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Assessing Website Performance In The Line Of The Is Impact Model

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Abstract

This research proposal presents a novel study that aims to contribute to the understanding of factors that impact on the performance of Australian university business school websites. The proposed study addresses the current limitations of website performance measurement and incorporates a multilevel perspective that accounts for user and organisational perspectives on website performance. This study adopts the IS-Impact model, developed by Gable et al. (2008) as its primary theoretical foundation and applies Shannon & Weaver's (1949) Communication Theory to develop a conceptual model of website performance as a tool for understanding multilevel website usage as a measure of website performance. The study employs a two-phase quantitative survey research method incorporating an exploratory and confirmatory phase. The exploratory phase aims to test the completeness and the applicability of the IS-Impact model's dimensions and measures in the university website context. The confirmatory phase aims to further validate the model and instrument derived from the exploratory phase, as well as to reconfirm the model and measures using quantitative data.

Keywords: IS-Impact, IS-Success, Website, Performance, Website performance

1 INTRODUCTION

Measurements that capture the performance of websites have enabled businesses to monitor and enhance their organisation's strategic and operational goals (Ghandour, 2010). Evaluating website performance has been the focus of much research over the past decades. However, despite this research, our understanding of how to effectively measure website performance remains limited. The objective of this research is to better understand the factors that impact website performance, particularly taking into account the recently developed understanding of multiple levels of usage as a measure of performance.

In Australia, and throughout the world, universities have invested in websites as a means of providing and disseminating information, facilitating e-commerce, and providing services to staff, current students, prospective students, and other university stakeholders. Universities have begun to realise the need to understand and maximise the positive outcomes their websites generate in order to optimise the effectiveness of their website performance in serving current students and staff effectively, attracting prospective students, as well as delivering information about the university, its programs, research, and achievements to a wider audience. However, the question still remains - how do we evaluate website performance effectively for multiple levels of usage? (Epstein, 2004; Ghandour, 2010; Rai, Lang, & Welker, 2002).

Measuring the performance of websites is a problematic task and it has been approached from a number of different perspectives and contexts over the past decade. Ghandour, Benwell and Deans (2011) note that performance can be measured from a user, designer, or owner perspective, each of which will require the use of different criteria to measure different aspects of website performance. There have been a considerable number of attempts to develop instruments to identify, measure, and manage the quality of websites (for example, Aladwani & Palvia, 2002; Barnes & Vidgen, 2003; Loiacono, Watson, & Goodhue, 2002; Mich, Franch, & Gaio, 2003; Sharkey, Scott, & Acton, 2006; Webb & Webb, 2004) as well as instruments to define and measure user satisfaction (for example, Bharati & Chaudhury, 2004; McKinney & Yoon, 2002; Wang, Tang, & Tang, 2001; Zviran, Glezer, & Avni, 2006). Design perspectives assess the technical features of websites considered important, while owner's perceptions of website value can also help to identify website effectiveness in terms of achieving the goals for which the website has been designed.

The complexity of website performance and the difficulty in measuring the effectiveness of a website has led to the lack of a structured set of measurement criteria, the frequent use of simplistic measures, and inconsistent and varied utilisation of performance measures (Ghandour et al., 2011). The measurement of usage has suffered from measurement approaches that have often been idiosyncratic and lack credibility or comparability (DeLone & McLean, 2003; McLean & Sedera, 2010). Studies that develop performance measurement tools have neglected to incorporate a multilevel perspective that accounts for user, design and organisational perspectives on website performance. Ghandour, Benwell, & Deans (2011) call for studies that combine these different perspectives into one single framework to provide additional insights into the overall evaluation criteria of a website. Similarly, Burton-Jones and Gallivan (2007) have urged that researchers examine usage from a multilevel perspective across the individual and organisational levels to enable a better understanding of system usage (Burton-Jones & Gallivan, 2007).

This research aims to address these concerns by developing a more robust understanding of website performance that incorporates user, design and organisational perspectives. To achieve this research objective, the study will draw on Gable, Sedera, & Chan's (2008) Information Systems (IS)-Impact model, Shannon and Weaver's (1949) and Mason's (1978) Communication Theory.

2 RESEARCH QUESTIONS

The objective of this study is, then, to develop a multilevel understanding of the effectiveness of a website performance. This study will focus on Australian university websites which are conceived of

as being informational and promotional in nature. Performance will incorporate both user and organisational perspectives in an attempt to provide a more complete understanding.

The overall research question is:

- What are the critical factors for evaluating the performance of a website based on organisational and website-user perspectives?

An important sub-question here for this research is:

- Does the IS-Impact model (Gable et al, 2008) include those dimensions and measures necessary to yield a testable model that determines website effectiveness?

3 THEORETICAL FOUNDATIONS

This study draws on the existing literature to develop a multilevel performance model for websites that incorporates user and owner perspectives for evaluating website effectiveness. In order to do so, the research draws on the IS-Impact model for measuring the success of the website as an information system, Communication Theory to conceptualise and evaluate the performance of a website as a communication channel and assessing user satisfaction with a website. This perspective views the website as an information system which has a large number of users who are not limited to an organisational context and whose use of the system is volitional, with the website conceived as a mutual communication channel between the organisation and its customers. This allows the adoption of IS success theories and communication theory to explain effective website performance (Molla & Licker, 2001; DeLone &McLean, 2004).

3.1   IS-Impact Model

As with website effectiveness, a number of studies have focussed on constructs for evaluating the success and impact of information systems. However, structured and robust models that capture the whole information system success/impact scenario are still scarce (DeLone & McLean, 1992; Petter, DeLone, & McLean, 2008). Gable et al. (2008) introduce and validate a measurement model for assessing IS success. The IS-Impact model evolved from a body of literature on IS success initiated by DeLone & McLean (1992). See figure 1 below.
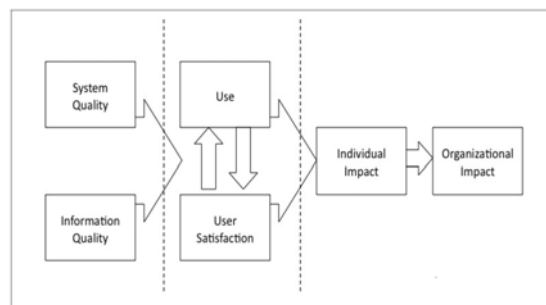

Figure 1. IS Success Model (DeLone and McLean, 1992)

However, the IS-Impact model differs from the IS success model (DeLone and McLean, 1992) in the following ways:
- it depicts a measurement model and does not approach a causal/process model of success,
- the satisfaction construct and use construct are not included in the final measurement model,
- use is treated as an antecedent (and consequence) of IS-Impact, while satisfaction is an immediate consequence of IS-Impact,

- new measures have added to reflect the contemporary IS context and organisational identity,
- more items to measure the organisational impacts construct were added.

The IS-Impact model shown in *Figure 2* is a four dimensional model that comprises two major dimensions- impact and quality and 37 measures. The "impact" dimension measures impacts to date, while the "quality" dimension measures probable future benefits. "*Individual impact*" is a measure of the extent to which the IS influences the capabilities and effectiveness, on behalf of the organisation, of key users; "*organisational impact*" is a measure of the extent to which the IS has promoted improvement in organisational results and capabilities; "*information quality*" is a measure of the quality of the IS outputs, namely the quality of the information of system procedures in reports and on-screen; "*system quality*" is a measure of the performance of the IS from a technical and design (Gable et al. 2008, pp. 389-390).
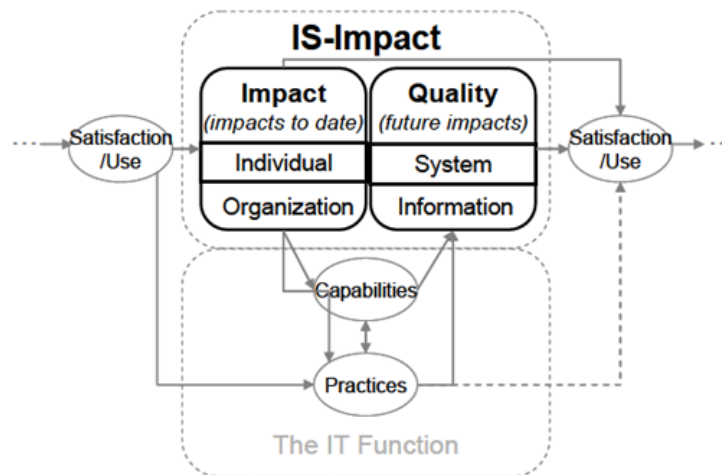

Figure 2. The IS-Impact Model (Source: (Gable et al., 2008 p. 395)

This research adopts the IS-Impact model as the foundation of this study. The individual user is defined as an individual external and internal user employing technology in completing tasks while the organisation is defined as an individual organisation managerial user and a group of organisation managerial users, or a collective of managerial users employing technology to monitor, improve business strategic and achieve organisation goal. The IS-Impact model is intended to be robust, simple, and yet generalizable, in order to yield results that are comparable across time, stakeholders, different systems and system contexts (Gable et al., 2008). As Petter et al. (2008, p. 242) note:

> What makes this particular instrument to measure IS success unique is that this instrument captures the multidimensional and complex nature of IS success by measuring four key success dimensions and by using at least four measures for each dimension. The instrument has strong construct validity in that it captures multiple aspects of each variable, which is a dramatic change from much of the measurement of IS success constructs that focus on only one aspect of the construct. Another strength of this model is that the instrument was rigorously tested within the context of enterprise systems to ensure its validity… It is encouraging to see research conducted to create a strong, multidimensional instrument to measure IS success, which overcomes a major shortcoming in previous IS empirical work; namely, inadequate measurement of the dependent variable, IS success.

However, while Petter et al., (2008) comment positively on the IS-Impact model, they also argue that in order to provide more insight into the measurement of IS success more research needs to examine if use and user satisfaction provide additional explanatory value in different settings, particularly for voluntary systems such as websites, which is what this research proposes to do.

3.2 Communication Theory

In this research, a website is viewed as an information system that includes a large number of users who are not enclosed by its organisational context and for whom use is volitional. In addition, a website is a mutual communication channel between the organisation and its clients (Straub,

Hoffman, Weber, & Steinfield, 2002). Hence, communication theory can be adopted to explain website performance (DeLone & McLean, 2004; Molla & Licker, 2001).

Shannon and Weaver (1949) offer a model of communication and a foundational theory for sending and receiving messages through a channel and analysing communication problems. The model includes an information sender (a source of information), a transmission medium (with noise and distortion), and an information receiver (whose goal is to reconstruct the information sender's message). The communication is successful when the receiver captures the intended message sent by the information sender, and it is more effective when the intended meaning conveyed to the receiver can lead to the desired conduct expected by the sender.

The communication model of Shannon and Weaver (1949) was first employed by Mason (1978) to conceptualise the performance of a communication channel. Mason (1978) suggested a framework exhibiting three criteria of success, each of which is necessary but not sufficient to capture the changes in performance:

- 1. Technical: how accurately the message is transferred to the receiver.
- 2. Semantic: how precisely the receiver receives the intended message.
- 3. Effectiveness: how effective is the channel in terms of the benefit accrued to the stakeholders (sender or receiver).

This study will adopt communication theory to interpret the success of website performance. Because a website is a means of communicating between organisations and users, communication theory can be used to assess its communicational performance in terms of its technical and semantic accuracy and effectiveness for senders and receivers.

4 CONCEPTUAL MODEL

In this study, three dimensions of success for communication channels identified by Mason (1978), technical, semantic, and effectiveness, are used to represent a multidimensional, multi-level model of website performance. Following the work of DeLone and McLean (1992, 2003) *website system quality* is used to represent technical success, *website information quality* and *website service quality* represent semantic success , and *website usage*, *individual impact*, *organisational impact*, *user satisfaction* (*individual satisfaction*, and *organisational satisfaction)* measure website effectiveness.

The theoretical foundations outlined above may be expressed in a conceptual model that integrates the various perspectives. See Figure 3 below.
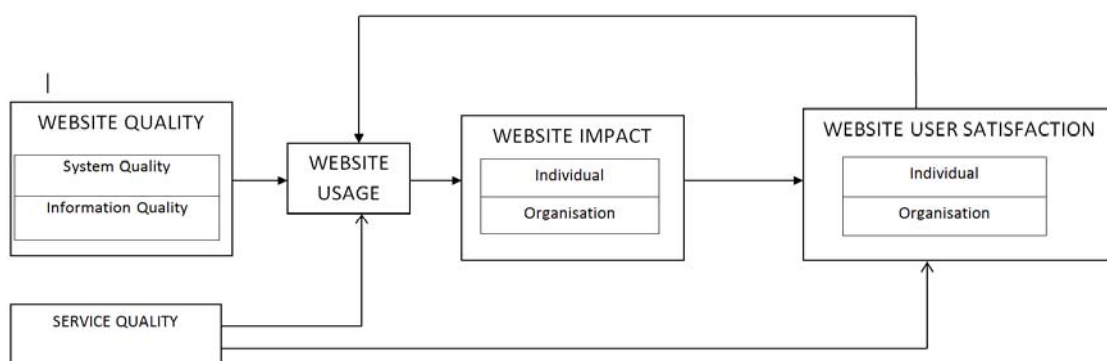

Figure 3. Conceptual model

The constructs used in the conceptual model include:
- Website Quality and Impact dimensions based upon IS-Impact model,
- Website Service Quality as identified by DeLone & McLean (2004),
- System Usage constructs as identified as mediators of IS Impact by Tan (2010),
- User Satisfaction as identified as an immediate consequence of IS-Impact by Gable et al. (2008).

4.1 Website Usage

There have been a number of definitions of system usage conceptualised by researchers. Goodhue and Thompson (1995, p. 218) define system usage as "the behaviour of employing technology in completing tasks". Davis (1989) used "intension to use" as a proxy for usage. Burton-Jones and Straub (2004, p. 20) re-conceptualise system use as "a user's employment of one or more features of a system in a task". They also note that a user can be an individual, a group, or a collective; a system is an artefact providing representation of a task domain; and a task is a goal-directed activity (Burton-Jones & Straub, 2004). From an empirical study on IS system use, Tan et al., (2010) found use as an important mediator of IS Impact and conceptualised use as a continuum of activities distinguished by the granularity of its domain elements.

This research posits system usage can be applied in the assessment of website performance and system usage as an intervening variable in the relationship between website quality and IS Impact.

4.2 Website Satisfaction

Satisfaction, according to Oliver (2010), is the psychological result that is achieved by users from the emotion surrounding disconfirmed expectations and it is connected with a user's prior feelings about the user experience. From this perspective, satisfaction may be best explained as an ongoing evaluation of surprise inherent in a 'product' acquisition and/or using experience. Gable et al. (2008) confirm that satisfaction is an immediate consequence of IS-Impact.

In the context of website performance, there are two kinds of satisfaction that need to be assessed: user satisfaction and organisational satisfaction (Huizingh, 2002). According to Huizingh (2002), user satisfaction refers to the extent to which the website meets or exceeds the expectations of website users while organisational satisfaction reflects how satisfied the organisation is with the overall results of the website investment.

The satisfaction of website users, measured via the users' emotional response to the website, commonly holds a central stake when website satisfaction is under consideration (Stockdale & Lin, 2008). Organisational satisfaction has been investigated less frequently, but website use statistics may have a greater influence on the organisational satisfaction with the website (Ghandour, 2010). In both cases, website users and organisations are both key stakeholders in website satisfaction.

In this study, satisfaction is defined as the contentment of both the website user and the organisation (website owner) with respect to his/her prior using experience.

4.3 Website Service Quality

According to DeLone and McLean (2004) service quality is defined by the overall support delivered by the service provider. Service quality is important in an e-commerce environment because users are not only employees but also customers. Therefore, poor user support can lead to lost customers and lost revenue. Oliver (1993) and Gable et al. (2008) both affirm that service quality is an immediate antecedent of customer satisfaction, or, in other words, satisfaction is an immediate consequence of service quality. Pitt et al. (1997) note that IS researchers mismeasure effectiveness if they do not include in their assessment package a measure of service quality. This study, therefore, is concerned with the effect of satisfaction as an immediate consequence of IS-Impact and service quality in the website performance context.

5 PROPOSED RESEARCH METHODOLOGY

The research approach proposed for this study is a two-stage quantitative research approach. An exploratory phase and confirmatory phase will be used to address the above research questions.

5.1 The Exploratory Phase

Adapted from the two-step approach of Burton-Jones and Straub (2006), this phase is used to choose the salient constructs and measures for the website usage activity. Herein, an identification survey instrument will be developed to measure the study's research constructs. The identification survey aims to test the completeness and the applicability of the IS-Impact model's dimensions and measures in the new context (in this case the unit of analysis in this research study will be a University Business school website's performance). Doing so will ensure that the measures and constructs are not only conceptually but also empirically relevant in the website performance context. In addition, new measures or constructs not already identified in the literature of IS-Impact but of possible significance in the website environment will be identified. A pre-test of the survey instrument will be conducted.

This test is intended to acquire empirical feedback from expert participants to assess the appropriateness of the original survey instrument (Lewis, Templeton, & Byrd, 2005). In doing so, the feedback from participants over the survey design such as format, content, comprehensibility, terminology, and ease and speed of completion, will be used to make any necessary adjustments to the instrument.

Following the pre-test, a pilot test will be performed using a small sample similar to the target sample of the main survey (Lewis et al., 2005). Further, adopting Lawshe's (1975) approach, item screening will be used to empirically screen the website usage, website satisfaction and service quality constructs. Furthermore, a content validity ratio will be used as a quantitative approach to ensure content of items for the three constructs. After that, items that are not statistically significant will be dropped from the survey instrument.

5.2 The Confirmatory Phase

The confirmatory survey aims to further validate the model and instrument derived from the exploratory phase, as well as to re-evaluate the model and measures using quantitative data. The exploratory forms the foundation for the main study. The results of the exploratory phase will be used to develop this main survey. In this phase, both an online and paper survey will be sent to about 4000 current students, 1000 prospective students who are doing Pre-enrolment English Program, 215 staff (including 30 senior academic manager staff and professional managers, 125 academic staff and 60 professional staff) of the University's Business School. From the findings of the main survey the research hypotheses will be revisited in order to interpret the results and present the conclusions of the study.

6 CURRENT STAGE OF THE RESEARCH

Currently, the study is entering the explanatory phase of the proposed research methodology. In this phase, the definition of the study has been completed examining relevant issues relating to the IS-Impact model. An evaluation has been made of current challenges in relation to construct measurement and validation in research.

Based on the prior literature, the study has modified items for measuring website performance and been developing items for measuring website satisfaction from the view of both the organisation and the website users.

7 PLANS FOR COMPLETION

The current plan for completing the research is as follows:

- modify items for measuring website performance   June 2012,
- develop items for measuring website satisfaction   August 2012,
- develop identification survey instrument   September 2012,
- perform pre-test study   October 2012,

- conduct pilot content validity test   November to December 2012,
- perform data analysis   December 2012 to January 2013,
- revise survey instrument for the main survey   February 2013,
- conduct main survey   February to May 2013,
- perform data analysis   June to August 2013,
- write thesis   September 2013 to July 2014,
- submit thesis   August 2014.

8   Conclusion

This research study is motivated by the research gaps identified in prior literature (Ghandour, Benwell, & Deans, 2011; Burton-Jones & Gallivan, 2007; Petter, DeLone & McLean, 2008) and the opportunity for a significant practical and theoretical contribution. The study will lead to an increased understanding of the factors that impact website performance, in particular taking into account multiple levels of usage as a measure of performance. The integrated theoretical model proposed also advances the robustness and scope of the existing theoretical framework.

The proposed research design minimises the threats to the validity of the research results and its wider conclusions whilst ensuring a significant practical and theoretical contribution. The survey research approach is adopted in the study as the survey is useful for studying representative populations and, although slightly limited in internal validity, can provide accurate, reliable and externally valid data.

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