemed as positive outcomes for the individual, which may in turn, extend benefits to the organisation, such as reduced employee stress, and increased performance. Little research has focussed on bulletin board e-mail use. Ku (1996) found no personal or task characteristics to be related to the bulletin board use of e-mail. In contrast, results from the present study indicated that gender was significantly related to bulletin board use. Future research should explore further, the concepts underlying bulletin board e-mail use. Qualitative research may aid in identifying additional benefits associated with this form of communication.

CHAPTER 8: CONCLUSION

Communication via e-mail has become widespread in organisations, and in many instances may constitute the primary means of intra-organisational communication. This technology has impacted not only on working procedures, but also on working patterns and working relationships. With this in mind, it is important that psychologists from the Industrial/Organisational community explore both the individual and organisational consequences of e-mail use. The present study investigated the impact of e-mail use on employee perceptions of role stress and job performance. In addition, the current study investigated the possibility of a mediating model.

It was proposed that role stress might mediate the relationship between e-mail and job performance. Results did not provide support for this model. However, significant bivariate relationships were found to exist between two of the four e-mail uses and role stressors. Namely, routine e-mail use was found to be positively related to role overload. Whilst this relationship is weak, it is of interest as it builds on previous research which has found e-mail use overall to be unrelated to perceptions of overload.

Secondly routine e-mail use was found to be negatively related to role conflict. This finding supports Page (1999) assertions that e-mail can aid in promoting or supporting co-operation between organisational members.

It was expected that the role stressors incorporated in the present research would be negatively related to employees' perceptions of job performance. There was little support for this prediction, with the exception of role ambiguity. Similarly, to other research, role ambiguity was found to be negatively related to job performance.

It was also predicted that bulletin board, socio-emotional and routine e-mail use would be positively related with employees perceptions of job performance. This hypothesis

relieved only partial support, which may again be a result of the limited variability in job performance variables. However, the bulletin board use of e-mail was found to be significantly related to job performance, suggesting that this use of e-mail encourages the sharing of information between employees that may be useful for performance.

Overall, whilst this research did not provide support for a mediating model, it did demonstrate relationships between various e-mail uses and role stressors. In addition, this research highlighted the need for further investigation of the concepts underlying the bulletin board use of e-mail, and also empirical research into the individual and organisational consequences of the bulletin board use of e-mail. The current research found bulletin board use of e-mail to be associated with two potentially beneficial outcomes for the employees and the organisation, namely bulletin board use was found to be positively related to employees' perceptions of job performance and negatively related to their feelings of resource inadequacy.

To conclude, the present research aimed to investigate the impact of various email uses on employees' perceptions of role stress and performance. Whilst this research has demonstrated significant relationships between email uses and role stressors, the exploratory nature of this research prevents firm conclusions from being made, yet provides interesting directions for future research.

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APPENDIX A: COVERING LETTER

The impact of e-mail use in organisations on role stressors and employee performance.

INFORMATION SHEET

My name is Sharon Tucker. As part of the completion of a Masters Degree in Organisational psychology I am undertaking a research project under the supervision of Dr Fiona Alpass, Senior Lecturer School of Psychology at Massey University. The aim of this study is to explore e-mail use in organisations and how this might impact on people's feeling of job related stress and job performance. This study will investigate if certain e-mail uses in organisations affect employees' perception of role stress and therefore performance.

If you agree to take part in this research, you will be asked to complete the attached questionnaire. Included in this questionnaire will be questions relating to your e-mail use at work, your experience of role related stress, and how well you feel you perform on your job. This survey will take approximately 10 minutes to complete. I will be inviting all employees at UCOL to participate in this research because of the widespread access to e-mail within the organisation.

You have the right to decline to take part in this study. If you do choose to participate you may refuse to answer any particular questions at any time. This study is being undertaken by myself, an independent researcher, and is not affiliated with UCOL's management.

If you choose to participate in this study your identity will be protected throughout the study, as this is an anonymous questionnaire, your name will not be required. To maintain your anonymity, all completed questionnaires will be sent freepost directly to me via the

School of Psychology at Massey University. Only my supervisor and myself will have access to completed questionnaires, which will be stored in a secure place until the end of the study and then destroyed. By completing the questionnaire it is assumed that you are giving your informed consent to participate in the study. As the questionnaire is anonymous, you will be unable to withdraw your completed questionnaire once I have received it, as I will be unable to identify you.

If you would like a summary of the results of the research, these can be sent to you at the end of the project. The research findings will be presented to the Chief Executive Office of UCOL and may also be published in professional journals so that other psychologists can learn from our findings. The results will be published in summative format, and no information that could identify any individual will be presented. However, it will be possible to see how an occupational grouping of UCOL employees use e-mail. You have the right to ask any questions about this study at any time during participation. If you have any questions or would like a summary of the results, please do not hesitate to contact myself via e-mail at Sharon.Tucker.1@uni.massey.ac.nz or my supervisor Dr Fiona Alpass on 06 356 9099 extn 2081. This project has been reviewed and approved by the Massey University Human Ethics Committee, PN protocol 01/86.

Thank you for your consideration.

Sharon Tucker

APPENDIX B: FOLLOW UP LETTER

The impact of e-mail use in organisations on role stressors and employee performance.

My name is Sharon Tucker. Two weeks ago I sent you a questionnaire as an invitation to participate in a study investigating the use of e-mail in organisations. If you did not complete the questionnaire, but would still like to participate in the study I have provided another copy of the questionnaire. Participation is voluntary, you have the right to decline to participate or answer any questions. If you have already returned a completed questionnaire, thank you very much for your time, please disregard the attached questionnaire. Outlined below is information regarding the study.

INFORMATION SHEET

As part of the completion of a Masters Degree in Organisational psychology I am undertaking a research project under the supervision of Dr Fiona Alpass, Senior Lecturer School of Psychology at Massey University. The aim of this study is to explore e-mail use in organisations and how this might impact on people's feeling of job related stress and job performance. This study will investigate if certain e-mail uses in organisations affect employees' perception of role stress and therefore performance.

If you agree to take part in this research, you will be asked to complete the attached questionnaire. Included in this questionnaire will be questions relating to your e-mail use at work, your experience of role related stress, and how well you feel you perform on your job. This survey will take approximately 10 minutes to complete. I will be inviting all employees at UCOL to participate in this research because of the widespread access to e-mail within the organisation.

You have the right to decline to take part in this study. If you do choose to participate you may refuse to answer any particular questions at any time. This study is being undertaken by myself, an independent researcher, and is not affiliated with UCOL's management.

If you choose to participate in this study your identity will be protected throughout the study, as this is an anonymous questionnaire, your name will not be required. To maintain your anonymity, all completed questionnaires will be sent freepost directly to me via the School of Psychology at Massey University. Only my supervisor and myself will have access to completed questionnaires, which will be stored in a secure place until the end of the study and then destroyed. By completing the questionnaire it is assumed that you are giving your informed consent to participate in the study. As the questionnaire is anonymous, you will be unable to withdraw your completed questionnaire once I have received it, as I will be unable to identify you.

If you would like a summary of the results of the research, these can be sent to you at the end of the project. The research findings will be presented to the Chief Executive Office of UCOL and may also be published in professional journals so that other psychologists can learn from our findings. The results will be published in summative format, and no information that could identify any individual will be presented. However, it will be possible to see how UCOL employees as a group use e-mail. You have the right to ask any questions about this study at any time during participation. If you have any questions or would like a summary of the results, please do not hesitate to contact myself via e-mail at Sharon.Tucker.1@uni.massey.ac.nz or my supervisor Dr Fiona Alpass on 06 356 9099 extn 2081. This project has been reviewed and approved by the Massey University Human Ethics Committee, PN protocol 01/86.

Thank you for your consideration.

Sharon Tucker

APPENDIX C: QUESTIONNAIRE

The Impact of E-mail use in Organisations on Role Stressors and Job Performance

It is assumed by completing and returning this questionnaire you are giving your informed consent to participate in this study. This project has been reviewed and approved by the Massey University Human Ethics Committee, PN protocol 01/86.

Firstly we would like some general information about you. Please tick the circle next to the answer which you believe gives an accurate indication of your current situation, or write details in the space provided.

What is your gender?

Male

Female

What is your age in years?

How long have you worked at UCOL? Please indicate the number of years and months.

.....yearsmonths

What Campus are you based at?

Palmerston North

Wairapa

Levin

What is your role at UCOL?

Academic

Administration

Student Support

Management

Other (Please specify)

What ethnic group do you belong to?

New Zealander – European descent

New Zealander – Maori descent

Pacific Islander

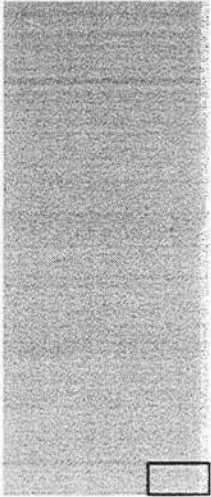
Asian

Other (Please specify).....

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What is your highest educational qualification?

- No school qualification
- School certificate passes
- School qualifications, University Entrance and above
- Trade certificate or Professional certificate or diploma
- Undergraduate University Degree, Diploma or Certificate
- Higher University Degree



People use e-mail at work for many different purposes. Read each statement below and tick the circle on the scale that indicates how often you use email for that purpose when at work.

- 1 - I never use the e-mail system for this purpose.**
- 2 - I seldom use the e-mail system for this purpose.**
- 3 - I sometimes use the e-mail system for this purpose.**
- 4 - I often use the e-mail system for this purpose.**
- 5 - I very often use the e-mail system for this purpose.**

1 I use e-mail to exchange routine information with others.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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**Office
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2 I use e-mail to schedule meetings.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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3

I use e-mail to co-ordinate activities.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
----------------------------------	-----------------------------------	--------------------------------------	----------------------------------	---------------------------------------

4

I use e-mail to share opinions.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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5

I use e-mail to resolve conflicts/ disagreements.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
----------------------------------	-----------------------------------	--------------------------------------	----------------------------------	---------------------------------------

6

I use e-mail to negotiate.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
----------------------------------	-----------------------------------	--------------------------------------	----------------------------------	---------------------------------------

7

I use e-mail to get to know someone.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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8

I use e-mail to keep in touch with someone in another location.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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9 I use e-mail to send notes that contain sociable or non-work related content.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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10 I use e-mail to send information to a large number of people.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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Office
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Only

11 I use e-mail to read bulletin board style information.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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12 I use e-mail to keep track of company news.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Seldom	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Often	<input type="radio"/> 5 Very Often
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13. On an average day how many e-mails would you receive?

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14. On an average day how many e-mails would you send?

--	--	--

People have different perceptions of their work roles and what they have to do at work. Some statements describing such perceptions are listed below. Read each statement and tick the circle that best describes how you feel about your job.

Office
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15 I am certain about how much authority I have.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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16 Clear, planned goals and objectives exist for my job.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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17 I know that I have divided my time properly.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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18 I know what my responsibilities are.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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19 I know exactly what is expected of me.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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20 Explanation is clear of what has to be done.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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21 I have to do things that should be done differently.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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22 I receive an assignment without the manpower to complete it.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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23 I work with two or more groups that operate quite differently.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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24 I have to buck a rule or policy in order to carry out an assignment.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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25 I receive incompatible requests from two or more people.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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26 I do things that are apt to be accepted by one person and not accepted by others.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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27 I receive an assignment without adequate resources and materials to execute it.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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28 I work on unnecessary things.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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29 I am given enough time to do what is expected of me on my job.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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30 It seems that I have too much work to do for one person.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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31 The performance standards on my job are too high.

<input type="radio"/> 1 Strongly Disagree	<input type="radio"/> 2 Disagree	<input type="radio"/> 3 Sometimes Disagree	<input type="radio"/> 4 Neither Agree or Disagree	<input type="radio"/> 5 Sometimes Agree	<input type="radio"/> 6 Agree	<input type="radio"/> 7 Strongly Agree
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Read each statement below and decide how often the idea expressed in each statement defines how you feel about your job. Tick the circle on the scale that indicates your perception of how you presently feel about your job.

- 1 Never or scarcely ever see things this way.
- 2 Occasionally see things this way (1 or 2 times a month)
- 3 Sometimes see things this way (1 or 2 times a week)
- 4 Frequently see things this way (3 or 4 times a week)
- 5 Very frequently or always see things this way.

32 My workload is too heavy.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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33 The amount of work I have to do interferes with the quality I want to maintain.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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34 I have been given too much responsibility.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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35 There is a need to reduce some parts of my role.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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36 I feel overburdened by my role

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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37 People I work with do not give enough attention and time to my role.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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38 There is not enough interaction between my role and other roles.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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39 I wish there were more consultation between my role and other roles.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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40 I am not involved in joint problem solving or collaboration in planning action.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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41 Even when I take initiative for discussions or help, there is no response from other roles.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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42 I do not receive the information that is needed to carry out the responsibilities assigned to me.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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43 I do not have access to enough resources to be effective in my role.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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44 I do not have enough people to work with me in my role.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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45 I worry that I lack the necessary resources needed in my role.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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46 I wish that I had more financial resources for the work assigned to me.

<input type="radio"/> 1 Never	<input type="radio"/> 2 Occasionally	<input type="radio"/> 3 Sometimes	<input type="radio"/> 4 Frequently	<input type="radio"/> 5 Very Frequently
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Listed below are statements regarding aspects of job performance. Read each statement and rate your job performance according to the provided scale.

- 1 This aspect of my job performance is extremely good.
- 2 This aspect of my job performance is Good.
- 3 This aspect of my job performance is neither good nor poor.
- 4 This aspect of my job performance is Poor.
- 5 This aspect of my job performance is Extremely Poor.

47 Your overall job performance.

<input type="radio"/> 1 Extremely Good	<input type="radio"/> 2 Good	<input type="radio"/> 3 Neither Good nor Poor	<input type="radio"/> 4 Poor	<input type="radio"/> 5 Extremely Poor
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48 Your ability to analyse problems.

<input type="radio"/> 1 Extremely Good	<input type="radio"/> 2 Good	<input type="radio"/> 3 Neither Good nor Poor	<input type="radio"/> 4 Poor	<input type="radio"/> 5 Extremely Poor
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49 Your ability to make decisions on the job.

<input type="radio"/> 1 Extremely Good	<input type="radio"/> 2 Good	<input type="radio"/> 3 Neither Good nor Poor	<input type="radio"/> 4 Poor	<input type="radio"/> 5 Extremely Poor
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50 Your ability to find better ways to do the job.

<input type="radio"/> 1 Extremely Good	<input type="radio"/> 2 Good	<input type="radio"/> 3 Neither Good nor Poor	<input type="radio"/> 4 Poor	<input type="radio"/> 5 Extremely Poor
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51 Your initiative on the job.

<input type="radio"/> 1 Extremely Good	<input type="radio"/> 2 Good	<input type="radio"/> 3 Neither Good nor Poor	<input type="radio"/> 4 Poor	<input type="radio"/> 5 Extremely Poor
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52 Your ability to co-ordinate activities on the job.

<input type="radio"/> 1 Extremely Good	<input type="radio"/> 2 Good	<input type="radio"/> 3 Neither Good nor Poor	<input type="radio"/> 4 Poor	<input type="radio"/> 5 Extremely Poor
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53 Your job knowledge

<input type="radio"/> 1 Extremely Good	<input type="radio"/> 2 Good	<input type="radio"/> 3 Neither Good nor Poor	<input type="radio"/> 4 Poor	<input type="radio"/> 5 Extremely Poor
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54 Your attitudes on the job.

<input type="radio"/> 1 Extremely Good	<input type="radio"/> 2 Good	<input type="radio"/> 3 Neither Good nor Poor	<input type="radio"/> 4 Poor	<input type="radio"/> 5 Extremely Poor
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Thank you, once again, for your time completing this survey. Please place the completed survey into your supplied addressed FREEPOST envelope.

APPENDIX D: MULTIPLE REGRESSION RESULTS

Table 6

Hierarchical multiple regression of Job Performance on Sex, Resource Inadequacy, Routine E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R²change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.127	.118
Resource Inadequacy		-.161	-1.73
Routine e-mail use		.100	.109
Resource Inadequacy x Routine e-mail use			.179*
R	.156*	.237*	.297**
R²	.024	.056	.088
Adjusted R²	.018	.039	.065
R² Change	.024	.032	.032

*p<.05, **p<.01, ***p<.001

Table 7

Hierarchical multiple regression of Job Performance on Sex, Resource Inadequacy, Complex E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.158	.157
Resource Inadequacy		-.151	-1.48
Complex e-mail use		-.023	-.024
Resource inadequacy x Complex e-mail use			0.16
R	.156*	.219*	.219
R²	.024	.048	.048
Adjusted R²	.018	.030	.024
R² Change	.024	.023	.000

*p<.05, **p<.01, ***p<.001

Table 8

Hierarchical multiple regression of Job Performance on Sex, Resource Inadequacy, Socio-emotional E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.162	.161
Resource Inadequacy		-.149	-.143
Socio-emotional Use		-.032	-.030
Resource inadequacy x Socio-emotional e-mail use			.053
R	.156*	.220*	.226
R²	.024	.048	.051
Adjusted R²	.018	.030	.027
R² Change	.024	.024	.003

*p<.05, **p<.01, ***p<.001

Table 9

Hierarchical multiple regression of Job Performance on Sex, Resource Inadequacy, Bulletin Board E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.120	.117
Resource Inadequacy		-.123	-.129
Bulletin Board e-mail use		.171	.177
Resource inadequacy x bulletin board use			-.044
R	.156*	.273**	.276*
R²	.024	.074	.076
Adjusted R²	.018	.057	.053
R² Change	.024	.050	.002

*p<.05, **p<.01, ***p<.001

Table 10

Hierarchical multiple regression of Job Performance on Sex, Role Isolation, Routine E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.122	.123
Role Isolation		-.141	-.148
Routine e-mail use		.095	.104
Role Isolation x Routine e-mail use			.082
R	.156*	.224*	.238
R²	.024	.050	.057
Adjusted R²	.018	.032	.033
R² Change	.024	.026	.007

*p<.05, **p<.01, ***p<.001

Table 11

Hierarchical multiple regression of Job Performance on Sex, Role Isolation, Complex E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.151	.151
Role Isolation		-.133	-.133
Complex e-mail use		-.021	-.021
Role Isolation x Complex e-mail use			-.003
R	.156*	.206	.206
R²	.024	.042	.042
Adjusted R²	.018	.024	.018
R² Change	.024	.018	.000

*p<.05, **p<.01, ***p<.001

Table 12

Hierarchical multiple regression of Job Performance on Sex, Role Isolation, Socio-emotional E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.157	.154
Role Isolation		-.133	-.129
Socio-emotional use			.066
Role Isolation x Socio-emotional e-mail use			
R	.156*	.209	.219
R²	.024	.044	.048
Adjusted R²	.018	.026	.024
R² Change	.024	.019	.004

*p<.05, **p<.01, ***p<.001

Table 13

Hierarchical multiple regression of Job Performance on Sex, Role Isolation, Bulletin board use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.112	.114
Role Isolation		-.119	-.114
Bulletin board e-mail use		.183	.180
Role Isolation x Bulletin board e-mail use			.038
R	.156*	.272**	.274*
R²	.024	.074	.075
Adjusted R²	.018	.056	.052
R² Change	.024	.049	.001

*p<.05, **p<.01, ***p<.001

Table 14

Hierarchical multiple regression of Job Performance on Sex, Role Overload, Routine e-mail use and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.123	.127
Role Overload		-.086	-.078
Routine e-mail use		.099	.098
Role Overload x Routine e-mail use			1.67*
R	.156*	.194	.256*
R²	.024	.038	.066
Adjusted R²	.018	.020	.042
R² Change	.024	.013	.028

*p<.05, **p<.01, ***p<.001

Table 15

Hierarchical multiple regression of Job Performance on Sex, Role Overload, Complex E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.154	.156
Role Overload		-.067	-.078
Complex e-mail use		-.016	-.013
Role overload x Complex e-mail use			-.059
R	.156*	.171	.181
R²	.024	.029	.033
Adjusted R²	.018	.011	.008
R² Change	.024	.005	.003

*p<.05, **p<.01, ***p<.001

Table 16

Hierarchical multiple regression of Job Performance on Sex, Role Overload, Socio-emotional E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.159	.160
Role Overload		-.067	-.070
Socio-emotional e-mail use		-.038	-.041
Role Overload x Socio-emotional e-mail use			-.036
R	.156*	.175	.178
R²	.024	.030	.034
Adjusted R²	.018	.012	.007
R² Change	.024	.006	.001

*p<.05, **p<.01, ***p<.001

Table 17

Hierarchical multiple regression of Job Performance on Sex, Role Overload, Bulletin board e-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.115	.113
Role Overload		-.049	-.054
Bulletin Board use		.187	.187
Role overload x Bulletin board e-mail use			-.016
R	.156*	.249*	.250*
R²	.024	.062	.062
Adjusted R²	.018	.045	.039
R² Change	.024	.038	.000

*p<.05, **p<.01, ***p<.001

Table 18

Hierarchical multiple regression of Job Performance on Sex, Role Ambiguity, Routine E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.077	.089
Role Ambiguity		-.295	-.269
Routine e-mail use		.100	.097
Role Ambiguity x Routine e-mail use			.165
R	.156*	.339***	.376***
R²	.024	.115	.141
Adjusted R²	.018	.098	.120
R² Change	.024	.090	.027

*p<.05, **p<.01, ***p<.001

Table 19

Hierarchical multiple regression of Job Performance on Sex, Role Ambiguity, Complex E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.108	.108
Role Ambiguity		-.209	-.291
Complex e-mail use		-.030	-.031
Role Ambiguity x Complex e-mail use			-.002
R	.156*	.327***	.327***
R²	.024	.107	.107
Adjusted R²	.018	.090	.084
R² Change	.024	.082	.000

*p<.05, **p<.01, ***p<.001

Table 20

Hierarchical multiple regression of Job Performance on Sex, Role Ambiguity, Socio-Emotional E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.115	.113
Role Ambiguity		-.290	-.266
Socio-emotional e-mail use		-.044	-.031
Role Ambiguity x Socio-emotional e-mail use			0.98
R	.156*	.328***	.341***
R²	.024	.108	.116
Adjusted R²	.018	.091	.094
R² Change	.024	.083	.009

*p<.05, **p<.01, ***p<.001

Table 21

Hierarchical multiple regression of Job Performance on Sex, Role Ambiguity, Bulletin Board –mail use, and Interaction subjects (n=167), showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.076	.077
Role Ambiguity		-.272	-.284
Bulletin board e-mail use		.164	.164
Role Ambiguity x Bulletin board e-mail use			-.046
R	.156*	.362***	.365***
R²	.024	.131	.133
Adjusted R²	.018	.115	.111
R² Change	.024	.107	.002

*p<.05, **p<.01, ***p<.001

Table 22

Hierarchical multiple regression of Job Performance on Sex, Role Conflict, Routine E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.124	.111
Role Conflict		.095	.069
Routine e-mail use		.105	.098
Role Conflict x Routine e-mail use			-.125
R	.156*	.198	.232
R²	.024	.039	.054
Adjusted R²	.018	.021	.030
R² Change	.024	.015	.015

*p<.05, **p<.01, ***p<.001

Table 23

Hierarchical multiple regression of Job Performance on Sex, Role Conflict, Complex E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.156	.152
Role Conflict		.072	.060
Complex e-mail use		-.012	-.012
Role Conflict x Complex e-mail use			-0.75
R	.156*	.173	.188
R²	.024	.030	.035
Adjusted R²	.018	.012	.011
R² Change	.024	.005	.005

*p<.05, **p<.01, ***p<.001

Table 24

Hierarchical multiple regression of Job Performance on Sex, Role Conflict, Socio-emotional E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.161	.156
Role Conflict		.071	.060
Socio-emotional e-mail use		-.037	-.033
Role Conflict x Socio-emotional e-mail use			-.069
R	.156*	.176	.189
R²	.024	.031	.036
Adjusted R²	.018	.013	.011
R² Change	0.24	.007	.005

*p<.05, **p<.01, ***p<.001

Table 25

Hierarchical multiple regression of Job Performance on Sex, Role Conflict, Bulletin board E-mail use, and Interaction effect, showing standardised regression coefficients, R, R², Adjusted R², and R² change for all subjects (n=167).

Variables	Steps		
	1	2	3
Sex	.156	.115	.112
Role Conflict		.074	.079
Bulletin Board Use		.193	.197
Role conflict x Bulletin board e-mail use			.033
R	.156*	.255	.257
R²	.024	.065	.066
Adjusted R²	.018	.048	.043
R² Change	.024	.041	.001

*p<.05, **p<.01, ***p<.001