

VALIDATION OF CONTENT MANAGEMENT SYSTEMS: USERS EXPERIENCES

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—Abstract —

A content management system is ubiquitous and trouble-free in managing accurate, up-to-date, easily accessible and systematically organised information. The main aim of this study was to explore the perceptions of the e-Learning officials regarding the quality of content populated in the content management system (CMS) of the e-Learning unit of Gauteng Department of Education (GDE). This study used the Information Systems Success Model (ISSM) to validate user experiences. A mixed methods research approach incorporated a questionnaire and a series of focus group interviews to explore the perceptions of the e-Learning officials. The study used convenience sampling to select a sample of 15 e-Learning managers (Deputy Chief Education Specialists) and 30 e-Learning subordinates (Senior Education Specialists). The findings revealed that the information in the CMS was relevant and that all the activities in the e-Learning unit were performed as expected. Furthermore, the instructions to navigate the system were clear. This study gives a better insight into how the quality of information within a system is understood during development and evaluation. This contribution adds to the literature on e-Learning and could be used as a guideline for ensuring the quality of information in systems content development.

Key Words: *Digital, e-Learning, content management system, information quality, Information System Success Model*

JEL Classification: 030, 032, 039

1. INTRODUCTION

The implementation of e-Learning in the South African education system since the early 1990s has entirely transformed educational operations (Al-Samarraie, Teo & Abbas, 2013). Users can be motivated to use e-Learning systems since they are available anytime and anywhere (Hong, Tai, Hwang, Kuo & Chen, 2017). E-Learning encompasses, amongst other things, content management systems (CMSs), Learning Management Systems (LMSs), as well as content design and development to ensure the quality of information, system and service by the designers and facilitators (Muries & Masele, 2017:126). Stoffregen, Pawlowski and Pirkkalainen (2015) reviewed the barriers to e-Learning systems and identified a gap between user satisfaction and usage expectancy on public sector e-Learning systems. Thus, the cause for concern becomes why are users not satisfied with e-Learning systems.

Regarding e-Learning systems, the majority of institutions of higher learning in South Africa have migrated to LMS for their daily academic and administrative operations (Bagarukayo & Kalema, 2015). Furthermore, universities are implementing LMSs such as Blackboard, Moodle and SharePoint platforms to enrol students; design e-Learning courses and simulations; as a learning transfer medium; to make available courses for sharing and collaboration in blended learning environments; to supplement course delivery, with extra support to learners in large classes with online materials as well as support for instructors with learning design; for teaching and learning and as a content repository (Bagarukayo & Kalema, 2015). In addition, LMSs and CMSs may benefit organisations by improving customer satisfaction, streamlining of processes, employees' productivity improvement, tracking of information, elimination of useless information in storages and quantifying business continuity (Marutha & Ngulube, 2018).

Since the introduction of e-Learning in the South African education system, the Department of Education (GDE) in Gauteng, a province of South Africa, has developed an interest in implementing e-Learning initiatives such as CMSs to deliver and achieve organisational goals and objectives. E-Learning plays a significant role in enabling institutions to share in the best practices and experiences within and outside the country (Danaj, Dumi, Zejneli, & Çelo, 2013). Furthermore, e-Learning enables people to collaborate in accessing, creating and publishing material in different contexts that incorporate the use of digital, auditory and text-based resources (Naidoo, 2017). In this regard, the key features

of a CMS such as creation, acquisition, organisation, storage, distribution and usage can be used in an interactive way to create a conducive and effective work environment (Detlor, Hupfer, Ruhi & Zhao, 2013). Information quality is an important factor of a CMS that is often disregarded when developing systems. This is because information quality is perceived as an important antecedent for encouraging users to use the system (Urbach & Müller, 2012).

Content Management Systems that were in place before the advent of the new CMS technology were not effective enough to handle and interpret file formats and store them in the CMS repository (Kaluža, Vukelić & Rojko, 2016). Therefore, this study intends to explore the perceptions of the e-Learning officials regarding the quality of content populated in the content management system (CMS) of the e-Learning Unit of the GDE. The Content Management System in this study was specifically designed for the management of the e-Learning unit at a district level. It should be noted that the content referred to in this study is not relevant to a school context; it is content for the e-Learning unit at a district level in GDE. The e-Learning CMS that is referred to, is an artefact designed for the e-Learning officials to use when performing their duties in the e-Learning unit. The e-Learning officials in this study include the Deputy Chief Education Specialists (DCEs) and the Senior Education Specialists (SESs) in the GDE district. To be specific, the DCEs are the managers in the e-Learning unit whereas the SESs are the subordinates reporting to the DCEs. The following research question guided the study:

- *What are the perceptions of the e-Learning officials regarding the quality of information populated in a content management system (CMS) for the e-Learning unit?*

2. CONCEPTUAL UNDERPINNING OF THE STUDY

2.1. The concept of information quality in a CMS

The literature review revealed that information quality focuses on constructs of information system output such as relevance, understandability, accuracy, conciseness, completeness, currency, timeliness, and usability (Petter, DeLone & McLean, 2008; DeLone & McLean, 2003). This type of information quality is often regarded as an important antecedent of user satisfaction (Urbach & Müller, 2012). However, research into the evaluation of CMSs in the South African education system is still in an embryonic stage. Essentially, the evaluation of the quality of end users' CMSs has received limited attention in terms of research

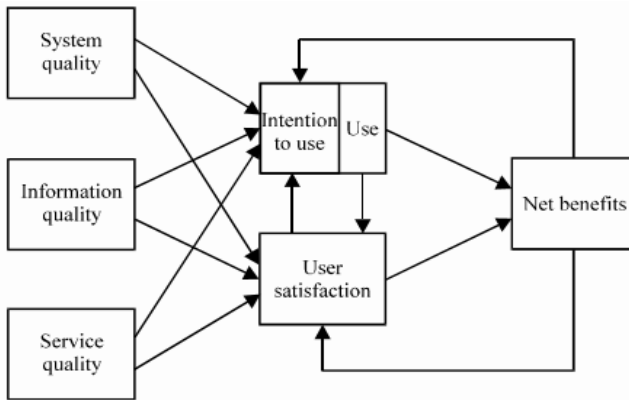
(Suwawi, Darwiyanto & Rochmani, 2015). In addition, Wang, Wang and Shee (2007) illustrate that the following items should be considered when evaluating a system for information quality:

- information that is exactly what you need
- information that you need is available at the right time
- information that is relevant to your job
- sufficient information
- information that is easy to understand
- up-to-date information

Additionally, Gorla, Somers and Wong (2010) discovered that if the information in a system is not relevant and delivered on time, that it will frustrate the users, as well as prevent them from performing their duties. Thus, information should be relevant, complete and accurate. Following on this, it becomes crucial for researchers to acquaint themselves with the appropriate measures to ensure information quality in information systems in various contexts (Lim & Kim, 2014).

The focus of the study was to determine the perceptions of the e-Learning officials while evaluating the quality of information in a content management system (CMS) according to the constructs of the ISSM (Information Systems Success Model) model (DeLone & McLean, 2003). Therefore, the study is located within the frameworks of theories of design and evaluation (Gagne, Wager, Golas, Keller & Russell, 2005; DeLone & McLean, 2003). Theories serve as conceptual frameworks that direct and forecast the study by outlining the relationship between constructs (Steinberg, Bringle & McGuire, 2012). These constructs are referred to as hypothetical entities under investigation. Information quality is one of the attributes that contribute to the success of information systems (Urbach & Müller, 2012). Thus, information quality was the main construct used for this study – as depicted in the model of DeLone & McLean (2003) in Figure 1:

Figure-1:DeLone and McLean updated ISSM (2003)



Source: DeLone and McLean (2003)

The Information Systems Success Model (ISSM) consists of constructs such as system quality, information quality, service quality, intention to use, user satisfaction and net benefits. These are discussed in Table 1:

Table 1: Information systems success model variables

No	Construct	Description
1	System quality	The desirable characteristics of an information system. For example: ease of use, system flexibility, system reliability, and ease of learning, as well as system features of intuitiveness, sophistication, flexibility, and response times.
2	Information quality	The desirable characteristics of the system outputs; that is, management reports and Web pages. For example: relevance, understandability, accuracy, conciseness, completeness, currency, timeliness, and usability.
3	Service quality	The quality of the support that system users receive from the IS department and IT support personnel. For example: responsiveness, accuracy, reliability, technical competence, and empathy of the personnel staff.
4	Intention to use	The degree and manner in which staff and customers utilise the capabilities of an information system. For example: amount of use, frequency of use, nature of use, appropriateness of use, extent of use, and purpose of use.
5	User satisfaction	Users' level of satisfaction with reports, websites, and support services.
6	Net benefits	The extent to which IS are contributing to the success of individuals, groups, organisations, industries, and nations. For example: improved decision-making, improved productivity, increased sales, cost reductions, improved profits, market efficiency, consumer welfare, creation of jobs, and economic development.

Source: DeLone and McLean (2003)

This study made a conscious and informed decision to use the ISSM model to evaluate the quality of information in the e-Learning CMS. Figure 2 depicts the e-Learning CMS designed by the researcher and used in this research.

Figure-2: e-Learning CMS



(Adapted from Joomla, 2013)

3. METHODS

A mixed methods research approach was used to ensure that the users' perceptions of the quality of the information in the e-Learning CMS are articulated. The researcher used qualitative research method in order to get "multiple realities rooted in subjects' viewpoints" that occur in a natural setting (Brink, 2010; Streubert & Carpenter, 2011; Wiersma & Jurs, 2009) and quantitative research method to collect close-ended quantitative data (Creswell & Creswell, 2017). This study intentionally employed a case study design (Yin,

2009) to identify the different perspectives that the GDE e-Learning officials have on the quality of information in the content management system (CMS). This study employed a convenience sample to select participants based on their interest, availability and representation of specific characteristics (Creswell & Creswell, 2017). The e-Learning officials that were included in the convenience sample was therefore selected because they were interested to participate and also available for post-interview consultation. In total, 45 participants (15 DCEs and 30 SESs) were sampled and included in the study. Participation in the study was voluntary and participants were informed that they could withdraw from the study at any time. Qualitative data were collected by means of focus group interviews that were recorded and that were later transcribed verbatim from the audio recordings. Quantitative data on the perceptions of e-Learning officials about the quality of the information in the e-Learning CMS was collected by means of questionnaires, using a five-point Likert scale ranging from 5 = Strongly agree; 4 = Agree; 3 = Neutral; 2 = Disagree; to 1 = Strongly disagree.

Qualitative data analysis was undertaken to derive meaning from the collected data, as well as to understand and interpret it (Miles, Huberman & Saldana, 2013; Polit & Beck, 2006) whilst quantitative data analysis was undertaken to provide answers to the research question. Qualitative data sourced from the focus group interviews were analysed by using Tesch's technique for qualitative data analysis (2013). Data analysis was done by breaking up the data into manageable themes, patterns, trends and relationships (Tesch, 2013; Babbie & Mouton, 2007). Furthermore, in analysing the qualitative data for this study, themes and categories were identified, described and coded as guided by Tesch (2013:118). Equally, quantitative data analysis was descriptive in nature. Statistics for all variables were calculated and the output information was presented in the form of tables.

3.1 Triangulation

The purpose of triangulation is to obtain complementary data on the same topic through the use of different methods (Creswell & Creswell, 2017). The aim is to bring together strengths and non-overlapping weaknesses in order to increase the validity of the data or to corroborate data (Sandelowski, 2000). It generally involves the concurrent, but separate, collection and analysis of qualitative and quantitative data where the two data sets are brought together during the interpretation (Tashakkori & Teddlie, 1998). In this study the triangulation design was used to validate qualitative results. Triangulation was ensured in this study by

combining qualitative and quantitative methods of collecting data (LoBiondo-Wood & Haber, 2006). This study collected data from multiple sources such as questionnaires and focus group interviews, with the intention of obtaining diverse views of the phenomenon under investigation (Cohen, Manion & Morrison, 2007). Triangulation was furthermore ensured by the mixing of data or methods to discover diverse viewpoints or standpoints to cast light on the topic under investigation (LoBiondo-Wood & Haber, 2010).

4. FINDINGS AND DISCUSSION

This study explored the perceptions of the e-Learning officials regarding the quality of information populated in the content management system (CMS) for the e-Learning unit. The results shown in Table 2 demonstrate the information quality mean scores for both DCEs and SESs.

Table 2: Information quality mean scores for DCEs and SESs

	N	Minimum	Maximum	Mean	Std. Deviation
The CMS provides relevant information	36	4	5	4.58	.500
The CMS provides information you need at the right time	36	3	5	4.53	.560
The CMS provides sufficient information	36	2	5	4.14	.683
The CMS provides information that is easy to understand	36	4	5	4.47	.506
The CMS provides up-to-date information	36	3	5	4.33	.717

The mean scores for providing “relevant information” (4.58) and “information you need at the right time” (4.53) show that the respondents strongly agreed that the information provided was relevant (Table 2). Additionally, the findings from qualitative data analysis revealed that the relevant information for the e-Learning unit was available within the content management system. Gorla et al, (2010)

mentioned that it is commendable for the information in a system to be available and relevant. Participants commented that all the necessary e-Learning information was available – even information pertaining to the Department of Basic Education. These findings are consistent with Wang, Wang and Shee (2007) who state that information quality in a system should be information that is exactly what you need, information you need that is available at the right time, information that is relevant to your job, sufficient information, information that is easy to understand, and up-to-date information. These authors also indicated that a system with quality information had clear instructions to follow. The findings of the study show that, similarly, participants indicated that they found the e-Learning information as expected and that all the activities that they were performing in the e-Learning unit were included. Based on the interviews the participants also described the importance of information quality as follows:

“Well I expected to find resources for e-Learning and that’s exactly what I did, some of them I was actually surprised to find them there.” (Francina).

“It covers almost all the activities that we are doing in eLearning.” (Matome).

More over, the content available on the system was even more than what the participants expected, as verbalised by another participant:

“I never thought I’ll find these whole lot of resources so what I found was not one of my expectations.” (Maria).

These findings are further elaborated upon in Table 3 that displays the frequencies for information quality variables, based on the Likert-scale options. Table 3 provides a summary of the valid values for each case.

Table 3: Information quality frequencies

Information quality		Responses	
		N	Percent
	Disagree	1	2.8%
	Neutral	9	25%
	Agree	16	44.4%
	Strongly agree	10	27.8%
Total		36	100.0%

As for information quality of the e-Learning CMS, 25% of the respondents were neutral, 2.8% disagreed, 44.4% agreed with the information quality whilst 27.8 strongly agreed (Table 3). When 44.4% of the respondents agree with information quality, then it means that the information within the system was of quality. The findings further illustrated that the quality of information for the e-Learning CMS was available, easy to retrieve and systematic. Overall, the study illustrated that the system information was available, clear and sufficient to enable e-Learning officials to perform their duties. This is in line with the statement of Rodrigues, Sarabdeen and Balasubramanian (2016) that information in a system should be exactly what you need at the right time, relevant to your job, sufficient, easy to understand and up-to-date. Gorla, et al. (2010) support the assertion by stating that information should be relevant, complete and accurate.

These extracts suggest that an effective system has well-structured information that is interlinked and easily acceptable to the users. Users do not want to find themselves going in and out of the system; they work more easily when all the information is in one place. When the system is functional and easy to use, users associate that with high quality information. The findings are corroborated by Liu Li and Hu (2013) who identified the quality of information, content and the system performance as elements of high priority in satisfying users' information needs. In addition, DeLone and McLean (2004) emphasise that users are more satisfied with the system when the information quality and system quality are high.

Nevertheless, the study also revealed that challenges were experienced in terms of competency skills, internet connectivity and navigation. The study found that participants experienced challenges when navigating the tablets they were using to access the e-Learning CMS. Internet connectivity posed challenges because when the connectivity was poor the participants could not use the system effectively. The findings of the study support the statement by Nagunwa and Lwoga (2013) that slow internet connectivity and inadequate computer skills pose a challenge to users. In addition, (Russell, 2014) points out that when accessibility of the system is not easy, it becomes a barrier to the users of the system. This calls for a system that is trouble-free for the users.

5. CONCLUSION

Based on the findings, this study reached several conclusions. Firstly, results of the quantitative analysis indicated the importance of having the relevant

information and at the right time. Thus, system designers should make full use of the completeness, availability, and accuracy of information to increase the quality of information in a content management system (CMS). Secondly, the results of the qualitative analysis findings indicated that the relevance of information in a content management system satisfies the users' expectations. Similarly, the results of the investigation uncovered that the users' expectations of the quality of information in a system are actually high. This research contributed to the knowledge and practice in the fields of information systems and e-Learning systems in the South African education system, in terms of the users' perceptions of the quality of information in the systems used. In conclusion, systems information is always subject to further improvement in the future.

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