

Implementation of an Electronic Report Viewing Application for multi-cultural users

Diane Norton

IT Consultant, P.O. Box 112, Menlyn, 0063, Pretoria, South Africa.

Tel: 27-826537390, dinorton@global.co.za

ABSTRACT

Is it necessary to customise computer interfaces for South African users from different cultural groups who work on the same computer system in a corporate environment? This question is addressed by a combination of a literature review and testing the ideas in a case study in a South African financial institution.

The research used a sample of 28 people from a total user base of approximately 240. They represented a range of cultural backgrounds, and computer experience. The research took place during the pilot of the implementation of an Intranet report viewing product.

The evaluation is primarily based on the completion of questionnaires six weeks after the introduction to the pilot system.

Both components of the study suggest that customized user interfaces may not be necessary for users of the same computer based systems in South African businesses.

Keywords

User interface, interface design, multi-cultural usability, interface customization.

INTRODUCTION

The title of this conference, "Empowering South African users through usable Information Technology" suggests there are two focus points:

- 1) To provide *users with the skills* to use technology
- 2) To ensuring that the technology is "*usable*" for

ACM Copyright notice:

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honoured. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee

CHI-SA 2001, Pretoria, South Africa

Copyright © South Africa ACM Chapter 2001

South Africans.

This paper discusses the need for customization of the user interface for users of different cultural backgrounds, and tests the usability of an Intranet product for use by multi-cultural South Africans in a corporate environment.

The term "user" will refer to South Africans working in a corporate environment, who have a need to use technology, and more specifically computers.

The following questions will be explored:

1. Do South African corporate users from different cultural backgrounds, working towards the same goals, with the same computer systems, need customized user interfaces?
2. Can the difference in ability to adapt and use new technology be attributed more to computer literacy, training and experience with technology than traditional cultural background.
3. Can corporate technology users in South Africa be regarded as belonging to one culture?

In the above points *user interface* refers to the look and feel of the application, the usability of the screen, icons and features of the system.

Usability includes the above, but is broader than this, and includes other factors such as availability of the system, the speed of the network, and the impact on the work processes.

The above questions are posed in the light of the challenge that HCI (Human Computer Interaction) faces "to value and encourage diversity while communicating and working together effectively" [10].

THE IMPORTANCE OF HCI IN THE CORPORATE ENVIRONMENT IN SOUTH AFRICA

Consideration for ensuring good quality human computer interaction, particularly starting in the early stages of application design and development, does not attract a very high percentage of the investment that is spent on IT (Information Technology) in this country. Management do sometimes listen to users who complain about usability of systems, but often this is too late, and only minor modifications can be achieved.

In the author's experience there are also cases of insufficient training and change management for the implementation of new systems. A contributing factor is that the budget is often cut in this non-tangible part of the project.

The cost to the company of users being unable to use expensive IT systems effectively is difficult to measure and not widely recognized in South Africa.

In some cases management have unrealistic expectations of how quickly and easily the users will learn to use a new application. The users then feel they are left to cope as best they can.

PERSPECTIVES ON CULTURE

Before being able to address the impact of culture on Human Computer Interaction, it is necessary to determine what is meant by "Culture".

People carry patterns of thinking and potential behaviour which they have learnt from early childhood. These are termed mental programs, the source of which lie in our environment. A term for these mental programs or software is "culture". Culture is learned, not inherited [6&8].

Cultural patterns prevailing in society are reflected in the attitudes and behaviors of the members [2] Culture is referred to as the meaning that underlies routine and behaviour in everyday working life [19].

Cultural differences manifest themselves in things such as symbols, heroes, rituals and values. Symbols, which are the most superficial, include words, pictures or objects that carry particular meaning, which are only recognized by those who share the culture. There can be a transfer of these between cultures. Rituals are activities that are socially essential, while values, which are the inner core of culture, are tendencies to prefer certain states to others *e.g.* what is good versus evil? These influence the way people will behave in certain situations [6].

The area for concern in Human Computer Interface design are the symbols and common meaning of things. Values on the other hand will determine how people may react to authority, change and the introduction of new work methods and technology.

Culture differences between countries

There are a number of references to cultures differing between countries. In the 1970s and 80s, Hofstede did research on the values of people working for IBM subsidiaries in over 50 countries, according to a number of dimensions. The result of this work indicates that each country has one dominant culture [6]. This is supported by Yeo who suggests that cultures appear to be associated with national boundaries [19].

Although the Arab Gulf Countries (AGC) consist of six Arab states, Al-Abdul-Gadar maintains that there are sufficient similarities between them to warrant discussing them as a whole from a cultural perspective in relation to managing computer based information systems [2].

Hofstede's dimensions are referred to in various literature consulted for this paper. The following section includes a short description of each dimension [1]. South Africa's position on these dimensions, together with those of the Arab Gulf States, will be discussed in relation to that of America, the country that produces considerable software and the UK, where the application used in this study was developed.

1. *Power Distance (PD)*: A high power country has a strong centralized government, tall organization hierarchies and inequality is expected, while low power countries have flatter hierarchies, more perception of equality. The cultural effect on interface design is linked to access to information, importance of security, focus on logos etc
2. *Collectivism vs Individualism*: Individual cultures value time, freedom, challenge and extrinsic motivators, while collective cultures value training, physical conditions, skills and intrinsic rewards for mastery.
3. *Femininity and Masculinity*: In masculine cultures the traditional distinctions are strongly maintained while in feminine cultures they tend to collapse the distinctions and overlap the gender roles. Both genders may exhibit similar feelings and behavior.
4. *Uncertainty avoidance (UA)*: Cultures with a high uncertainty tend to be expressive, raise voices and show emotions, and shun ambiguous situations. Low UA cultures tend to be less expressive and less openly anxious. An example of this in web site design is that British Airways' site offered more choices, multiple interface controls and a much more complex screen than Sabena Airlines (Belgium).
5. *Long vs short term orientation*: Long term orientation, which is important in Asian countries, shows an orientation towards practice and search for virtuous behaviours, while western cultures are orientated to believe in and search for the truth.
 - High long term focus puts the emphasis on relationships for the source of information and credibility, as well as patience in achieving results and goals.
 - Low long term focus puts emphasis on rules for the source of information and credibility, and people expect immediate achievement of goals.

South Africa was not rated on this dimension as it was only added to the study later.

On these evaluations Al Abdul suggests that, compared to America where most of their technology comes from, the AGC countries have greater power distance, more uncertainty avoidance, less masculine values and less individualism than America [2].

South Africa has scores which are closer to those of America and the UK than the AGC countries. South Africa was ranked as a low power country, with a score of 49, America was 40 and the UK was 35. South Africa's score for Individualism was a little lower than the other two countries. South Africa had a score of 65 while the UK score was 89 and America 91. On the Masculinity index South Africa ranked 13 with a score of 63, Britain had a score of 66 and America 62. For uncertainty avoidance South Africa had a score of 49, Great Britain was 35 and America was 46 [1]. It is therefore suggested that in terms of these dimensions South Africa's culture is similar to those two countries which in the past have been the main suppliers of technology to South Africa.

Computers have had a significant affect on culture as they have increasingly replaced certain human mental processes. Computers have fundamentally changed the relationship between people and work, and therefore affected the economic system and the structure of society as a whole [7]. In discussion of the diffusion of technology into the Arab Gulf Countries, it is said to be unfortunate that the introduction of technologies are sometimes accompanied by their cultural side effects, which could dominate local customs and traditions [2].

This suggests that computers and technology have an influence on the culture of countries, which may vary between countries, depending on their level of adoption of technology.

CULTURAL CONSIDERATIONS FOR COMPUTER INTERFACE DESIGN

Impact of language, symbols etc.

Language: It is not always possible or appropriate to translate interfaces [11]. Studies done by Griffith in 1994, are cited, which conclude that people learn and progress faster if they can interact with computers in their own language [19].

Symbols, buttons, icons: Examples of criticisms of the use of symbols in computer user interfaces is the well-quoted "trash can" that does not look like the trash can in common use in many countries [19].

Focus on the goal to be achieved

Nielsen suggests that an important consideration in interface design is to focus on what the user will want to do with the system [14].

The differences in the trends and tendencies in different cultures should not be treated as deficiencies in a multi-cultural world, but that it is necessary to co-operate to *achieve practical goals* without requiring everyone to think, act and believe identically [1]. Surviving in a multi-cultural world is not about people that think, feel and act in the same way, but rather about people that need agreement on practical issues, and cooperation [6].

The need for CUI, PUI customization

Yeo motives the need for a Culture User Interface (CUI) and a Personal User Interface (PUI). This is illustrated in examples of the very different symbols that were chosen by New Zealanders, Americans and Malaysian when asked to choose a symbol to depict sport, gardening, and stamp collecting [19].

It is suggested that if companies want to do international business on the web they should consider the impact of culture in the understanding and use of web-based communication, content and tools [1]. This is illustrated with examples of websites from different countries in relation to Hofstede's dimensions. An example is on the dimensions of collectivism and individualism. A comparison was done on websites for national parks in two different countries. In the USA the focus is on visitors, their goals and reasons for visiting the park, while in Costa Rico the site downplays the role of the tourist and emphasizes a slogan which is based on the national agenda [1].

The differences that they refer to and illustrate in their examples indicate a need for customization of web pages for different audiences from different countries.

The question, however, is how much of this customization is necessary for the usability of the interface due to cultural differences, or differences on content and presentation because it is a marketing medium. It is well accepted that marketing messages should be narrowly focused on the target population to be successful.

In the last ten years the Client Server GUI (Graphic User Interface) has made navigation easier especially compared to the command line of mainframe systems. With the advent of Web Browser users can easily learn to use it and the interface is similar regardless of application [17]. This would suggest that some applications are easy enough to use for all users with the necessary understanding of the Web Browser navigation and a common spoken language.

A computer/technology culture?

Is there not a computer/technology culture or sub-culture that uses a language, symbols, values and protocols for behaviour, which are understood by its members (users) throughout a country? Does this not also apply at a general level to users throughout the new global economy, irrespective of their country of origin?

In other definitions “culture” is seen to have four distinct yet inter-related meanings [10]. These are:

1. Differences on work values and customs for different countries.
2. Different schools of thought within a field
e.g. HCI.
3. People trained in different disciplines
e.g. engineering vs computer science.
4. Cultural gaps between researches, developers and end-users.

It is also suggested that the introduction of computer systems creates new cultures in that users of Mac and Unix systems could even be considered separate cultures [13].

Computer users within a country would certainly be talking the same “language”, using terminology which is often totally unintelligible to non-users.

English has become the international spoken language for technology and to a extent for business. This is the case in South Africa, a necessity with its 11 official languages, This does make it easier for South Africans to understand and adopt technology from other English speaking countries.

The common understanding of the computer culture would also include graphic, icons and symbols, functionality, and behavioral norms. Members of the computer culture would have very different work behavior and habits than non users.

It is suggested that the trash can is recognized throughout the world by computer users [5]. People belonging to the computer culture learn the meaning of this as well as the functionality behind it. From there does it matter if it looks like the rubbish bin you have in your office or not?

The following is an example of the technology language, also called “jargon and acronyms” that users do not always understand the origin of. The author has on numerous occasions set up mail setting on a computer using the term “SMTP”, not knowing what it stood for, but knowing that it is used for an outgoing mail setting. Had I realized it stood for “Send Mail To People” it would have made more sense and easier to remember, but the task was still completed. The same abbreviation or technical term is probably used for this purpose in non-English speaking countries, as this is an international computer communication standard. The

origin of this, like the “trash can” escapes them, but they know that SMTP is the setting for outgoing mail. It would help to understand the terms if we knew the origin, and may find them if we took the time to look up the words in a computer dictionary. There are however so many terms and concepts in this new world of technology, that it is not practical for all human computer interfaces to fully explain these in a way understandable to all users irrespective of their level of technology awareness. It would also irritate the advanced users.

A new language has been born that contains words and symbols with their own meaning and purpose understood by members of the computer culture and sub-divisions of the computer culture, irrespective of their origin.

The understanding and expectation of how the computer will react to an instruction is part of computer literacy which is the level of adaptation that a person has to the computer culture.

It is felt that computer literacy and familiarity with an application which work under the known operating system *e.g.* Windows will enable the user to easily learn to use another application within the same environment, using similar navigation principles. It is also suggested that a user familiar with applications in one environment/operating system will be able to learn another more easily than a person that is not at all computer literate or had no exposure to computers.

Therefore all exposure and computer skills add to a person’s general level of computer literacy, enabling them to adapt to new interfaces and functionality more easily. There is however a need to find the balance between customizing user interfaces and the ability that people have to learn.

In motivating the need for CUI it is suggested that it is possible to maintain the functionality of an application while the user interface changes for different cultures [19]. This may work for some applications. In other applications it is not enough to change the interface on its own, and that applications need to be re-developed for different cultural groups [13]. There is merit in this as in some applications the front end is linked to the logic of the application and just changing a few icons and layout will not meet the differences in the cultural way of working, reasoning and problem solving.

A lot of attention in the HCI field is presently directed towards appropriate standards for internationalization of computer applications and interfaces [5,9,18].

Cultures are not mutually exclusive. A person can belong to a number of different cultures [6 &19]. In this context it is certainly possible for a person to belong to

the South African culture, their home language or religious culture, and to the computer culture.

Usability of Interfaces for South Africans

South Africa has a multi-cultural/ multi-racial population and has a history of lack of opportunities for certain of these groups. These include lack of access to general literacy and computer skills. There is also a requirement in South Africa at the moment for previously disadvantaged, less literate and older people who have had limited exposure to technology, to be able to use technology.

When considering the meaning of culture for human computer interface design in South Africa it is necessary to look at present and future South African computer/technology users.

A large proportion of South Africans from all races and cultures who have access to computers, have this access at work. There are standards for functionality in applications that are accepted/expected by users based on their previous experience with computers.

The vast majority of South African computer users have more exposure to Windows than any other standard. In the PC environment in South Africa, corporate users are most familiar with the Windows operating environment, Microsoft Office, and the Internet Explorer interface and functionality. Macintosh computers were not freely available or well supported in South Africa for a number of years. Now they are primarily used by advertising agencies and some academics. Unix/Linux is not widely used in a desktop environment.

Decision makers with regard to development or purchase of software, should take this familiarity with the Windows environment into consideration when evaluating an interface and its usability for the South African multi-racial computer users.

Although it is suggested that the spoken language of South African technology users is English, there are cases in which the interface does need to be translated into the user's first language. These include:

- education purposes where computers are used as a method of educational instruction.
- interfaces used by large numbers of people, as is the case in a bank ATM. Standard Bank offers the choice on their ATMs between English, Afrikaans and Zulu, and are planning to add some of the other official languages.

Can we expect computer users to use interfaces similar to these standard ones, provided they are evaluated as "usable" for the South African cultural group? Or do they need further customization to cater for the different traditional cultures in South Africa?

A study done in Botswana, one of South Africa's neighboring countries is of relevance here. The results of that study indicated that 57% of the respondents would welcome a localized interface, although the private sector were less supportive of this and the rural centers more supportive. Only 25% wanted to use the local official language for computer interface commands. There was also a poor response to the preference for localized icons, which were no better understood than the Windows default icons. It was suggested that the interpretation of icons used in computer interfaces were perhaps regarded as part of learning how to use the new technology. Searle [16] suggested that members from different cultures may understand something in similar ways if they share the context within which it occurs. This is relevant in this study, since English is the platform for expression at the office which is also the context for the use of computers [16].

CASE STUDY: ELECTRONIC REPORT VIEWING IN A SOUTH AFRICAN FINANCIAL INSTITUTION

Description of the system

The product used in this study is called NetQM, developed in the United Kingdom. It is a purchased client server product using a Web Interface accessible from the company Intranet. It has the ability to store and provide viewing of an electronic version of reports traditionally printed on paper. It includes a number of features to help users view reports and find the relevant information as quickly as possible.

The features include the ability to :

1. Easily navigate to view the report on screen.
2. Search for specific entries.
3. Print single or multiple pages.
4. Send single or multiple pages as an email to someone who does not have access to the system.
5. Make notes linked to a page on the report.
6. View notes any other user has made on a report.
7. Select back copies of a report from a calendar indicating the days on which a report is available.
8. Use double views of a report to easily compare different parts of the same report.
9. View different reports at the same time.
10. Do queries provided the report has been specially formatted to enable that.
11. Export the above queries to another application *e.g.* Excel.

The menus are defined so as to provide quick access to the reports. The menus are structured according to the reports used by the different business units and further split according to the frequency that reports are generated. Users do not have excessively long lists of reports to work through to find what they need.

Scope of the study

This study uses the “action research” approach, which is defined as “research that involves practical problem solving which has theoretical relevance” [12]. It focuses on the increase of knowledge and improvement of the work [12]. Action research is directly involved in planned organizational change. It emphasizes collaboration between researchers and practitioners [3].

Action Research also supports the “socio-technical” approach in which technology should not be allowed to be the controlling factor when new work systems are implemented. This approach also advocated that users should be involved in the design of new systems for their own processes [12].

In this study a questionnaire was used to determine if there were any differences between members of different cultural groups in their ability to learn and effectively use the NetQM application interface. The study also considered the usability of the product in a broader sense, by investigating the impact on how the task is performed and on the productivity of the users. The study took place in the analysis and pilot testing phases of the implementation of the project within the financial institution.

Analysis and Pilot Phase

The purpose of the *Analysis Phase* of the project was to determine the feasibility of implementing an electronic report viewing application for certain administrative departments. These departments used a specific mainframe system that generated the reports to be converted from a paper environment to an electronic delivery environment. The cost justification of implementing the system was one element of the analysis. The NetQM product was also reviewed by the author against 10 Usability Heuristics put forward by Nielsen [15]. The average score on these dimensions was over 4, indicating good usability.

This was complemented by consultation with the users to determine if and how their work processes may change to take advantage of the functionality of this particular application. The application had previously been implemented elsewhere in the organization. The implementation of this application in the organization is part of a company drive towards using less paper and a continual long term reduction in costs.

The consultation took place with a multi-cultural group of users who would make up the pilot group and form the sample throughout this study. The application was introduced to these users, using a demonstration of the system to small groups according to functional department structures. Within these small groups the feasibility of implementing it in their environments was discussed. This was followed by one-on-one interviews to further discuss which reports they used, and how they use them. The potential impact of having the reports on

screen instead of on paper was discussed further in the light of the processes they use for handling their specific reports. The users were asked if they envisaged any practical constraints to implementing the technology for their environment.

One of the purposes of the *Pilot Study* from Management’s point of view was to determine how much assistance the users need to be able to use the application. This would help determine what the training requirements would be for the full implementation for all the users. The other purpose was to determine if there were any potential problems with regard to the usability of the application in that environment, for those users, which would be a good test for usability for all the users.

The pilot study included providing users access to one report on NetQM for a few weeks. They still had the printed version available during the pilot phase.

This enabled the implementation team to determine if there may be any utilization problems, without jeopardizing the business. The report chosen was one of the most difficult in terms of the process surrounding it. It was felt if that was successful then it could be assumed that the new method of delivering reports would also be appropriate for the other reports.

Super-users were selected from the different business areas in the various geographic locations. The role of these super-users was to train and support the users in their departments to use the application. Towards the end of the pilot study the super-users from around the country attended a one day formal training session on how to use the application. The role they would play in the change management in their areas was also discussed.

Once all the reports are implemented on the system all users will be trained by the super-users, who will also provide ongoing support. The new report viewing application will run in parallel with the old method of printing the reports for a further two months for all users. It is recognised that people need to learn and adapt to the user interface, functionality and a different way of working that is required by the introduction of the new technology.

The use of the product is task related, and focused on the goal to be achieved. This supports Nielsen who suggests that a critical part of usability is linked to what the person needs to do with the system. These include characteristics of software that could assist in achieving the goal and sub-goals more efficiently [14].

Methods of Evaluation

The study was based on a sample of 28 multi-cultural users from the Gauteng Office, who represented a total population of 240. It was only possible to use a small

sample, as this study was based on the pilot study for the implementation. There are a further 1200 users of the electronic report delivery application for viewing reports from other systems in the financial institution.

Although this is not a random sample it is broadly representative of the total population. The users in the study included members of all levels of report users for this system within the business.

The level of computer literacy was determined through the completion of a questionnaire, plus informal observation during the analysis phase and implementation of the pilot study. The users who participated in the pilot study were also requested to complete an evaluation questionnaire of how easy it was to use the different features of the report viewing application. Information was also collected on their traditional culture background and what their main country of origin was, as well as an indication if they felt it was necessary to customize the interface for users from different cultural backgrounds.

Results

Demographics of group

It was not considered appropriate to ask direct racial questions in the questionnaire, and therefore cultural background was determined from aspects such as home language, family country of origin, and length of stay in South Africa. The outcome of questions posed to the users in the sample indicated that all except two had lived in South Africa all their lives.

The results (Table 1) suggested that four spoke one of the black languages at home, six were from an Indian cultural background, four were from mixed or so-called "coloured" background and the rest were white. The last group included two people with an Eastern European background.

Customisation of Interfaces

The question was posed "Have you encountered any problems interpreting the application or any other user interface (screen display and functions) due to cultural issues *e.g.* the meaning of icons that are not clear." 75% of the sample answered "no", while all the others did not reply. The latter responses were from users who had used the interface less than the others. When asked if they feel interfaces should be customized for different cultures 53% said "no", 21% indicated "yes".

The answers suggested that people with cultural backgrounds that can broadly be described as "Indian" or "coloured" showed no difference in their responses from the "whites". However, all four of the people speaking a black language as their home language answered either "yes" or "not sure". Examination of the responses suggests that this group generally had low computer literacy skills, and had hardly used the

interface. It is not clear whether the response reflected the need for more skills or real need for customization.

The reasons given for saying "yes" included the broader issues of the need to recognize different cultures, as well as ensure that people from all cultures have the opportunity to access technology.

Some of those that indicated yes were also included in the 21% who indicated that they felt they needed training to use the application and understand the icons. Discussing the perceptions on this with some of these users indicated that they did not need a separate interface as much as an opportunity to learn what the icons meant. This is supported by a similar interpretation in the Botswana study mentioned earlier [16]. 10% did not answer this question.

The reasons given by some of the users for *not* customizing the interface was this would make training and support as well as the ability to help each other more difficult. It was also mentioned that customization was too costly and not necessary as the users working within the institution were literate in English. Some users indicated that they felt this application and others used by the institution were very usable across cultures, but that customization of fonts, thesaurus and spell checks should reflect the diversity. Other users felt that the ability to use the application relied on computer literacy and training. Being able to use international software was also seen as an advantage as these would be transferable skills.

All members of the pilot group were familiar with computers and need to work with them in their daily tasks. Their main exposure had been to mainframe systems although these are presented via the Windows operating system on the desktop. The users had varying levels of exposure to Windows functionality.

Computer literacy evaluation

The results of the computer literacy questionnaire indicated that 13 users evaluated their knowledge of Windows and Microsoft Office as "not used/beginner", while 11 were "beginner-competent" or "competent" with only 3 users feeling they are "advanced" users. This was supported by the author's informal observation of the users during the pilot testing of the application, where the average Windows and Intranet computer literacy level were assessed as medium-to-low.

During the group discussions in the analysis stage many users indicated that they had not used the Intranet or Internet. It was thus surprising that many indicated in the questionnaire that they use it for more than two hours a month. This reply could be influenced by the fact that they are supposed to use it.

The responses in the questionnaire with regard to the number of years they have used computers and the

amount of computer training they have received related to their feeling of competence on the Windows and MSOffice environment. The users who rated themselves as “competent” or “advanced” in their Windows skills all found the report viewing application relatively easy to use, giving it an overall rating of between 3 and 5, on a 5 point scale. A number of users who were less confident in their Windows skills also rated it high with regard to ease of use. The average rating of ease of use by all users was 3.9, indicating broad support for the system.

Use of NetQM

The number of times that the users had used the application appeared directly related to their rating of ease of use, suggesting that once they do try and use it for a while they will find it easier to use. Note the users in the pilot study had not attended a training course and had received only minimal assistance as they asked for it.

The informal observation also showed trends that indicated that the users who struggled with learning the new application were those who were less computer literate.

Table 1 User responses to questionnaires

Demographics			Computer use				NetQM use		Feedback on NetQM				
Designation	Home language (1)	Country of origin	Used computers	Number computer courses attended	Competency - Windows and Office (2)	Use of intranet/ internet per month	NetQM Frequency of use (3)	NetQM training (4)	Avg. ease of use (5)	Overall ease of use (6)	Benefits (7)	Problems with interface (8)	Want interface customized (9)
clerk	S Sotho	SA	5-10 yrs	0	beginner	2-10 hrs	3 times	2	3.7	3	yes	no	yes
clerk	Zulu	SA	5-10 yrs	2	beginner	0-2 hrs	twice	2	4	3	yes	NR	not sure
clerk	Sotho	SA	5-10yrs	3	not used	now & then	none	1	NR	NR	NR	no	yes
?	Zulu	SA	+10 yrs	0	NR	NR	daily	3	2.6	NR	yes	no	yes
supervisor	Indian dialect	India	+10 yrs	8	advanced	+10hrs	daily	1	5	5	yes	no	no
operator	NR	India	+10 yrs	1	comp/beg	2-10 hrs	none	1	NR	NR	yes	no	no
clerk	Eng	India	2-5 yrs	0	beginner	now & then	none	1	NR	NR	NR	NR	yes
CLO	Indian dialect	India	+10yrs	6	competent	+10 hrs	daily	1	2.4	4	yes	no	no
?	Eng	SA	5-10 yrs	1	competent	now & then	3 times	2	5	5	yes	NR	NR
clerk	Eng	NR	+10yrs	2	beg/not used	never	daily	1	4	5	yes	NR	NR
supervisor	Eng	SA	+10 yrs	1	beg/not used	0-2 hrs	NR	2	3	3	yes	no	no
supervisor	Eng	SA	+10 yrs	0	beginner	+10 hrs	daily	2	NR	2.8	yes	no	no
?	Afr	SA	+10 yrs	3	beginner	now & then	NR	1	5	NR	yes	NR	NR
clerk	Eng	NR	+10yrs	0	not used	NR	daily	1	4.25	NR	yes	NR	NR
Manager	Afr	RSA	+10 yrs	5	competent	2-10 hrs	daily	F	4.6	5	yes	no	no
CLO	Eng	SA	+10 yrs	3	beg/comp	2-10 hrs	NR	1	1.8	2	yes	no	no
?	Afr	SA	+10 yrs	0	not used	now & then	NR	1	1	1	NR	NR	NR
Clerk	Eng	SA	2-5 yrs	4	not/beg	now & then	daily	2	5	5	no	no	yes
Clerk	Eng	SA	5-10 yrs	4	not used	now & then	> 1 month	1	4.4	3	NR	no	no
?	Afr	SA	5-10 yrs	9	advanced	2-10 hrs	11 times	2	5	4	yes	NR	yes
CLO	Eng	Yugoslavia	+10 yrs	6	advanced	0-2 hrs	3 times	2	4.3	5	yes	no	no
supervisor	Eng	UK	2-5 yrs	2	com/beg	2-10hrs	daily	F	3.57	4	yes	no	no
manager	Eng	Britain	2-5 yrs	2	competent	0-2 hrs	daily	1	3.6	4	yes	no	no
manager	Eng	Croatia	+10 yrs	4	competent	now & then	5 times	1	3.7	3	yes	no	no
Manager	Afr	SA	+10 yrs	3	not used	+10 hrs	daily	3	4	4	yes	no	yes
CLO	Afr	SA	5-10 yrs	4	comp/beg	2-10hrs	daily	2	4.8	5	yes	no	no
CLO	Eng	England	5-10yrs	3	competent	2-10hrs	few times	1	5	5	yes	no	no
?	Afr	SA	5-10 yrs	5	competent	now & then	daily	F	4.7	5	yes	no	NR

Notes: NR – not recorded; CLO – Client Liaison Officer

- 1) Home language Eng – English, Afr - Afrikaans
- 2) Own assessment of competency in Windows and MSOffice; not used, beginner, competent, advanced
- 3) “Approximately how many times have you used NetQM to view reports 1319?”
- 4) Number of types of NetQM training e.g. group, one-on-one, colleague assistance, training course, self-taught
- 5) Average of seven scores of different aspects of use of NetQM, from 1=difficult to 5=easy
- 6) “Generally – how easy to use did you find NetQM?”
- 7) Whether benefits of NetQM were recorded
- 8) “Have you encountered any problems with interpreting NetQM or any other user interface... due to cultural issues?”
- 9) “Would you prefer the NetQM user interface to be customized for users from different cultural backgrounds in South Africa, for everyone to be able to use it effectively?”

A significant factor in the experience of usability of the system is that 17 users indicated that their 1st language was English, the rest indicated that it was a 2nd language. As this application and all other systems in this corporate environment use the English language in the interface, a good understanding of English would also make the interface easier to use.

The factors which seemed to be more important than cultural background in their effect on product usability for this specific group of users were:

1. Familiarity with web interfaces and the standard functionality of web interfaces.
2. Familiarity with computer systems and applications in general.
3. The problem solving and exploratory skills that are associated with higher levels of computer literacy.
4. The ability to change/adapt to new ways of working.

Questions were also put to the users asking them how well the application and viewing reports on screen integrated with their work processes. On average the response was very positive. The main benefits the users cited for the use of NetQM was the fact that it enabled the reports to be available early in the morning and whenever required thereafter. The easy access to historical reports was also seen as a major advantage, and the users felt that it would improve productivity. Certain of the users had already started using features such as e-mailing reports to people who did not have access to NetQM.

Willingness to change and to try new things

The results indicated that there were differences between the users in their willingness to try and use the new application, as well as to persist to solve any problems. Some of this related to their lack of confidence in computers and waiting for others to help them solve problems while for others it is interpreted as a difference in willingness to try new things.

A change management process was required for the introduction of this software and the new way of viewing the report information. The way people relate to data and

information is clearly a behavioral issue, and a slight change can require profound behavioural changes [4].

This certainly applies in this situation where a major mind-set change is needed for people to view material on screen, when they are accustomed to viewing them on paper. The challenge is to stop them from printing everything before they read it. If this change is not achieved it would negate the projected cost saving which should be realized by suspending the printing of these reports.

CONCLUSION

The literature study and case study indicate that there is limited evidence that different cultural groups in a South African corporate environment require different or customized user interfaces. This supports the results of Hofstede's work that the corporate computer users of a country tend to belong to one major culture.

Although the few blacks in the sample expressed a need for a customized interface, it appears that this response may have been due to limited familiarization with computers and limited computer literacy skills, rather than a real wish for a different interface.

Despite diverse cultural backgrounds, corporate users who use the same system to achieve the same goals seem to require the same interface.

If it is accepted that there is a computer/technology sub-culture, then efforts should be directed towards developing this culture with a sensitivity to beliefs, religions, customs and the intrinsic meaning of words and symbols in the country in which it is to be used

It is further suggested that provided the users have achieved a certain level of computer literacy and exposure to Web Interfaces, thus becoming a member of the South African “computer culture”, they have the ability to use products similar to the one evaluated in the study without customization of the user interface per cultural group.

If the correct change management and training are implemented, and a cross section of users are consulted with regard to the impact that a new application would

have on their previously manual procedures, it may be possible for users to learn to use a standard interface based on the task to be performed, and not need culture specific interfaces to be designed.

Due to the history of South Africa, the lack of opportunities and a disadvantaged education system in the past, it does happen that individuals from certain cultural backgrounds need extra tuition to master the use of certain applications. Some may argue that this is part of the culture of that person. Even if that is so, it is suggested that the solution is to provide the opportunities to learn about the technology and the interfaces found useable by co-workers who need to achieve the same work objectives than customization of interfaces.

Where customization is possible, the author supports Yeo's recommendation for development according to PUI principles [19]. These enable users or their technology support people to customise the interfaces on an individual basis.

Many users do not fit into clear cultural patterns. This is partly due to some people living in different countries during their lives. Cultures are also less clearly defined as computer users are increasingly exposed to influences of the international global economy. This facilitates considerable transfer between cultures with regard to knowledge, behaviours, and standards.

It is recommended that the focus for the future in South Africa should be to ensure that the future generation, those presently at school, have maximum exposure to technology and computers, irrespective of the operating system and interface they learn about.

This would enable them to develop a general ability with regard to computers and therefore adapt to the English software used by South African companies. This should be more of a priority and money better invested than trying to go to great lengths to adapt computer user interfaces to the levels of competence of the present generation, who have the disadvantage of a backlog of skills due to the South African historical situation.

South Africans therefore need to ensure that the user interfaces and functionality of applications developed or purchased for South African users comply to the cultural understanding of South Africans as one culture. They also need to be applicable for the level of computer literacy of their target user group and need to enable those users to achieve their specific work goals.

Together with a continual drive to increase computer literacy amongst the South African population, this should provide users with the skills to use technology as well as ensuring the technology is usable for South Africans.

REFERENCES

1. Aaron Marcus & Associates. 2000. Cultural Dimensions and Global Web Design. What? So What? Now What? <http://www.amanda.com>.
2. Al-Adbul-Gadar A.H. 1999. *Managing Computer Based Information Systems In Developing Countries: A Cultural Perspective*. Idea Group Publishing U.S.A.
3. Avison, D. Baskerville, R. Myers, M.I. 2001. Controlling Action Research Projects. *Information Technology and People*. Vol 14, No1 2001 pg 28-45.
4. Bodestab, C.J. 1997. Information Breakthrough. *How to turn Mountains of Confusing Data into Gems of Useful Information*. Oasis Press, U.S.A.
5. del Galdo, E.M. and Nielsen Jakob. 1996. *International User Interfaces*. John Wiley & Sons Ltd. U.S.A.
6. Hofstede, Geert, 1997. Cultures and Organizations Software of the Mind. *Intercultural cooperation and its importance for Survival*. McGraw Hill. UK.
7. Hofstede, Geert, 1994. *Uncommon Sense About Organisations. Cases, Studies, and Field Observations*. Sage Publications. USA.
8. Hofstede, Geert, 1991. *Cultures and Organizations Software of the Mind*. McGraw Hill. UK.
9. Karat, John and Karat Clare-Marie. World-Wide CHI: Perspectives on Design and Internationalisation. *SIGCHI*. Vol 28 No.1. January 1996. <http://www.cwi.nl/-steven/sigchi/bulletin/1996.1/international.html>.
10. Kellogg, W.A. and Thomas, J.C. Cross Cultural Perspectives on Human-Computer Interaction: A Report on the CHI 92 Workshop. *SIGCHI Bulletin*. Vol 25. No2. April 1993, pg 40-45.
11. Kukulka-Hulme, A. 2000. *Communication with users: insights from second language acquisition*. Institute of Educational Technology, The Open University, Milton Keynes.
12. Mumford, E. 2001. Advice for an action researcher. *Information Technology and People*. Vol 14, No1 2001 pp 12-27.
13. Nakakoji K. Crossing the Cultural Boundary. *Byte*. June 1994. Pg 107-109.
14. Nielsen, Jakob, 1994. Goal Composition: Extending Task Analysis to Predict Things People May Want to Do. <http://www.useit.com>.
15. Nielsen J. 1994 Heuristic Evaluation. In Nielsen, J. and Mack, R.L. (Eds) *Usability Inspections Methods*. John Wiley & Sons, New York. <http://useit.com/papers/heuristic>.

16. Onibere, E.A., Morgan, S., Busand, E.M. and Mpoeleng, D. Human-computer interface design issues for a multi-cultural and multi-lingual English Speaking country – Botswana. *Interacting with Computers* Vol 13. 2001. pg 497-512.
17. Orubeondo, A. and Mitchell, Lori. What makes a useful user Interface? *Infoworld*. October 30 2000. pg 54 - 55.
18. Teasley, B, Leventhal, L, Blumenthal, B, Instone, K, Stone, D. Cultural Diversity in User Interface Design: Are Intuitions Enough? *SIGCHI Bulletin*. Vol 26, No. 1 January 1994 pg 36-40.
19. Yeo, Alvin, 1996, World-side CHI: Cultural User Interfaces, A Silver Lining in Cultural Diversity. *SIGCHI* 1996.