Association for Information Systems
AIS Electronic Library (AISeL)

CONF-IRM 2016 Proceedings

International Conference on Information Resources Management (CONF-IRM)

2016

Management of ICT in education: A meta-study on the local (South African and International research landscape

Moira Bladergroen
mbladergroen@sun.ac.za

Sheryl Buckley
bucklsb@unisa.ac.za

41. Management of ICT in education: A meta-study on the local (South African and International research landscape

Moira Bladergroen
mbladergroen@sun.ac.za

Sheryl Buckley
bucklsb@unisa.ac.za

Abstract

Despite early optimism, the benefits and impact of information and communication technology investments in education have not been successfully noticeable to date. This is particularly challenging in view of the continual global pressure for the digitisation of education. This paper addresses the quantifiable array of research on the management of information and communication technology in education (MICTED). Articles published between January 2010 and December 2014 in ten free, open-source, peer-reviewed electronic journals were collected to ascertain current research trends on MICTED. Through a meta-analysis a representative sample was obtained that enabled generalisation across local and international boundaries on the MICTED. A humanist approach was used to develop post-priori quantitative analysis. The data indicates a vacuity in research on MICTED. A need for empirical research on MICTED exist that will inform and guide all role players in the South African education and global context on the implementation, use and sustainability of ICT in education.

Keywords

Management, ICT, Education, Meta study

1. Introduction

Ever since the introduction of information and communication technology (ICT) in schools, education became an international space where both teacher and learner function. In the meantime a need developed to look at the management of this borderless space that entered the education context.

Despite early optimism, the benefits of ICT investments in education are not (yet) fully realised. This is especially problematic in view of the rapid on-going digitisation of so many aspects of education. Even though there are different strategies for organising education in general, very little was found in literature on the management of ICT in education. This is particularly interesting given the plethora of research available on 'ICT in education'. Policy makers and senior education managers need to recognise that contention and confusion between role players with different beliefs and expectations are likely to develop in the absence of well-orchestrated institutional managerial directions.

Also, research is a key feature of the education landscape and ought to influence the decisions made by top structures in the educational domain. The question can rightfully be asked why the South African education system is struggling to implement, use and sustain ICT in education. As a result of these challenges, a need developed to generate valid and plausible descriptions and comparison of MICTED in the South African and International contexts, as the current state of affairs (in South Africa) did not provide the necessary evidence of sustainable implementation and use (Rahimi, Beer and Sewchurran, 2012; Baskaran and Muchie, 2006: 202-203; Hilbert and Snyman, 2007))

2. Management, Education and ICT reconsidered

2.1 Management

When reference to management is made it often refers to; (1) the interconnection between various functions. This includes the creation and executing of institutional policies through the planning, organizing, structuring, processing, controlling, evaluation and reporting of/on those activities, (2) the organization and coordination of activities to achieve the objectives of the institution, and (3) the people in the institution who have the responsibility and power to make decisions and to ensure that they are achieved (unknown, 'Todays concept of management'). In a schooling context, guidelines are always available on how to organize and coordinate school activities to achieve the objectives of the institution, and the role of management in securing the outcomes of institutional objectives (White Paper on E - Education, 2004). This Meta study went from the proposition that the effective implementation and use of ICT in Education requires thorough planning, organizing, structuring, processing, controlling, evaluation and reporting of/on activities.

Trying to implement change in an educational institution can be a daunting task, even more when ICT is involved. Bennet et al (2007) identified middle leadership as the crucial level where change can take effect. However in the education context collegiality takes preference over management structures. Teachers prefer learning from each other rather than monitoring each other (Bennet et al, 2007). Also, the collegial culture is that as long as you know 'what' to do, the 'how to do it' remains an individual and private (professional) space. Although there is discrepancy in the 'what' and the 'how' of teaching, teachers still expect their immediate senior to be accountable for the quality of teaching, competence and quantity assurance of the teaching process and outputs. Bennet et al (2007) also identified the mismatch between collegiality amongst departmental colleagues' vs collegiality amongst colleagues in the broader structures of the school leading to 'subcultural fragmentation'. Senior teachers prefer to act as managers looking after 'human and teaching resources', i.e. managers of the curriculum instead of acting like managers who monitors classroom activities, i.e. managers of colleagues. Collegiality according to Bennet et al (2007) is currently the virus that ensures individuated groups in schools which in turn decapitates effective change. Whether teaching experts will automatically be good ICT users and implementers remains to be explored. Unless change is effectively managed, failure is unavoidable.

Building onto this is Bennet et.al. (2007:464) contention that any change in a traditional setting creates uncertainty and poses new threats and challenges. It has not been proven that traditional practices produce less successful results than emerging practices. Nonetheless when change is envisaged, the desired modifications are to be complemented with a

framework that reduces traditional practices to a barrier to change. If this is not so, institutional change will not be successfully implemented; little learning will take place and practices will become paralysed. All the same for traditional school hierarchies – continued existence of existing management structures cripples articulation and the development of implicit knowledge. It is in articulation of the desired modifications that traditional views can be challenged and regenerated on the road to a participatory decision-making tradition. Demanding teachers to use ICT in education is not going to make it happen. A cyclical loop of structure, agency and restructuring is needed for change to be successful in a traditional context. If a traditional organisational hierarchical structure and culture persist in the context where ICT is introduced, organisational culture of differentiation and fragmentation will continue to exist and the adoption of a highly dynamic tool will remain unsuccessful.

Change can occur in one of two situations: Firstly, changes occur in line with the expectations of the teachers, or secondly, the changes must be so radical that there is no opportunity to fall back on the old modus operandi and thinking. Existing knowledgeability and capabilities need to be challenged and actions which cause conflict in existing structures of reality may assume the role that leaders take in schools.

2.2 Education (and its Context)

To discuss MICTED outside the multicultural context of South Africa (SA) will be ill conceived. The previous section illustrates how groups in an organisation form their own culture through their shared beliefs systems and practices. School cultures are embedded in wider cultures (local and international context), generic culture (educators as professionals), the distinct culture as addressed in the previous section and the perceived culture (how outsiders to the school view the school (Prosser 1999 in Lumby, 2012).

Lumby (2012) identified various elements which are typified under culture (context), namely socio-economic classes, level of education, organisational culture; approaches to specific subjects, approaches to teaching and learning, a subjects curriculum etc. Culture often exemplifies a division which is associated with an accent on power (Lumby, 2012). People accept their position and abilities and capabilities because they don't know any better or because they view them as unchangeable.

An illustration of the role of power can be found in the SA education system that underwent four major changes in the past 20 years. Whichever way the culture of teaching and learning was amended, the hierarchical management system remained unchanged. Also cultural boundaries of management remained unchanged, i.e. power changed in terms of political groups, but remained in the hands of whoever is the manager. Amidst all these changes the defining point of institutional and individual references remained embedded in the apartheid system; i.e. the impact of the apartheid system remained the point of reference to all discussions and changes that were envisaged. During all these changes the idea of ICT in education has been shadowing the education arena.

Pressure exerted by the international culture of technologically driven societies cascaded down through government and businesses to the poorest of the poor. Although other units of culture showed slow changes (e.g. socio-economic wellbeing of the SA citizens) the impact of the international pressure for technolisation is most noticeable in the explosion of mobile communication in SA. Furthermore the reflection of global pressure is visible in the

governments' persistence to allocate millions of rand for ICT exposure disconnected from simultaneous improvements of the socio-economic wellbeing of all SA's (Meyer, 2014).
Furthermore, the disparity in socio-economic wellbeing of the masses in SA impacts the educational outlook for the teacher. Ncontsa and Shumba (2013) found that **'**bullying, vandalism, gangsterism, indiscipline, intolerance, and corporal punishment were the most prevalent forms of school violence in schools… the effect of school violence on learning and teaching is devastating and, as a result, the educational goals of schools cannot be attained'.

2.3 ICT (within the Schooling context)

There is no shortage on literature addressing the role, perception and perceived importance of ICT in the teaching and learning context (Ting, 2005). The importance of the role that the teacher plays in the implementation of ICT in the teaching and learning environment has been 'over researched" (Jo Shan, 2013). The advantages of using early adopters and champions during the implementation phases of ICT in education appears to be the preferred method.
Idealistic expectations involves an immediate uniform improvement in learners' academic performance levels, irrespective of community or school culture. Lumby (2012) rightfully asks if the availability of ICT is enough to move learners into 'the cloud of perfection' devoid from the realities that awaits outside 'the cloud'. The current dominant educational culture in South Africa is poorly managed, characterised by a haphazard and superficial approach and implementation that continues to perpetuate the status quo with all its inequalities.

Government and School managers captured all the right nuances in the White Paper on Education, but in practice the educational context cannot meet the requirements and needs of both learner and community. An inevitable survival strategy of trivialisation of the education culture of both becomes the coping mechanism of the teachers. Adjustments to the curriculum time after time becomes a sort after solution for the ailing education system in SA. Changing pedagogy for increased and improved learning remains an illusion pursued by government.

According to Czerniewicz (2004:150) and Bytheway, (2011) managing ICTs in education demands attention to issues of culture, a recognition of the importance of people, and an attention to the sociology and socio-economic conditions that prevail. These include:

a) The use of ICTs in any environment imposes high levels of change. Depending whether the focus is on simple efficiency, or on higher levels of educational effectiveness the degree of change involved varies and education management needs to respond accordingly.
b) There is considerable evidence that in South Africa the ability of many educational institutions to accommodate and successfully manage change (at all levels) is very limited. The last two decades witnessed how ICT superseded challenges created through time and space. Recognition needs to be given that technology is a driver of change.
c) The uniqueness of South Africa is visible in the socio-economic differences, which directly affects the different needs for, and in technology. "One size" does not fit all, and access to technology does not in itself ensure access to equal educational opportunity."
d) The life-cycle of technologies reveals a vast changing environment which the different needs of managing ICTs in education over time must adapt to.

e) The future is not about South Africa alone, it is about South Africa in a highly connected and competitive world.
f) Perceptions are just as important as reality. Statistical research can easily disguise the cliché between perceptions and realities. Managing expectations and perceptions is just as important as managing the realities.

3. Rationale for the project

Although the business of education is a complex and slow changing industry, South Africa ascribed to the United Nations goals of a National Broadband Strategy, namely affordable entry level internet availability, 40% of households to be exposed to the internet and a 50% internet penetration to all developing countries. So far SA only succeeded in developing a national broadband strategy and having a 50% internet penetration rate. The basic right to exposure, accessibility and affordability of the internet is not possible to 53% (i.e. 28 million) of South Africans. World citizenship, communication and social cohesion is not obtainable to many SA citizens. Dumping laptops in schools without the necessary training to staff is an infringement of the basic rights as suggested by the UN (Hart, 2007). Superimposing the management of ICTs on the many other complexities at hand in education creates serious challenges to deal with. But managing the complexity may be one of the critical competencies needed to make the best of the opportunities created by the use of ICT in education (Hennessy et al., 2005).

4. Aims and Objective

The research aimed to quantify the array of research on the management of information and communication technology in education in South Africa and abroad. Thereafter the focus of selected samples which focused on MICTED will be identified. Lastly the recommended strategies (if any) for a positive impact and outcomes of MICTED will be identified and categorized.

5. Research Design

The researcher took a humanist stand (i.e. the researcher aimed to produce a universal account of the results, rather than giving a reductionist view on the results.

A mixed method approach was followed. Both qualitative and quantitative analysis of the available evidence were done. A model for future researchers and the education communities at large will be developed from the quantitative data.

5.1 Research Methods – Data sources

Data was collected from ten randomly selected free, open-source, peer-reviewed electronic journals published from January 2010 to December 2014. Google scholar was the preferred search engine and English the preferred language of publications. The research landscape includes all levels of education, i.e. primary to tertiary education.

5.2 Limitations of the study

Given the extent of academic publications on the World Wide Web, it is possible that there may be articles published on the MICTED, but cognisance was given to the fact that most

teachers and students in their personal and private capacity in the South African context may not automatically have access to paid e-journals. Hence the sample of convenience.

Also, this paper only presents the quantitative findings of the study and does not touch on the qualitative analysis of the data. These will be reported on elsewhere

6. Data analysis

The researcher believes that MICTED is an emergent field, hence the ambiguity on the variables that may emerge from the data.

The articles were collected and organized for triangulation in two single searchable interfaces, namely zotero and endnote. Abstracts, full text and references were thus conveniently available. By using the two interfaces smaller sub-data bases were created by using key criteria keywords (technology, education, and management or similar). The articles that fitted the main criteria namely MICTED were extracted for more detailed explorations. The qualitative discussion of these articles follow in succeeding articles.
The subset sample was pulled into a qualitative content analyser (QCA) as developed by Bytheway (2013) for further analysis to address the research aims and objectives. The QCA allows for both quantitative and qualitative data analysis.

Documented data was coded into a-priori and posteriori categories. The coding was subjected to frequency and title analysis in order to address the principal aims and objectives. The specifics of the coding were guided by qualitative methods originated by Schutz (1959) and subsequently refined by Strauss and Corbin (1998). Thematic development then followed in order to aggregate the results and develop themes that address the objectives of the project. Where there were overlaps of categories they were grouped, for example, management consist of manage, management, manager(s), leader(s), planning etc,

7. Results

Data were collected from ten free, open source, peer reviewed journals. Table 1 illuminate the total number of articles that focused on the three categories namely technology (858); education (1891) and management (59). This presentation does not represent the spreading across the different journals, since 6 out of 10 journals focus primarily on education with a secondary or added focus on technology and/or management.

When consideration is given to the coverage of any of the three specialised areas (Graph 1) the data shows an overlap between management and education in 16 of the articles, 6 articles addressed both ICT and Management and 41 articles focused specifically on ICT and Education)

When the titles of the articles are analyzed, the focus on technology are 137, with a total of 11 which used the concept of ‘information and communication technology, and 19 titles referred to ‘information technology’. The concept ‘digital’ was found in 32 out of 1931 articles.

Table 1. Journal article focus area (Jan 2010-Dec 2014)

Journals	Titles covering --		
	Technology	**Education**	**Management**
AERJ	1	172	1
Australian J	266	261	11
Brock	2	52	0
Current Issue	1	171	0
European J	4	179	12
Int J of Ed R	1	199	2
IJEdev	77	134	6
IJTinTL	6	0	0
Issues and trends	5	5	0
RLT	6	3	0
SAJE	3	237	4
TOJET	486	478	23
Total	**858**	**1891**	**59**

What is interesting is that research focusing on the use, role and impact of cell phones is very low. In 2013, South Africa had 59,474,500 registered cell phone numbers which equals more than one cell phone number per capita. Increasingly the focus is moving towards the use of smart phones in and for the teaching and learning context, yet no articles shows any concern on any aspect of cell phone use in the classroom. That is not to say that no research is done on the issue, but it does indicate a reduced interest in the journals consulted in a digital device that is taken the lives of those we educate by storm.

When the subcategories of management are mapped onto the total 1891 articles (Table 2), only 4 articles address the concept ‘planning’. But none of these relate to a combination of Education and ICT, or Management and ICT.

The other subcategories namely structuring, processing, controlling, and evaluation (all key concepts when management in a context is considered) are not directly reflected in any of the 1891 articles.

Graph 1. Journal article focus area overlaps (Jan 2010-Dec 2014)

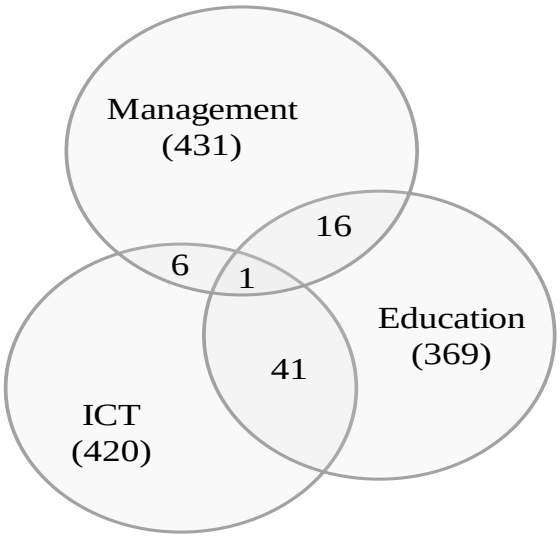

Table 2. Management tasks focus area sub-categories

Management subcategories	Number of articles	Post-priori criteria		
		Education and ICT	Management and ICT	Education and Management
Planning	4	0	0	0
Organising	8	1	0	0
Structuring	8	0	0	0
Processing	34	0	0	0
Controlling	9	0	0	0
Evaluation	45	0	0	1
Reporting	2	0	0	0

Further analysis on the word 'management' yielded a thought-provoking pattern (Table 3). The majority of management related articles focused on Learning Management System, LMS (33%). There appears to be a high premium on the systems which organise and manage e-learning within an institution. So, even though 14 out of 42 articles focused one way or the other on the management and delivery of learning, they are not proposing the way it should be done. The administrative management of teaching and learning seems to be well taken care of, but should that be the main focus of researching ICT in education? When LMS becomes the main focus for researching ICT in education, where does the student fit in? This question holds equally true for the 19% of articles which focused on Knowledge Management System (KMS). Improving teachers and schools' competitive edge appears more significant to researchers then for example students' abilities. This skewedness would be pick up if MICTED held an equally strong focus.

The final selection of articles which adhere to the study focus (that is MICTED) included one article from 2010, one article published in 2011 and one article published in 2014:

Omona, Van der Weide and Lubega (2010) focus on the 'development of KM systems frameworks, knowledge processes and knowledge technologies to promote effective management of knowledge for improved service deliveries. No explicit management issues are addressed by the authors.

Sudaryanto (2011), focuses on ICT adoption and the factors affecting adoption in Agriscience. The author recommends future and existing farmers to be exposed to ICT training and hands-on activity to improve their competitive edge in the global market. No explicit management issues are proposed or discussed by the author.

Pouezevara, Mekhael and Darcy (2014), focuse on the planning and evaluation of ICT in an all-girls education program. The partnership with community was part of the main aim of the study. Sustainability was also a main focus including planning and preparations. The authors further addressed hardware related processes and software provision. Suggestions included the management of the infrastructure, creating an enabling environment for all staff including improving their capabilities. Important is that the commitment of Leadership is crucial to the sustainability of ICT in education.

Table 3. Denoted 'management' titles

Sub-categories for 'Management'	Number of articles
Student performance management	1
Learning management systems (LMS)	14
Knowledge management systems (KMS)	8
Bandwidth management	1
Behavior management	1
Health management (incl. stress, intelligence)	3
Content management systems	1
Educational (quality) management, Leadership	3
Change management	1
Assessment management	2
Classroom management	2
Human resource management	1
Time management	1
Sport management	1
Stereotype management	1
Management, education and ICT	1
Total	**42**

It was however the article of Marshall (2010) who efficaciously explored the elements of organisational aspects, leadership and systems during the MICTED. Marshall (2010) argues that technology is the driver of change, and thus of institutional change (systems). Where ICT in tertiary institutions are concerned it is not about the execution of change, but about resource utilisation, sustainability, scalability and reusability of change. Unless tertiary institutions embrace technology it will soon be outdated as an 'institution of society, making their existing organisational models and pedagogies unsustainable'. Marshall (2010) further argues that the change envisaged is dependent on the change culture and leadership decisions of the tertiary institution. He concludes that a lack of change actions relates directly to the lack of management of and in tertiary institutions (amongst other things).

8. Discussion

Technology stands very central in the lives of people and businesses alike. Pressure to conform to this global trend is a recognised occurrence in the South African (SA) context. The willingness to take up the task is captured in the SA government policy documents. Still research done so far on ICT in the South African education system identified a number of difficulties on the implementation and use of ICT in Education. The unsettling evidence of this project suggests a lack of research on the management of ICT in education. From a total of 1713 open access peer-reviewed journals, only one article (Marshall, 2010) successfully addressed the issue of MICTED. Even though the article's theoretical position that technology is the driver of change in tertiary institution is highly contestable. Nevertheless it is encouraging that Marshall (2010) already identified the need for MICTED, but discouraging that researchers up to December 2014 did not see MICTED or subdivisions of it important enough to spend critical energies on.

8.1The impact of a lack of MICTED on education

Dell, Louw and Wilker (2010) as did others suggested that the method of educational instruction is more important than the pattern of delivery, suggesting that ICT does not operate in a vacuum when used within an organisational context; in fact ICT usage are imbedded in the character and culture of the organisation. This culture is fashioned and developed by and through both people and structures.

Since human beings are inherent social beings who acts, feel, live and think, the importance of meaning making, whether through own experiences or through observed experiences, stands central in our understanding of the world at large. Through ICT realities can be created and the user can ascribe to or reject those realities. The response to the 'observed or experienced realities' will be determined by existing societal impact on the users of ICT. It is only when the user is excluded from the realities of everyday life that the realities of ICT can have an uninterrupted effect.

When this argument is projected on the teaching-learning context, the realities created through the use of ICT must be in-line with the ethos of the institution. Reflecting back on earlier writings the teaching and learning context is never value free or politically neutral. The government of the day has a need to enforce their power; they dictate the curriculum according to their own political views and beliefs often to the benefit of the ruling party. ICT is also not a neutral artefact. The developers of hard and software do so with a specific group and need in mind. This initial cultural need is then 'exported' globally thereby penetrating any culture at any given time.

If the explicit curriculum and the silent curriculum are in conflict, ICT may add to the confusion. Through ICT realities can be created that may be projected as the norm – but how will the curriculum address conflicts created through ICT?

The current state of ICT interactions allows human beings to be either in an onlooker position similar to the traditional classroom situation, or be actively involved through hands on activities. Because programs are used the reality of the learning becomes subjective to the creator of program. Who and what the user experience is narrowed down to how advanced the program is. Success or failure is limited to a few responses which direct the teaching-learning moment, with a disregard for other human realities of tiredness, unhappiness, sickness etc. Human assessment, contact and awareness of the realities of the moment which may influence performance are still needed. Realities and perception seem to matter significantly and management of ICT use during the teaching–learning process is thus an obligation and not a choice.

ICT in education assist in strengthening the theoretical base of the learners. Then again the actual practical real life teaching examples are still not readily available. Through ICT instrumental action/practice can be devoid from reality. To ensure that ICT is not used as a means to sweep its users with a flood of existing political and economic systems a need for empirical research on MICTED exist to guide/inform and direct all role players in the South African education context.

8.2 Guidelines on areas to be researched

The following areas can all contribute to a better understanding of MICTED:

a) The study, design, development, application, implementation, support or management of computer-based information are all issues relating to ICT. Perceptions on the use of Information and Communication Technologies in education has been thoroughly researched, but the kind of ICT and its impact of use still requires more careful thought.
b) The various systems which assist education activities need to be thoroughly investigated and evaluated, since information systems (IS) is no new concept to the education sphere; IS has been in existence since the pre-mechanical era The coming of computers saw an exponential growth in the development of IS (electronic record keeping, communication systems etc.). Boundaries to information, communication and application systems moved into the distant past. Efficiency became a given, productivity improved and precision is no longer a form of art. Still research on the management of information systems within an academic sphere is low to non-existent in the articles evaluated. An investigation into the accountability and responsibility in the use, implementation and sustainability of ICT in education is long overdue.
c) The management of ICT in education institutional processes and the impact of ICT usage on those processes remains a perplexing challenge that needs to be explored.
d) The benefits of ICT in an education context has also been thoroughly research, yet no substantial effect studies on a variety of professional education areas (e.g. Engineering) were found in the articles analyzed. In fact no guidelines as to impact studies for any of the above were found within the data analyzed. Measuring motivational factors and levels have been exhaustively explored, but impact and benefits studies over and above emotive factors are still an ignored area in many specialized areas.
e) The didactics and pedagogy on the teaching of realities that is outside the life-experiences of the learner and then getting the learner to internalize those observed realities through the use of ICT is also not clear yet.

9. Conclusion

Many studies already indicate teachers' willingness to use IT in the classroom, but there is a lack of evidence available on how education institutions can be assisted and guided on the implementation, use and sustainability of ICT in the classroom. Lewin et al (1999) however caution against the use of (ICT) purely because it is available; to create uniformity; or because it allows the opportunity to conform and not to reform. Research that focuses on the management and impact of multiple ICT teaching and learning activities in an existing traditional teaching and learning context is required.

The impact of the personality and approachability of the persons involved in MICTED influence staff members' experiences and feelings of satisfaction and success with the implementation and use of ICT in education. Who to appoint and/or the feasibility of criteria for the manager of the implementation and use of ICT in education, capability to 'manage' the integration and use of ICT in education, the time needed (for example a blended learning approach) that is ideal to a specific context, how to improve communication between staff members regarding MICTED, the impact of a constantly changing curriculum on the effective use and implementation of ICT in the classroom; the impact of a rigid curriculum on the effective use and implementation of ICT in the classroom and the impact of a rigid and narrow use of ICT on the teaching-and learning outcome.

Researching all the various aspects of MICTED may guide the managers in the education sphere on the importance (or not) of use (or not) of ICT in education, the correct ICT for the content and outcomes to be achieved and (as an after myth) how the growing culture of instant gratification and shallow development of knowledge is (re-) enforced by the way users are involved during teaching and learning with ICT.

References

Baskaran, A. Muchie, M. & Maharajh, R. 2006. Innovation system for ICT: The case of South Africa. In Baskaran, A. & Muchie, M. Eds. Bridging the digital divide: Innovation systems for ICT in Brazil, China, India, Thailand and Southern Africa. London: Adonis & Abbey: pp. 181-209.

Bennet, N., Woods, P., Wise, C., and Newton, W. (2007). Understanding of middle leadership in secondary schools: A review of empirical research. School Leadership and Management, 27(5), pp. 453-470.

Bytheway, A. (2013). Qualitative research without money: Experiences with a home-grown qualitative content analysis tool. The Journal of Community Informatics, 9(4).

Bytheway, A. (2011). Assessing Information Management Competencies in Organisations Electronic Journal of Information Systems Evaluation 14 (2), pp. 179-192. Available online at www.ejise.com

Czerniewicz, L. (2004). Cape of Storms or Cape of Good Hope? Educational technology in a changing environment. British Journal of Educational technology 35 (2), pp. 145-158.

Dell, A.C., Louw, C., and Wilker, J.F. (2010). Comparing Student Achievement in Online and Face-to- Face Class. Formats. MERLOT Journal of Online Learning and Teaching, 6.

Department of Education. (2004). White Paper on e-Education Transforming Learning and Teaching through Information and Communication Technologies (ICTs), no. 26762. Staatskoerant. Available: http://www.education.gov.za/LinkClick.aspx?fileticket=Keu0%2fBkee%2bM%3d&tabid=191&mid=484

Today's concept of organisational management. (2016). Ch 3: 51- 65. . Jones and Bartlett publishers. Available: www.jblearning.com/samples/0763746177/46177_ch03.pdf

Hennessy, S., Ruthven, K., and Brindley, S. (2005). Teacher perspectives on integrating ICT into subject teaching: commitment, constraints, caution, and change. Journal of Curriculum Studies, 37(2), pp. 155–192.

Hart, G. 2007. Information literacy the missing link in South Africa's educational transformation? In: Asamoah-Hassan, H. (ed). Sub-Saharan Africa Colloquium on Information Literacy and Lifelong Learning. ADDIS.

Hulbert, D & Snyman, M. (2007). 'Determining the reason why ICT centres fail: Six South African case studies', Mousaion, 25 (2), pp. 1-20.

Govender, I. (2008). The integration of technology in mathematics at secondary schools in the Western Cape to enhance learner performance. An evaluation of the Khanya project.

Available:
http://etd.uwc.ac.za/xmlui/bitstream/handle/11394/2797/Govender_MCOM_2008.pdf?sequence=1

Ibrahim, S., and Hamzah, M. I. (2012). Leveraging open-source software in the education management and leadership training The Turkish Online Journal of Educational Technology, 11(3), pp. 215 - 221.

Jo, S. F. (2013). ICT in Education: A Critical Literature Review and Its Implications. International Journal of Education and Development using Information and Communication Technology, 9(1), pp. 112-125

Levin, J., Levin, S.R. and Waddoups, G. (1999). Multiplicity in learning and teaching: A framework for developing innovative online education. Journal of research in computing in education, 32(2), pp. 256-269.

Lumby, J. (2012). Leading organizational culture: issues of power and equity. Educational Management Administration and Leadership. 40(5), pp. 576-591.

Marshalla,S. (2010). Change, technology and higher education: are universities capable of organisational change? Research in Learning Technology. Alt-J. Research in Learning Technology, 18(3), pp. 179-192.

Meyer, D. F. (2014). Job creation, a mission impossible? The South African case." Mediterranean Journal of Social Sciences 5(16).

Ncontsa, V. and Shumba, A. (2013). The nature, causes and effects of school violence in South African high schools. South African Journal of Education, 33(3), 00. Available

http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0256-01002013000300013&lng=en&tlng=en.

Omona, W., Van der Weide, T. and Lubega, J. (2010). Using ICT to enhance Knowledge Management in Higher Education: A conceptual framework and research agenda International Journal of Education and Development using Information and Communication Technology, 6 (4), pp. 83-101.

Rahimi, S.R., Beer, C. D. and Sewchurran, K. (2012). The Conceptual Difficulties in Implementing e-Learning in Post-Apartheid South Africa. International Journal of Information and Education Technology, 2(6).

Strauss, A. & Corbin, J. (1998). Basics of Qualitative Research. Thousand Oaks, Sage.

Sudaryanto. (2011). The need for ICT education for managers or agri-businessmen for increasing farm income: Study of factor influences on computer adoption in East Java farm agribusiness. International Journal of Education and Development using Information and Communication Technology, 7(1), pp. 56-67.

Wenger, E. (1998). Communities of practice: Learning, meaning and identity. Cambridge university press, Cambridge.

Ting, S. E. (2005). The impact of ICT on learning: A review of research. International Education Journal, 2005, 6(5), pp. 635-650.