

Using electronic mail in the University Environment

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Abstract

The electronic mail seems to be one of the most important communication tools today. Universities can not be out of this reality, due to the activities they are dedicated to in relationship with both teaching and researching. In order to check the real implementation of electronic mail in the public universities from Madrid, we have designed a survey; professor's opinions about their own use and knowledge of electronic mail and other software; and their attitudes to them have been collected. We have put emphasis in some main details such as satisfaction degree and expectations. Various relations have been empirically checked.

Keywords

electronic mail, university professors, technological attitudes.

INTRODUCTION

The implementation of information technologies in Organisations and their strategic consequences have been studied under different perspectives. Porter (1985), Sethi and King (1994); Toraskar and Joglekar (1993) refer to concrete cases of obtaining advantage for an appropriate use of information technologies in the communication processes. For McKeen and Smith (1993), the use of information technology can have effects not only in the relationships amongst organisations but also in their internal relationships. Brown (1995) mentions the investments in strategic information systems as a way for organisations to look for competitive advantages.

Dos Santos (1993) supports the idea that the impact in investments in information technology in the organisation can not be understood in a complete way, by only putting attention to the performance measured in high levels of value creation, since this way, it is difficult to distinguish between applications and uses. To understand the impact of a technology in the organisation, it is appropriate to check how it is being used in the process in which it is being implemented. It is convenient to identify differences between the way information technology is perceived by users as a means to search competitiveness and how this perception is taken into reality.

Information technologies are affecting the way information exchanges amongst different members in the organisations. They allow, in many cases, to substitute the physical contact. Many authors have checked in an empirical way the role of electronic media in the communication (Eveland and Bikson, 1988; Finfholt and Sproull, 1990; Markus, 1994; Rice and Associates, 1984; Fulk, 1993; Sproull and Kiesler, 1991; Trevino, Lengel and Daft, 1987).

Yates and Orliwoski (1992 ; 1994) speak about genres in organisational communication, for example, one memo, a committee or a summary, as typified and common actions socially recognised as a way with a purpose and common determined characteristics. The purpose of communication in a genre is not a private individual aim to communicate but a built and recognised purpose, utilised in some circumstances. For example, the socially recognised purpose of a committee meeting is to discuss, make decisions, delegate or implement some actions related to competencies.

Ricoma (1996) speaks about two types of available technologies for communication in organisations : face to screen technologies and voice and data technologies, where we could include facsimile, electronic mail and voice and mail technologies.

In the last fifteen years, the use of personnel computers have popularised a great number of information services, including electronic mail. E-mail is a way to exchange information in which messages are sent from a personal computer or terminal to other via modem and telecommunication systems.

The usage of e-mail started with ARPAnet (as an Internet precursor) in 1963 and 1970 in the United States, it was gradually extended with the use of mainframes and minicomputers based in local networks in the seventies and had a great increase with the use of Internet in the eighties. Electronic mail in first times was thought as a means for exchanging information for little and selected groups. Actually its use has been extended to million of users all over the world. Electronic mail is the most utilised service in Internet. Since 1970, it has been implemented as a communication tool for academic and personnel relationships. In 1990, the popularity and ubiquity in the electronic mail over the rest of traditional communication means has allowed it to be recognised as a standard way of communication.

Electronic mail allows to send messages by making usage of computerised means. Messages are stored in a personal boxmail. When every user needs to look at their messages, he or she can visualise, warehouse or send again the received messages. The messages that have been sent can be in any kind of format, texts, graphics, images, sound, etc.

OBJECTIVE IN THIS STUDY

In an university field, in which there is an important need to establish communications with main objectives in the research amongst people and workteams, the use of electronic mail is essential. In the Spanish university environment there is not a specific policy for a formal use of electronic mail. In the United States, some initiatives have been developed in relation to this theme, on trying to develop policies for using the tool, by looking for a consistency with mission and university objectives (Anderson et al., 1996).

Although some studies have been developed over the use of electronic mail in private enterprises, it is often more unusual to find work based in the use of this tool by the Public Administration. We consider of interest to know some data related to the use of electronic mail by professors, as it is a group of persons that can clearly influence in the technological training of future workers.

For that, our study, developed in Madrid's Public Universities, has as main objectives:

To develop a brief description of attitudes, use degree of satisfaction and expectations over computer media, specially electronic mail, in the area of study.

To check the existence of relationships amongst some variables in the study. Concretely, we have studied the influence of previous attitude and knowledge towards software packages and their usage.

To show some of main differences and common points amongst various universities in the study.

METHODOLOGY

In order to know main parameters in the use of electronic mail in the university, a survey was sent to the whole population of professors and researchers in the public universities in Madrid (Autonoma University from Madrid (UAM), Complutense University (UCM), Alcalá de Henares University (UAH), Politechnic University (UPM), Carlos III University (UC3M) and Rey Juan Carlos University (URJC)), in the period of November and December 1998, and in the beginning of January 1999, In these universities there are working 13.648 professors and researchers, as last available figures from the beginning of academic year 1998-1999 show.

The survey is divided into five parts, composed by 23 questions. Every part is dedicated to different aspects : personal data, in which main characteristics related to surveyed people are checked, in order to delimitate some e-mail user's profiles; previous attitude, in this part we have tried to know and evaluate which is the main attitude for computers in general and for electronic mail in particular; training knowledge: level about some the most important considered electronic media in order to use them as tools for teaching or researching, and the use of the so called tools. This time, one tries to know in which way one has been able to achieve nowadays degree of use in electronic mail; use of electronic mail, some questions in relationship with degree of use of electronic mail, message content and recommendations about its use are questioned; satisfaction and expectations, in this part we try to know which is the degree of satisfaction that various users show about electronic mail, the evaluation of these communication means and the explanation of some of its main problems.

RESULTS

Descriptive analysis

- General data

The deadline for receiving surveys was closed in a definitive way the first of march. This time, 910 answers have been received, although there are lost values in some of the questions. From this, most part of respondents come from the Complutense University in Madrid, UCM (273, 30,7%), followed by the Autonoma University from Madrid, UAM (166), Politechnic University in Madrid, UPM (163), Alcala de Henares University, UAH (126), Carlos III University, UC3M (118), Rey Juan Carlos University, URJC (43).

As we can observe, most answers have to be with people from the Complutense University in Madrid. This is mainly due to the big quantity of people that work, it is now one of the biggest Universities in Spain. After, we can also check the percentage of responses in every university in relationship with professors, the level of reponse obtained has been over 6%, having reached better indexes the new universities, Carlos III University and Rey Juan Carlos University, together with Alcalá de Henares.

	Complutense (UCM)	Autónoma (UAM)	Politécnica (UPM)	Alcalá (UAH)	Carlos III (UC3M)	Rey Juan Carlos (URJC)	TOTAL
Professors	5863	2034	3182	1149	815	391	13434
Answers	273	166	163	126	118	43	889
Percentage	4,8%	8,4%	5,2%	11,2%	14,8%	11,3%	6,8%

Table 1: Response percentage by universities

If we consider areas of knowledge, the answers have been, Social Sciences (262), Engineering (234), Experimental Sciences (210), Health Sciences (100) and Humanities (103).

Lastly, in Table 2 we can check responses indexes by professional categories (having into account differences in the classifications of these categories in the case of Spain and other English spoken areas. For example, in Spain most associates work full time at the university). The great response index in the generic category “others”, has senior professors, visitors and other contractual varieties, we can even stress assistant professors, that mean more than 10% of total responses.

	Professors in University	Associates in University	Professors in Technical University	Associates in Technical University	Senior Assistants	Junior Assistants	Others
Number of teachers	1505	4411	225	1970	4538	785	116
Responses	129	347	12	97	162	100	44
Percentage	8,57%	7,87%	5,33%	4,92%	3,57%	12,74%	37,93%

Table 2: Response Percentage by professional category

By observing the frequencies of response we could establish a profile of responses. It is on average an associate in university, with nine years of experience in his actual job or similar, he is about forty years old (with a great difference in the Rey Juan Carlos University, which is the newest one).

- Previous attitude to electronic mail and computer media

Attitude to computers and electronic mail is very positive in every case. General values put an emphasis in positive attitudes or very positive in the e-mail, in 96% of answers, having lightly decreased (92%) the figures if we refer to attitude to computers.

The attitude towards computers is positive in all professional categories, except for associate professors, that show a completely positive attitude. In concerning with knowledge areas, again most attitudes are positive ones, except in engineering areas (that it is completely positive). The predominant attitude through electronic mail is, however, completely positive, except in the area of humanities and in the professional category of Professor of Technical University, which is simply positive.

- Knowledge and use of computer tools

We can observe the existence of two groups of computer tools, that we could call simple and complex ones. This way, people asked show in general, high level of knowledge and use in the electronic mail, text processors and Internet, while levels related to digital databases, electronic sheets and mathematic-statistical packages are slightly low. These two groups are characterised by different behaviours: while the so called of “easy use”, knowledge is higher,

the complex ones are generally learnt for their use, in these last ones knowledge and use go together.

Engineering Professors seem to have greater knowledge in all computer tools, and Humanity ones, seem to have lower levels. This difference is repeated constantly in the case of tool use. In the case of text processors, the tool is equally known and used by different knowledge areas, apart from their specialisation.

This difference is reproduced by universities, since practically the whole group of the Polytechnic University. They show a greater knowledge in the use of all computer media. By professional categories, we can stress that those that possess a bigger knowledge in these tools are Assistant ones. In general all categories have an upper knowledge degree in word processors and electronic mail. Technical and University Professors know and use less databases and electronic mail. University Professors use less data bases and Internet in general.

With a great difference in all universities, self-training is the commonest way to acquire knowledge about electronic mail. In the Rey Juan Carlos University, the Polytechnic University and Alcalá de Henares, the percentage is over 50%. There are also, many answers that include a mix in this option with some others, that is, with a brief explanation from friends and known people, with classes in the university or other kind of classes.

- Use of electronic mail

In this part, we try to know about some details in relationship with the use of electronic mail. Mean time in daily use of electronic mail is about 32 minutes (a 27,7% from the answers use it half an hour a day). However there is important to stress that there is a great dispersion (35 minutes), and the presence of a group over 15,5% that daily use electronic mail during an hour or more time. By universities, answers go from mean values about 40 minutes in the case of professors from the Polytechnic University to 23 minutes in the case of the Rey Juan Carlos University.

In relation to the number of sent messages, we can check that in mean numbers, four messages are sent per day, although there is a great dispersion (7,8 standard deviation). A 24% of the people send two daily messages and 22% reply one. Paradoxically, there is a person who admits to send daily 98 messages. Once again, the Polytechnic University is stressed over the rest (6 messages per day), and if we take into account areas, engineering is the most important one.

In relationship with the percentage of messages with a whole laboral sense, more than a third of professors say that all of them are, while only two thirds assure that more than a 75% of their messages are completely laboral. At the same time, almost four of ten professors do not ever send non laboral messages, and only a 25% send over 25% as number of non laboral messages. These figures are slightly better than the ones that have been got in practically all studies that have been developed in firms, since there is a need to take advantage of resources that professionals working in every kind of firms. In any case, and out of this consideration, we have been able to contrast that there is an absolute independence between the variable "use of electronic mail" and number of strictly laboral messages (that it is, the first one do not condition the second one). Rey Juan Carlos University mix two curious faces, as it is the major number of strictly laboral messages and the greatest quantity of messages with a non laboral character. By categories, professors from University represent the biggest percentage of strictly laboral messages, while assistants and others are the ones that less percentage represent in this study.

About half of people in the study states that all their messages arrive into destination, and most part of rest of answers signal that there is a little number of lost messages. The less percentage of lost messages come from Engineering (hardly the biggest number of messages by mean), against Humanities. In our opinion, this could have a relationship with the technological training of the different groups.

On forgetting the answers that state that it is an opinion, it seems to be a greater of favourable opinions that opposite ones. The answer to that question is quite uniform by Universities and knowledge areas, although there is a great divergence by categories. We can stress that Technical University Professors mainly perceive that the sense of humour is a waste of resources and time.

- Satisfaction and expectations

In the last part of the survey we have tried to know about advantages and problems derived from the use of electronic mail in this environment, and this time be sure about the perception of asked people about the security problems in networks and to know other opinions.

	Complutense University (UCM)	Autónoma University (UAM)	Polytechnic University (UPM)	Alcalá de Henares University (UAH)	Carlos III University (UC3M)	Rey Juan Carlos University (URJC)	MEAN
Existence of rules about electronic mail	6,20%	12,90%	11,70%	6,70%	33,30%	0%	11,90%
Knowledge over control of messages	16,50%	35,40%	44,90%	10,50%	41,10%	29,30%	37,80%
Knowledge about security measures	9,40%	19,80%	20,30%	20%	51,60%	26,30%	27,70%
Consideration of electronic mail as a secured technology	49%	54,20%	49,40%	54,20%	67,30%	46,30%	53,40%

Table 3: Satisfaction and expectations over electronic mail

Electronic mail, is generally considered as a secured communication tool. We can stress the case of the Carlos III University, that presents a better knowledge about the existence of security rules and measures over electronic mail. In the other hand we can observe that most professors do not know about the existence of controls in the contents of electronic mails. It is important to check that in the Rey Juan Carlos University none of the professors know of any rule over electronic mail use, although one important part of them employ security measures.

Tables 4 and 5 show frequencies got in the advantages and disadvantages of electronic mail that have been stressed as more important by participants.

ADVANTAGES	Complutense University (UCM)	Autónoma University (UAM)	Polytechnic University (UPM)	Alcalá de Henares University (UAH)	Carlos III University (UC3M)	Rey Juan Carlos University (URJC)	TOTAL
1.- information quickness	184	91	134	120	129	40	698

2.- few confidentiality or privacy	180	34	56	13	12	33	328
3.- file transfer	58	12	107	51	13		241
4.- costs	98	18	41	14	30	15	216
5.- comfortability	30	13	13	54		15	125
6.- versatility	55	13	12	5	13		98
7.- communication	14	13	36	15	4	12	94
8.- security	13	12	12	14	3		54
9.- messages storing	12	1		8	2		23
10.- manager simplifier		13	1		3		17

Table 4: Advantages of the use of electronic mail

The main perceived advantage is the fastness in the communication, recognised by 700 responses (from the total 889 received). Besides there are some important considerations as for example, simplicity and easy use, the possibility to send other files and a low cost. In relationship with problems appeared as a consequence of electronic mail use, it has been stressed by priority order:

PROBLEMS	Complutense University (UCM)	Autónoma University (UAM)	Polytechnic University (UPM)	Alcalá de Henares University (UAH)	Carlos III University (UC3M)	Rey Juan Carlos University (URJC)	TOTAL
1.- many different softwares	199	55	53	12	13	13	345
2.- few confidentiality and privacy	149	13	28	46	15	12	263
3.- high timetable dedication		14	36		36	34	120
4.- some messages do not arrive	36	35	2	17	13	13	116
5.- impersonality		55			3	3	61
6.- publicity	12		34	1	13		60
7.- lost of information		13	36	2			51
8.- viruses			35				35
9.- delays	3	1	13	2		14	33
10.- it has not problems	12	13	1	3	1		30
11.- lack of generalised use	13	13	3				29
12.- difficult access	12			1	2		15

13.- failures, technical problems			5				5
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Table 5: Problems in the use of electronic mail

The biggest disadvantage about the use of electronic mail is the existence of various programmes that manage the tool, this can make it more difficult the understanding and weakly modify formats. There are also answers related to confidentiality or the need of time. To solve some of these problems, two are the main security measures mentioned in the answers : antivirus and the use of key words.

The quantity of perceived advantages in the users, is often close to the double of the inconveniences, where we can conclude that there is a high satisfaction in the use of the electronic mail. Professors consider it as an agile and inexpensive way of transmitting information, that makes it easier some communications although in some cases, with lack of confidentiality.

The possibility, even the legality of an eventual received and sent message control by email is a controversial. Next table collects answers to these questions, classified by universities and grouped in more positive, medium, less positive.

First to say about the achieved responses is that the question has not been indifferent to most people. The existence of more answers that received surveys implies that expressed opinions are complex, specially when they don't agree with the control, since professors keep different arguments. Specially significant it is the existence of a group that supports the control of messages when they are professionals, specially in an environment like the university one where confidentiality in some research is crucial.

Most part of favourable opinions about the control of electronic mail are based in the waste of time it generates some time, while most contrary efforts keep the idea that it is a violation to intimacy rights, in comparison with for example, a phone conversation.

As a conclusion in this part, we can affirm that electronic mail is, in general, evaluated in a positive way although some disadvantages are still perceived ; professors don't consider the tool as a futuristic one but as a present element to use.

Correlation study

Now, we proceed to the study of correlations, before the formulation of some hypotheses in the paper.

There is a significative correlation (over 59%) in the attitude towards computer media and towards electronic mail. It is a logical relationship, due to the fact that the time employed is the same (in the computer), and the electronic mail keeps strong relationships with some computer tools (as for example, text processors to send messages).

Slightly less, although also significative is the relationship amongst attitude and knowledge towards electronic mail, closely aligned with the psychological theories about computer media. In the same situation the relationship between attitude towards electronic mail and its use (close to 50%) is found. Finally, in the same group, although slightly upper is the relationship amongst knowledge and use of electronic mail.

To contrast in certain way the veracity of the before statements, we can observe that, although less, there is a certain correlation between knowledge of electronic mail and time dedicated to

its use (26%). Apart from this, the mean time of electronic mail usage is related with the number of sent messages, although only at the 16% level.

The before established relations in concerning with electronic mail have also been applied to the rest of computer media. In this sense, there are strong relationships (over 75%) in the knowledge and use of internet, digital databases and statistical packages. We can explain these high correlations, specially the last two ones, due to the difficulty in the learning of these tools, that are only going to be justified if they are going to be utilised.

The degree of knowledge over internet is also positively correlated with the use of electronic mail (53%). Besides, due to the possibility of building electronic mail by Internet, this relationship is supported since both technologies belong to the telematic area.

As some curiosities, we can stress the strong negative correlation (about 54%) between the age of the people surveyed and the percentage of messages with a non laboral content. Most part of these messages with no laboral content are sent by the youngest people.

Formulation and hypothesis contrast

Having into account the Theory of the Reasoned Action (Fishbein and Ajzenis, 1975), attitude shows the quantity of affection that one person feels “towards or against” some object or behaviour. Attitude of a person in relationship with information technology is referred to the fact if the person feels that information technology is positive or negative. Davis et al. (1989) find that the the feelings people have towards information technology is positive or negative. Davis et al. (1989) find that people attitudes to the use of information technologies is directly related with the perception these persons have about the technology. Orlikowsky and Gash (1994) maintain that the knowledge people have on the technological behaviour is critic to understand the interaction.

From these theories we can directly derive the following hypotheses :

H1 : There is a direct relationship in the attitude people have towards e-mail and the knowledge of it.

H2 : There is a relationship between electronic mail knowledge and use of electronic mail.

H3 : There is a direct relationship between attitude towards computer media and knowledge of computer media.

H4 : There is a relationship between knowledge and use of computer media.

In the same way, we can affirm that electronic mail keeps a narrower relationship with some computer media than with other ones. This way, due to the fact that most sent messages today have a high textual content, we could relate knowledge of text processors with e-mail use. In the same way, with the same origin and certain convergence of technologies we can postulate a relationship between internet knowledge and electronic mail use. These opinions are supported by the correlation study we have developed before.

H5 : There is a direct relationship between text processors knowledge and the use of electronic mail.

H6 : There is a direct relationship between internet knowledge and the use of electronic mail.

Apart from these hypotheses, directly derived from the theory and the observation, we will have the opportunity to contrast the existence of some other relations and variables conditioning.

For the contrast of the beforementioned hypothesis ANOVA (variance analysis) has been utilised . In all cases the null hypothesis of mean equality has been refused. This way, the relationships between attitude and knowledge in one hand, and knowledge and use of electronic mail with the rest of computer media in the other hand have been checked. Now, we indicate signification levels in the case of the electronic mail.

Relationship	F. Snedecor	Significance level
Electronic mail attitude towards electronic mail knowledge	40,23	0,000
Electronic mail knowledge towards electronic mail use	212,11	0,000
Internet knowledge towards electronic mail use	53,29	0,000
Text processors knowledge towards electronic mail use	16,77	0,000

Table 6: Values in the variance analysis

A very interesting and surprising argumentation at the same time is, however, that it has been impossible to check the existence of a direct relationship between attitude and use of various computer media, including the electronic mail. This way we have achieved the conclusion that the initial perception of a media is only related to the real use through the learning of the tool, the knowledge acquired. The second group of hypotheses (5 and 6), related to the relationship amongst different media, have been already checked, so we can affirm that the most related computer software with electronic mail are internet and text processors. Some characteristics in common have already been indicated, but we could add some others, as the easy learning of these tools, in general self-made, or universality in the subjects.

CONCLUSIONS

In this paper we have tried to develop a brief approach to the use of electronic mail in the public universities in Madrid. For that, we have started by considering the knowledge of a relevant part in theory towards this communication media, and we have contrasted it with data collected in the developed survey.

There is a positive attitude towards electronic mail. Only some inconveniences such as the absence of a generalised standard or lack of confidentiality avoid a plain use to some persons. We consider that the use will be increasing as user's technical training increases too, and with the development of security tools too. We must, however stress the existence of some significative differences by universities, knowledge areas and professional categories, that we consider that tend to be reduced in time.

As future research papers, it should be interesting to compare the obtained results in this work with the ones that can appear from similar studies performed in private universities, in the students of both types of universities and in other people working for the Public Administration. Another important study to develop could be the comparison of data obtained in the this study with data collected from firms that operate in our country, as we think some interesting differences can be found.

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