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Implementing Web-based Electronic Services – a case study

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Abstract

This paper describes a study of a large intra-organization unit implementing web-based electronic services. End-user transition from using paper-based service to web-based e-Service requires an understanding of the scope from an end-user perspective. Introducing new technologies in the existing traditional paper-based environment needs insight into user adoption and usage. If the new technologies conflict with the existing system (i.e. paper-based), the user may offer resistance to its adoption. It was found in this study that this resistance was related to a push towards introducing new technologies by management.

Keywords

Web-based e-Services, End-user adoption, Users Experience, Users Motivation, Usage Frequency, Control, Self-Service, Support

INTRODUCTION

Web-based e-Services are an important area that has been gradually growing with introduction of web-based technologies. In recent years, the Internet has been identified as the world's fastest growing marketplace with seemingly limitless opportunities for marketing products and services (Domains, 1999). The websites on the Internet offer users experience with information that is central to user activity in conducting the task. Web-based e-Services provides consumers with commercial opportunities of a virtual marketplace that are cost efficient, have 24/7 accessibility, lack geographic limitations, are interactive, and enable real time delivery. Electronic shopping ranging from processing sales transaction to service delivery also provides users with information experiences that can have either positive or negative effects. Hewlett Packard, for instance, is rapidly transforming their after-sales service into an e-Service business unit, providing consumers with the chance to interact in real time on the web. Organizations engaged in e-Businesses like banking, airlines, car rental, management consulting, music, software and educational institutions are increasingly opting for online services delivery to meet e-Customer demand (Forrest and Mizerski, 1996).

An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption (Rogers, 1983:11). As innovations in web-based e-Service are rapidly emerging, it is yet unknown how consumers are reacting and adjusting to electronic information experiences. Users adopt innovations in services more slowly than they adopt innovations in goods (Zeithaml and Bitner, 2000:39). Nevertheless, customer adoption and continuance are arguably a critical success factor in realizing the potential of web-based e-Services and its future direction. Understanding what constitutes users in assimilating, coordinating, developing and applying different information experiences is central to the e-Service process. Adoption of web-based e-Service by end-users may be treated as technology adoption. The Technology Acceptance Model (TAM) of Davis (1989; 1993) and Davis *et al.* (1989) is used in this paper to investigate end-user requirements that may provide useful insights into correlating users information experience, motivation with web-based e-Services. TAM focuses on two beliefs: perceived usefulness (PU) and perceived ease of use (PEOU). The former enhances end-user job performance, while the latter should be easy to use. The application of these two instruments of TAM have shown to have been successful in past IS studies (Moon and Kim, 2001; Dishaw and Strong, 1999). Recent studies suggest it applies also to electronic commerce and to adoption of the Internet technology (Gefen, 1997). Davis *et al.* (1992) found intrinsic and extrinsic motivation to be

key drivers of behavioural intention to use. Venkatesh (1999) in his study found that manipulating the level of intrinsic motivation has a significant impact on perceived ease of use, and the effect of perceived ease of use on behavioural intention to use. However TAM has its critics and certain limitations have been identified including one of not being employed beyond the workplace in the user task environment (Moon and Kim, 2001). Malhotra and Galleta (1999) argue that TAM is incomplete in one important respect: it does not account for social influences on the adoption and utilization of new information systems. Dishaw and Strong (1999) suggest that TAM lacks task focus. Venkatesh (1999) calls for additional research to carefully examine how different constructs interrelate. Davis (1989) himself argues that future technology acceptance research needs to address how other variables affect usefulness, ease of use, and user acceptance.

Services are experiences (i.e. information experience); moods and emotions are critical factors that shape the perceived effectiveness of service encounters (Zeithaml and Bitner, 2000). If a customer was in a bad mood, service provision will likely be interpreted more negatively than if the customer were in a buoyant, positive mood. This will be reflected in the consumer's attitude towards such service usage experience in future. The theory of attitude formation could provide us with the direction of the relationship between e-Service and end-user information. Zajonc (1968) suggests that experience is "mere exposure effect" or that "the more you see it the more you like it (Rajecki, 1990:145). The mere exposure of subjects to an object, either with or without them realizing (Wilson, 1979) leads to an improved attitude towards that object (Bornstein, 1989). Transposing this to perception, more frequent users of e-Service are likely to have higher information experience and perception of e-Service; although the effect may be restricted to predictive (will) as opposed to normative (should) perception. Zemke and Connellan (2001) suggest customer's expectations go up with every new positive experience. Users with high positive experience may tend to use e-Services more frequently than those without it.

Csikszentmihalyi's (1975) theory of flow characterizes the interaction between humans and computer-mediated technologies. Since the web involves a computer-mediated environment and context, the work is relevant and adaptable to Internet applications (Berthon *et al.*, 1999). Flow is a multidimensional construct that represents the users (surfer/interactor) perception of the medium as playful and exploratory. The theory of flow suggests that involvement in a playful, exploratory experience is self-motivating because it is pleasurable and encourages repetition (Miller, 1973; Berthon *et al.*, 1999). The users state of flow is constantly changing and adds to the experience and retained and applied in similar task or repetition of the same task (see Table 1). On a first visit the user of e-Service may navigate the site, search for information, get used to the outlook of website, play with the different features, develop like and dislike toward certain characteristics, feel ease of use, evaluate perceived usefulness, and try to accomplish the purpose of the visit. On the repeat visit the user will be familiar with the past experience and enhance those experiences by developing and integrating into the new ones. Individuals who interact more playfully with a website will view the interaction more positively than those who interact less playfully, and consequently they may be more motivated to engage in interactions in the future (Webster *et al.*, 1993).

Zeithaml and Bitner (2000:62) point that users predict an estimate of the service based on past experience. It is assumed that end-users experience with information in past already exists in the traditional environment (offline) and may be applied in the web-based e-Service environment. Understanding the traditional service complexities of experience with information and transforming it to the web-based environment is a challenge for both practitioners and researchers. The dimension and scale of such complexity in terms of technology and its alliance with information may provide an integration point where technology requirements may meet with the users experience. Following adoption, users acquire personal experience with the system and consequently their own source of evaluative information (Karahanna *et al.*, 1999). Defining user experience, motivation, and usage frequency with information is not an easy and straightforward process. Rather developing an approach to studying the interface process on the basis of end-user interaction is suggested. This paper specifically investigates issues related to end-user experiences, motivation and usage frequency in web-based e-Service adoption and the process involving successive usage and continuation of e-Services.

METHODOLOGY

Multiple sources were used in data collection (Yin, 1994) – documentation, archival records, open-ended interviews, direct observation, participant-observation, and physical artifacts. This led to the development of converging lines of inquiry, a process of triangulation (Yin, 1994). In the first instance discussions were held together with three senior staff members involved in implementing the web-based e-Service. They included the executive director, IT Manager, and an outside Consultant. In the second round separate individual interview were conducted with these participants. The third round of interview was conducted with the admissions manager and separate individual interviews with two other staff members. Altogether six separate interviews with participants were held. In the first round interview the data collected and compared with the second round and third round interview data, for consistency, clarity and accuracy of the information. Interview data were compared to test for the factors having effect on users with high and low performance in using the system. This provided the advantage of not duplicating the data with just one set of evidence. The discussions and interviews were open-ended, the researcher in the beginning provided the topic, and the respondents were probed of their opinion about the events. The respondents were encouraged to provide their own insight into the problem.

The Case Study

This paper is part of a larger study investigating the critical success factors in web-based e-Service end-user adoption. The aim of the study is to investigate the uptake of web-based e-Services amongst end-users. The case study examines the web-based e-Service framework of the University of Australia (UA)¹. International students have the option to lodge an admission application through either of: web-based e-Service on the Internet, phone, fax, or in person. On receiving the application a decision is made by the staff on the admission status. Within this process the department is implementing an electronic delivery of its services on the website. This web-based e-Service has been in use for the last two and half years. The complete process involves students making the application and the staff processing applications on the website. The staff is currently using the web-based e-Service along with paper-based system. The transition from paper-based to web-based e-Service is believed by the department to be a significant step in the direction of moving the complete student admission process over the website and gradually removing the paper-based system.

Evaluating the Framework

The problem facing the international admissions department is that the staff is not adopting the web-based e-Service in processing the student admission applications, rather, it is continuing with the old system. Printing documents, storing in folders, processing, and correspondence with students are done through traditional mail and are central to the workflow system. Reliance on paper-based services tends to duplicate and increase task loads leading to errors and confusion. As a result of this, the department lacks provision of good service to its clients (students), resulting in considerable backlogs in processing. The department introduced the web-based e-Service to catch up with the increasing backlog and to improve service. The staff accounted for their resistance to adopt web-based e-Service on the basis of factual information such as: it added additional load to their current task, a lack of confidence in web-based e-Service, fear of providing wrong information on the web, and not seeking help when required.

Past-Present Situation and Future Goals

The senior staff outlined the department goals as – (1) processing all application by web-based e-Service on the Internet; (2) respond to student correspondence by web-based e-Service within 24 hours (and in peak time within 48 hours); and (3) diverting more students towards adopting the web-based e-Service application. Following Yin (1994), the case study was based on propositions, which reflected on research questions, review of literature, and the conceptual model. The central problem in the case study coincided with the research

¹ Not the real name.

problem under investigation. This helped the researchers to focus attention on certain data and ignore other data (Yin, 1994), due to the scope of the study, limited time and resources.

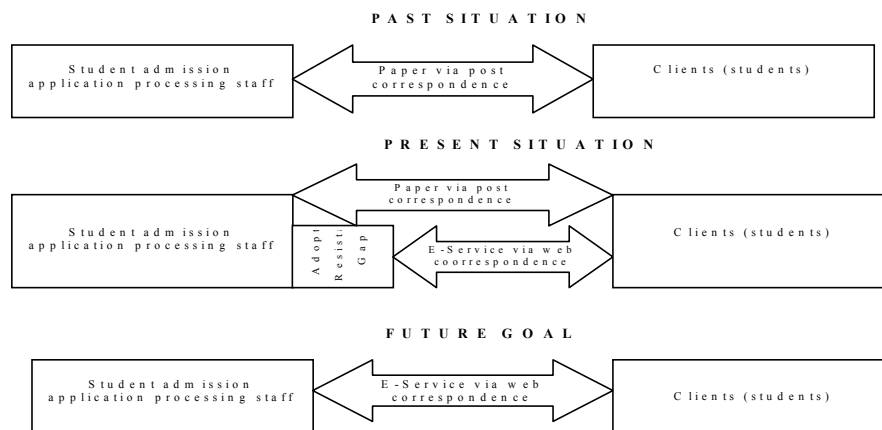


Figure 1: Past-Present Situation and Future Goals

User resistance in adopting web-based e-Services (see Figure 1) also related to some degree to perceived ease of use and usefulness (Davis, 1989) among staff in using the web-based e-Services. It was found that the old paper-based system was popular among staff, due to its ease of use and usefulness in conducting the task. It offered users with better control, self-service, and support, than the new web electronic system. Staff experience with new system suggests that it had high levels of control, less flexibility, and that it was not intelligent to detect simple errors. This reflected on prior experience and perception in doing the task with ease with the old system (i.e. paper-based). Though the web electronic system was useful, users perceptions were that it lacked ease of use. The web-based e-Service wasn't prototyped or tested for its efficiency and performance and the bugs needed fixing.

The gap (see Figures 1 and 2) between paper-based service and web-based e-Service were identified emerging due to information gap, design gap, communication, and fulfilment gap. Zeithaml *et al.* (2000) in their study pointed to each of these gaps on the basis of users experience with the website. Information gap leads to providing incomplete or inaccurate information to the users. The initial design of a website not meeting the users requirement may result in design gap. The presence of an information gap would exacerbate the design gap because incomplete or incorrect understanding of users might adversely affect the design of the website, therefore compounding users frustration. Similarly a communication gap reflects on a lack of accurate understanding about the websites features, capabilities, and limitations. Sometimes users are made promises that cannot be met, that contribute to the fulfilment gap. In the gap situation when the users expectations are not met their reactions is that of frustration. Although emotions such as anger and frustration are expressed when users report on problems arising from web-based e-Service quality, these appear to be less tense than those associated with traditional service quality experience (Zeithaml *et al.*, 2000). It can be suggested that the comparison in being 'less tense' may be due to the users perception of conveying their problem on web-based e-Service form is relatively new and any expression will need further user experience. The resulting gap (see Figure 2) in adopting the web-based e-Service at the time was anticipated to be growing. Introducing new changes in web electronic workflow entirely without considering the user-friendly characteristics (e.g. ease of use) of paper-based system started effecting users motivation and usage frequency in using web-based e-Service. There was underlying resistance in adoption of the web-based e-Service system and increasing negativity towards it features and usage. Low user perception and experience of the electronic system reflected in lower motivation to work with the new system and hence lower usage that resulted in doing less work with in the web electronic framework and more through paper-based service. As a result lower productivity resulted in web-based e-Service. It was evident those users who used the web-based e-Services acquired personal experience with the system and consequently their own source of evaluative information (Karahanna *et al.*, 1999). Users had less confidence (i.e. low motivation) in the web-based e-Service, which was intrinsic as well as extrinsic. Low intrinsic motivation reflected on their desire to use the web-based e-

Service, which at times was at its lowest. Conducting the task on paper-based service was seen as easy to do, known to the users, considered less complicated, systematic, and they (the users) knew what they were doing. Such consistent pattern of characteristics was either missing or not known (though it existed) to the user in the web electronic workflow.

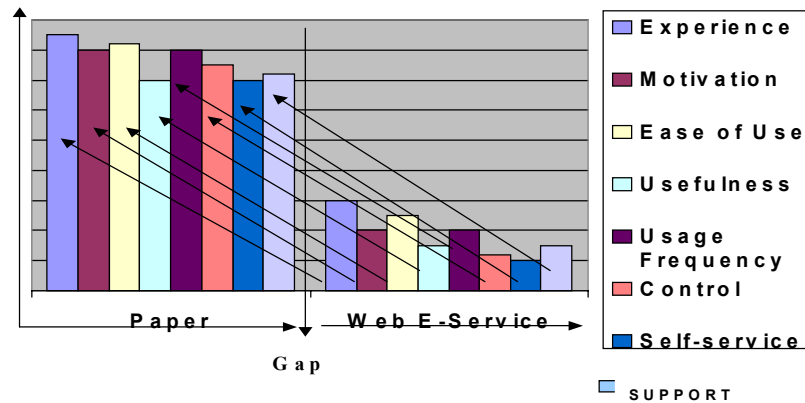


Figure 2: Web-based e-Services gap

Simultaneous use of both systems, stemming from the task requirement further complicated the use of web-based e-Service as the user had to revert repeatedly to the paper-based system to complete the web-based e-Service task. The web-based e-Service system was believed not to be self-sufficient and still being developed and updated from time to time, and in those times the users had to rely on the paper-based service system for information. The scope of web-based e-Service functionality wasn't defined and the users didn't have a good experience from the beginning. Establishing the web electronic workflow frame within the system, after the system was developed, resulted in adjusting the other features of the system, and hence adjusting the user experience, which was not an easy and straightforward process. Though the user might have taken the new features into their experience but they formed an initial perception of the system as "being inadequate to perform the web-based e-Service task." Such perception may have a down side effect on adoption and further usage of the web-based e-Service. Users guidelines in transferring the work from the paper-based system to the web-based e-Service would have greatly enhanced users experience, though such user experience already existed and transferring to the web electronic system may have been easy. Users were aware of the guidelines that were verbally conveyed, written guidelines were either missing or unknown to the users. Important information that was not conveyed to the users was "how the web-based e-Service would make their work easier to perform and save time and effort". Though this may not been considered important at that time, it would have a positive effect on the user if known.

Dimension of E-Service	Facets of Web-based E-Service Dimension	Selected Quotes
Reliability – Experience/support /self-service	<ul style="list-style-type: none"> Site is up and running Helps in doing the task 	<p>"The system is <u>not 100% ready</u>..."</p> <p>"Adds on to the task...increases task load."</p> <p>"The system is <u>not connected</u> to the financial system"</p>
Support/motivation	<ul style="list-style-type: none"> Error checks 	<p>"If the system can be fixed it can be fixed, otherwise we will <u>continue using it as it is</u>."</p>

<p>Support/Self-service/ Experience</p> <p>Experience</p>	<ul style="list-style-type: none"> Does the site meet all the task <p>flow flow</p>	<p>“System <u>is not intelligent</u> to check simple errors like spell checks, grammar checks.”</p> <p>“If any information is missed, there is no way to check, there are no <u>compulsory fields to inform of missing information</u>”.</p>
<p>Support/Self-service/Experience</p>	<ul style="list-style-type: none"> Dependence <p>flow</p>	<p>“Need to <u>rely on paper documents</u> and another database to complete the task... have to use all.”</p>
<p>Responsiveness- Motivation</p>	<p>Help available if there was a problem</p> <ul style="list-style-type: none"> Support <p>flow</p>	<p>“It is available...but if the system cannot do certain things, we have to <u>do it manually</u>.”</p>
<p>Support/self-service</p>	<p>Manuals, guidelines, online help</p>	<p>“Mine has been <u>chucked out...haven't seen one</u>.”</p> <p>flow</p>
<p>Motivation /experience</p>	<ul style="list-style-type: none"> When the system doesn't work <p>flow</p>	<p>Sometimes <u>have frustration</u> with the system when it doesn't work, of what we <u>expect of it</u>... it brings the motivation down, and when it works, it <u>bounces the motivation up</u>...tell everyone how well it works”</p>
<p>Motivation/usage frequency</p>	<ul style="list-style-type: none"> Flow effect <p>flow</p>	<p>“At home I am <u>more motivated</u> in using the system, as I am <u>relaxing</u>; at work I am <u>hurrying</u> as I have to do this quick...do that.”</p>
<p>Motivation/experience/usefulness/support / self-service</p>	<ul style="list-style-type: none"> Has a search engine <p>flow</p>	<p>“The site doesn't have a <u>search engine</u>...if there was one; information search would have been easier.”</p>
<p>Self-service/usage frequency/ease of use /motivation/experience</p>	<ul style="list-style-type: none"> Information search <p>flow</p>	<p>“Students with high level of literacy will be <u>confident to use</u> the site a lot.”</p>

<p>Access- Usage frequency/ control/motivation/ usefulness</p>	<ul style="list-style-type: none"> • Login to the site <i>flow</i> 	<p>“Too many log in screens...”</p>
<p>Usage frequency/ usefulness motivation/ Ease of use</p>	<ul style="list-style-type: none"> • Site update <i>flow</i> <p><i>flow</i></p>	<p>“Speed needs to be improved. needs to be faster.”</p> <p>“Due to time out period that disconnect, the user has to reenter all the information once again...this creates <u>duplicity of information</u> for us...as the same user is reapplying again and it is hard to differentiate between the same application.”</p>
<p>Flexibility- Experience</p>	<p>Choice of ways to do the task available</p>	<p>“<u>Verifying information</u> on the Internet is not possible, we still have to check students education credential in paper form”</p>
<p>Control/ Experience/ self- service/ motivation/ Usefulness</p> <p>Self-service/ usefulness/ control/</p>	<ul style="list-style-type: none"> • Flexibility <i>flow</i> • Incomplete information <i>flow</i> 	<p>“We need more control...we can get report, but that’s only in numbers, whereas the other databases has more information providing us with more <u>control over information</u>...this makes the <u>work easier</u>.”</p> <p>“When students are filling the forms online...it is not compulsory for them to write email address...we <u>can’t proceed</u> or get in contact if email address is not provided.”</p>
<p>Ease of navigation- Motivation/ ease of use usage frequency/ control</p>	<p>Easy to find what I need</p> <ul style="list-style-type: none"> • Easy to get anywhere on the website • Contains a site map with links to everything on the site • Has a search engine <p><i>flow</i></p>	<p>“When I am in between different tasks it logs off...have to <u>login number of times</u>...due to time out period, loose work when login back...<u>its irritating</u>”</p>

<p>Efficiency- Usefulness/ frequency/ service/ ease of use/ motivation</p>	<p>Simple to use <i>flow</i></p> <ul style="list-style-type: none"> • Site that contains just the basics <p>Doesn't require me to input a lot of information</p> <p>Structured properly</p> <ul style="list-style-type: none"> • Gives information in reasonable chunks • Gives information on command rather than all at once • No scrolling from side to side <p>No fine print that is difficult to read and hard to find</p>	<p>"Site needs to be improved with better features and functionality that will make it easier for us to use."</p> <p><i>flow</i></p>
<p>Site Aesthetics- Ease of use/ usefulness</p>	<ul style="list-style-type: none"> • Good pictures of items <p>Color of items same as what it is on the screen <i>flow</i></p>	<p>"Lot of pictures...in some countries computer is slower, it would take a long time to download images."</p>
<p>Control/ self-service/ experience/ motivation</p>	<p>Eye Catching</p> <ul style="list-style-type: none"> • Color is intriguing • Brightness rather than dark background <p>Simple <i>flow</i></p> <ul style="list-style-type: none"> • Free of distraction • Uncluttered • Clean, not too busy • No flashing things going across the screen • Not too much movement • No or few advertisements 	<p>"Screen is fine, fonts are too small, trying to fit everything in one page...people whose first language is not English would like the fonts to be bigger in size."</p>
<p>Customisation and Personalisation- Control/ self-service/ experience/ usefulness/ ease of use/ motivation</p>	<p>Site that help me find exactly what I want</p> <p>Easy to customise <i>flow</i></p> <p>Control</p>	<p>"Can't change or edit letter templates, cant do anything, everything is fixed...whereas with the other system lets you do"</p>

Table 1: Perceived dimensions, attributes, and concrete cues for e-Service quality and selected illustrative quotes (adapted from Zeithaml *et al.*, 2000)

Users effective role in determining the contents of service and its outcome may require moderate levels of input in the form of information from users to deliver the service. Though such participation in developing the service in paper-based system was present its

applicability in web-based e-Services was either missing or very low. Defining user jobs and managing the diverse user groups required an initiative at the system development stage, which at its very central may be integrated with the workflow process. The level of user's participation will be increased or decreased depending on the users experience thus shifting the complicated and repetitive task to the technology, other task requiring minimum input can be done by the user, making the process easier for the user to complete. Such an understanding if applied may have enhanced user task. The senior staff had the view of "we don't want them to create things" which was getting to be difficult when user wanted to customize features such as letter templates, screen font size, other changes, that were not allowed within the systems parameters. This may have brought in a sense of disconnected feeling among the users, as one participant put it "they (i.e. users) saw themselves as backroom people and not front room; they need to be in the front room". From the service context it is encouraged to have user's participation in service evolving process as much as possible, which adds on users experience, motivation, and decision-making. The user's comment about the web-based e-Service system was "we weren't consulted and no one ever spoke to us about the online web processing system, it just suddenly appeared and we have to use it". One participant even went a step further and stated, "they (the users) don't feel they have any ownership from the beginning" and "we are slowly trying to introduce that sense of ownership among users". Such experience may have been frequently shared among colleagues who were using the same service, and the overall general perception of web-based e-Service was perceived to be going low not as a result of its characteristics (not this time) but due to the intense downside collective feeling against adopting the system, due to lack of contribution in its process of development, participation, and consultation.

Users need to be clearly informed about their contribution in developing the web-based e-Service. Different users contribution in forming the end-service requires a clear understanding of each user participation and contribution to the process. Interconnected task of different users should demonstrate the start and completion of each user task and responsibilities. Whatever the case, the expected level of participation needs to be communicated verbally or in writing in order to perform their roles. To understand what is expected of them and the expertise to accomplish the task needs evaluation and feedback of their abilities necessary to perform within a specified context. Users education program can take the form of formal orientation programs, training, written literature provided to users (or manual, that were either missing or unknown), learning from colleagues and customers, and personal experience. User's performing a specific task requires understanding of the task process (for example: What is needed? How to progress? What is user supposed to do?). Observing other users doing the same task (brings confidence), exchanging information with other users, enhances users experience. Rewarding the users performing their roles effectively motivates the users and influences others in doing their task well, provides confidence, and job satisfaction.

CONCLUSION

In line with the preceding discussion it was observed that the end-user was going through different phases of adoption of the web-based e-Service. Predominantly the paper-based service system was considered to have all the pertinent characteristics that were needed to do the task. The paper-based apparatus was believed by the users as easy to use, had usefulness, offered considerable degree of experience, and motivation that existed in interfacing with the system. When such consistent characteristics were missing in the web-based e-Service system the users resisted to its adoption and usage that resulted in a gap. Introducing the web-based e-Service without integrating the user-friendly characteristics of the paper-based system brought in complexity to the newly introduced electronic task, which were at its early stages of development. Users overall initial perception towards the system was formed on the basis of their expectation of the system. When the system did not meet up to that expectation, user started forming a lower perception.

Users perception of working with the web electronic system were related in terms of how easy it is 'now' to use the system than it was in 'past'. This sharp comparison in user perception had to be profound and implanted in a way that positively improves the users perception based on what they can do and achieve with the web electronic system now and

what they couldn't do in the past. Though such an approach will highlight some of the characteristics, which the users will like, it may also emerge with some other characteristics that may not become instantly popular. Given time and implementation process that may guide changes needed to be made in fine-tuning those unpopular characteristics.

A complete revamp of the paper-based system cannot be ruled out. It may work as a supplementary system with minimal reliance, and to do away with the system completely at once is not recommended. It should be reduced in a gradual process until a stage when its only function is seen as ancillary and not interfering with the main electronic work flow. When that stage is reached (with complete coordination within the web electronic framework) will enable the entire task to be completed within the electronic domain without relying on the paper format. Such a system will require a complete web electronic infrastructure providing all the functionality of electronic workflow. The infrastructure supporting such a system will have undergone tremendous change by that time, and the overall scope of such a system will need redefining.

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