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Aims and Scope

IFLA Journal is an international journal publishing peer reviewed articles on library and information services and the social, political and economic issues that impact access to information through libraries. The Journal publishes research, case studies and essays that reflect the broad spectrum of the profession internationally. To submit an article to IFLA Journal please visit: journals.sagepub.com/home/ifl

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Call for papers: IFLA Journal special issue on Privacy

Submission deadline: 15 September 2017

IFLA Journal and IFLA's Freedom of Access to Information and Freedom of Expression (FAIFE) Advisory Committee are pleased to announce a call for papers for a special issue focused on Privacy. In the Digital Age, information is both more plentiful and more easily accessible than ever, a fact that has had profound implications for individuals' ability to exercise control over their own personal information. Many Library and Information Science institutions, associations, and professionals have long established privacy as a pillar of the profession's ethical codes, but as the nature of the creation and dissemination of information, as well as its content, has changed in recent decades, so too have the questions institutions, associations, and professionals face about how to define and uphold privacy.

IFLA Journal invites papers for a special issue focused on privacy, libraries, and information professions across all continents. The issue will be published in the summer of 2018 as Volume 44:2. In particular, the main goal of the special issue is to gather the latest theory, research, and practices from libraries and information professions to further the professional discourse on the definition and provision of privacy in the 21st century.

Guest editor
Dr. Louise Cooke
Reader in Information & Knowledge Management
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Topics of interest include, but are not limited to

- The development and role of professional ethics in creating privacy norms within libraries and information organizations
- Legislative rights and constraints on privacy in libraries and information organizations
- Internet technologies and privacy
- Privacy standards and norms in new information professions
- Public perceptions and behaviors regarding privacy, information access, and communications
- Education programs to inform public of issues regarding privacy and information access
- Privacy policies and practices of specific organizations
- Library interactions with public policy on privacy
- Collection, preservation, and safeguarding of digital data
- Confidentiality of services and usage information

Submission deadline

Articles for the special issue should be submitted to IFLA Journal for peer review before 15 September 2017.

How to submit a manuscript

IFLA Journal is hosted on ScholarOne™ Manuscripts, a web based online submission and peer review system SAGE Track. Please read the Manuscript Submission guidelines, and then simply visit the IFLA Journal Manuscript submission webpage to login and submit your article online.

Important: Please check whether you already have an account in the system before trying to create a new one. If you have reviewed or authored for the journal in the past year it is possible that you will have had an account created.

All papers must be submitted via the online system. If you would like to discuss your paper prior to submission, please contact Steven Witt, Editor of IFLA Journal: swwitt@illinois.edu.

For instructions on formatting your manuscript please consult the submission guidelines.

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impact access to information through libraries. The Journal publishes research, case studies and essays that reflect the broad spectrum of the profession internationally. All articles are subject to peer review. Articles are published in English. Abstracts will be translated by IFLA (the International Federation of Library Associations and Institutions) into the other working languages of IFLA—Arabic, Chinese, French, German, Russian or Spanish—for publication.

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Reproductive health information needs and maternal literacy in the developing world: A review of the literature

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Abstract

This article provides an analysis of the relationship of literacy and education in the developing world as they intertwine with reproductive health, and explores the reproductive health-related informational needs of women from these regions. Every day more than 800 women die from causes relating to pregnancy, 99% of whom are in the developing world. In 2015 16,000 children under five died every day. This article first provides a systematized review of the extensive canon of literature that explores the relationship between maternal literacy and mother and child health. A content analysis is conducted with the aim of deciphering the reproductive health-related informational needs of women in the developing world. Following, there is a discussion of interventions that have demonstrated success at ameliorating these gaps. Some of these interventions have met information needs related to family planning, HIV/AIDS, sexually transmitted infections, violence against women, sexuality, pregnancy education, and emergency obstetric care.

Introduction

Discussion of the Millennium Development Goals (MDG) is pervasive in the literature. Established by the United Nations at the Millennium Summit in 2000, all 189 UN member states committed to achieve the MDG by 2015 (United Nations, 2015).

According to the World Health Organization (WHO) (2014) we have failed to achieve the challenge set forth 15 years ago. While there is progress on all fronts, each goal now illuminates the endemic paucity that permeates the developing world. Using MDG6, to combat HIV/AIDS, malaria, and other diseases, as an example, 2012 saw 2.3 million newly infected with HIV, which was an increase from previous years (WHO, 2014). This certainly represented progress from the 3.4 million newly infected in 2001, but is still far from the goal of a reverse in the spread of the disease. Likewise, MDG5 which sets a goal of reducing maternal mortality by three-quarters from

1990 levels has instead seen a decline of slightly less than half of what was needed to reach this goal (WHO, 2014). There is a reliance upon household surveys to assess progress towards the MDGs. It is argued that this technique misses those living in slums, those that are homeless, and those that live in areas deemed too dangerous to assess – potentially as many as 250 million of the poorest of the poor (Carr-Hill, 2013: 3).

What the MDGs have achieved is the unintended consequence of a tremendous breadth of literature examining the state of the developing world in accordance with these goals. Much of this literature

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explores the topics that are under scrutiny within this paper including literacy and education, and mother and child health.

Research questions and methodology

The purpose of this research is to review the literature regarding the disparity in reproductive health suffered by traditionally disadvantaged women, and literacy and education as they specifically pertain to reproductive health and choice. This systematized review of the literature will attempt to answer the following research questions:

- What is the relationship between female literacy and education and child and maternal mortality? What does the current canon of literature produce as evidence of the reproductive health informational needs among women in the developing world?
- What educational interventions have demonstrated success in order to ameliorate the gap suffered by undereducated or illiterate women?

In order to answer the research questions above a systematized review of the literature will be employed (Grant and Booth, 2009). Databases searched for this review will include Academic Search Complete, Web of Science, PubMed, Library, Information Science and Technology Abstracts, Education Source, World Bank Data, and ProQuest's Dissertations and Theses Global. These were selected because they represent the fields of information science, public health, and education, all of which are relevant to the interdisciplinary nature of this topic. There were many search terms selected to query these databases. Some are: maternal literacy, child health, developing world, low-income countries, population health, MDGs, health outcomes, literacy, gross domestic product, infant mortality, and maternal mortality. The inclusion criteria for the literature are (a) works written in English, (b) scholarly works published in a peer-reviewed journal in the last 50 years, (c) the inclusion of indicators of maternal, child, or population health such as infant mortality, maternal mortality, child mortality, infectious disease status, and child nutrition, and (d) works that focus on female literacy and education, or reproductive health educational interventions, as examinations of both are important to answer the research questions. There are a few exceptions of works that do not have inclusion criterion (d) and are included only to provide meaningful statistical framing of health indicators (see Gebreselassie et al., 2005; Jejeebhoy, 1998; McCarraher et al.,

2006; Roberts, 2006 and statistics from the World Health Organization.

This paper will first examine literature on the association of literacy and education in the developing world as they intertwine with reproductive health, and in turn affect infant, child, and maternal mortality and wellbeing. Literature as old as 50 years will be included in order to demonstrate trends in these relationships.

Next, results of a brief manual content analysis of the articles produced by the literature review will be presented in order to ascertain the reproductive health-related information needs of women in the developing world. This analysis included systematically analyzing text that was determined to contain terms that describe reproductive health-related information needs from the literature, coding those terms categorically, and determining themes that could be used to answer the research question: What does the current canon of literature produce as evidence of the reproductive health informational needs among women in the developing world?

Finally, there will be a discussion of educational interventions found in the literature that have shown some success.

The term 'developing world' refers to countries with relatively lower scores than other countries on the Human Development Index. In the spring of 2016 the World Bank announced that it would discontinue use of this term. However, in reviewing the current body of literature most is written prior to this decision and therefore still uses this phrasing. As such, this review and analysis will continue with this phrasing utilized in the work being explored.

The developing world

In 1986, there were approximately 1400 reported maternal deaths and 25,500 instances of infant or child death each day (Winkoff and Sullivan, 1987). While these numbers may seem staggering, it is suspected that they are extremely low compared to actual death tolls. In 1984 only 5 out of 52 African countries had reported maternal mortality data. Areas with high maternal mortality corresponded to areas that lacked adequate health reporting systems. What was known, more specifically, was that in over half of developing countries, maternal mortality was the first or second cause of death in women aged 25–34 (Winkoff and Sullivan, 1987). Maternal death was also not the sole cause of suffering by pregnant women. In the early 1990s it was found that for each maternal fatality 100 women were compromised due to acute obstetrical complications, 250 contracted a sexually transmitted

disease and 1000 suffered stunting or anemia (Koblinsky, 1995). At the end of the 1990s, women who became pregnant in developing countries faced a risk of death due to pregnancy that was 80 to 600 times higher than women in developed countries (Shen and Williamson, 1999).

Maternal mortality has a direct impact on the survival of the child. In Chen et al.'s (1974) seminal work, it was discovered that for any live children born to the mothers who died, 95% also died within one year. Using 1993 as an example, 3 million perinatal deaths were believed to be associated primarily with poor health during pregnancy in addition to the 3 million perinatal deaths associated with complications at delivery (Koblinsky, 1995). It has been estimated that for every maternal death, on average, two live children are left motherless.

In the early 1990s 15 million infants and children died each year, in part because the percentage of low birth weight infants is greater in developing countries than in developed countries. The maternal mortality risk in the developing world was, as it still is, staggeringly higher than in developed countries; a difference in 1:21 versus 1:9850 (Fathalla, 1991). Despite the suffering caused by lack of reproductive choice, the contraceptive use in these countries at the time stood at approximately 14% (Fathalla, 1991). In 1995, it was found that 40% of women who did not want any more children were not using family planning methods (Koblinsky, 1995).

In 1994, the United Nations called together 179 countries for the International Conference on Population and Development in which access to effective contraceptives was deemed a human right (CBS News, 2012). Since then progress has been slow. Every year, more than 120 million couples have an unmet need for contraception and over half a million women die from maternal complications (Glasier et al., 2006). Abortion for women who do not wish to be pregnant has been found to be another area with amplified risk. In Africa, the mortality risk from abortion is one in 150 procedures as compared to less than one in 100,000 in the United States. The women who die from unsafe abortions account for 34,000 maternal deaths annually in Africa, or 13% of all maternal deaths in the region (Gebreselassie et al., 2005). Despite the fact that unsafe sex is the most important risk factor for disability and death in the developing world, "sexual and reproductive health services are absent or of poor quality and underused in many countries because discussion of issues such as sexual intercourse and sexuality make people feel uncomfortable" (Glasier et al., 2006: 1595). It was found 13 years after the conference that gaps in use of effective contraception across wealth quintiles persisted and were increasing (Gakidou et al., 2007). This particularly applies to the developing world as countries with large economic inequalities also exhibit large inequalities in modern contraceptive use.

Violence against women is also a serious issue that negatively impacts the health and security of women and children in the developing world. In 1998 rape and domestic violence together accounted for 5% of the healthy years of life lost to women of reproductive age in developing countries. At the time this meant that the health burden suffered by violence against women of this age group was similar in number to HIV, tuberculosis, maternal death due to sepsis, cancer, or cardiovascular disease (Jejeebhoy, 1998). This also led to considerable consequences for miscarriage and infant mortality.

The WHO cites violence against women as being a chief contributor to women's vulnerability and lack of power which in turn leads to greater susceptibility to HIV, induced abortion, low birth weight, and prematurity (WHO, 2013). In agreement with this it has been found that in rural Ethiopia, for example, females are at a higher risk for HIV transmission than males. It is speculated that due to their culturally endemic subservience and the tradition of child marriage, women are limited in their ability to negotiate sex (Bogale et al., 2011). Ethiopia also has high rates of both physical and sexual abuse (WHO, 2013).

Intimate partner violence has been found to contribute to the exertion of control over the woman, sexual risk-taking behaviors, low contraceptive use, stress, unplanned pregnancy, sexually transmitted infection (STI), urinary tract infection, infertility, and sexual dysfunction, and is often accompanied by sexual and psychological abuse (Coker, 2007). Fifteen years after Jejeebhoy's (1998) study the WHO cites rates of non-partner sexual violence to be as high as 21% and intimate partner violence to be as high as 35 to 42% in various regions of the developing world, with a shocking 65% in central Sub-Saharan Africa (WHO, 2013).

Finally, in looking at some key indicators of maternal and child health, every day more than 800 women die from causes related to pregnancy. Of these losses, 99% are in the developing world. Current infant and under-five mortality rates disproportionately affect the developing world at 53 and 46 deaths per 1000 live births respectively (WHO, 2014), with a child in Sub-Saharan Africa 15 times more likely to die than a child from a developed part of the world (WHO, 2014). In 2015 16,000 children under five years of age died every day (WHO, 2016).

Literacy, education, and mother and child health

The literature on the relationship between female literacy and education, and maternal, infant, and child mortality is prolific and deserves examination in this research. In his critical article, Caldwell (1979) touches briefly upon the history of the evidence collected that demonstrates the parallel between literate, educated mothers and healthy families. A review of his work produces the following information.

From 1960 in Ghana through the 1970s in Asia child survival was benefited greatly by maternal literacy even after controlling other variables including income and paternal literacy. It was repeatedly found that mothers who had no schooling had two to four times higher infant mortality rates. What is more, the more schooling that the mother has, the greater likelihood for child survival. For example, Caldwell (1979) reports that an unpublished 1973 survey of Indonesia demonstrated a negative correlation between children dying before reaching their fifth birthday and the increasing education of the mother. To correspond with this, in a 1972 United Nations study of 115 countries found that the correlation between literacy and expectation of life at birth was higher than between any other specific factor considered against expectation of life (McGranahan, 1972).

The attention to the relationship between infant and child mortality and mother's education piqued in the 1980s and 1990s and grew through the beginning of this century. In addition to establishing and reiterating the correlation between education and the mothers and children many researchers examined how it was affected by ancillary variables. Merrick (1985) and Esrey and Habicht (1988) both explored this relationship with attention to toilets and piped water. While piped water did have an effect in both studies, the effect was found to be stronger in cases in which the mother was literate. Esrey and Habicht found that literate mothers in Malaysia were more competent with regards to protecting their infants in unsanitary environments lacking toilets. Also, when piped water was introduced they were able to use it more effectively to better hygiene practices for their infants. The effect that Merrick found was significant, but secondary, accounting for one-fifth of the total impact. He determined both that education of the mother had the greatest effect on child mortality, and that among those with external water sources, the difference in child survival rates between mothers with no education and all other mothers increased between 1970 and 1976.

Cleland and Van Ginneken (1988) also examined the advantages associated with education which included housing quality and water and latrine facilities and found that they accounted for approximately one-half of the education-mortality relationship. In another groundbreaking work their research determined that for every one year of schooling a woman completes, there is a 7–9% decline in the mortality rate of their children under age five. More importantly, the relationship between education and decreased child mortality is greater in early and later childhood than infancy. Four to six years of education leads to a 20% drop in infancy, but a 42–73% reduction in later childhood.

Dreze and Sen (1995) determined that higher than average levels of development in Kerala, as compared to the rest of India, could be correlated to higher rates of female literacy in the early 1990s. By investing in female education as a strategy for development, Keralans enjoyed improved infant and maternal mortality rates, higher life expectancy, lower fertility rates, and opportunities for women to actively engage in social process. "Female literacy . . . is unambiguously found to have a negative and statistically significant impact on under-five mortality, even after controlling for male literacy" (Dreze and Sen, 1995: 166). They also discussed the likelihood that the educational achievements of women in Kerala are responsible for the longer life-expectancies of the entire population.

In Nicaragua, Sandiford et al. (1995) led a research team that attempted to explore the difference between mothers who were taught to read through primary schooling or as adults. Three groups of Nicaraguan women were recruited including those who those who had not attended primary school and became literate through adult education called the National Literacy Crusade, those who became literate in primary school, and those who were illiterate. All 4434 participants had given birth to at least one live infant. The women were tracked for 10 years during which child survival and nutritional status were compared. At the time of the National Literacy Crusade, the infant mortality rates of the illiterate women and the women beginning adult education were comparable. After the National Literacy Crusade, the infant mortality rate of the adult education group dropped dramatically and remained consistent with the formal education group for the rest of the study.

This was crucial because it demonstrated that the adult acquisition of education was equally able to influence mortality outcomes as formal schooling. Further, the children of illiterate mothers were approximately three times as likely to be malnourished as those whose mothers were in the adult education group and were 60% more likely to have diminished mid-upper arm circumference than

children of either of the other groups. It is also crucial to point out that physical access to health services was not significantly associated with any reduction in child mortality in this study.

Using this data again the researchers tested the women's intelligence and found that the acquisition of literacy was strongly correlated with higher intelligence. While this correlation was important, it was found that literacy acquisition had a greater effect on mothers who tested lower in intelligence (Sandiford et al., 1997). The authors concluded that intelligence is a major factor in infant and child mortality for illiterate women, and that education has the most impact on child health for women who are tested to be of lower intelligence.

In a continued effort to determine the variables that explain the relationship between female literacy and education and health, Lee et al. (1997) explored the relationship between the human development index (HDI), of which education and literacy are components, and infant and maternal mortality. They found that the HDI was a powerful predictor of both accounting for 85–92% of the variation of infant mortality rates and 82–85% of the maternal mortality rates.

If HDI is a factor in reproductive health, is public spending on health care, another component of the HDI? Filmer and Pritchett (1999) explored the relationship between these variables and found that the impact was statistically insignificant and the variation of public spending accounts for less than one-seventh of 1% of the observed mortality differences. Instead they found that economic and cultural variables along with female education explained 95% of the cross-national variation in mortality.

Another factor that was studied in the late 1990s was the effect of higher ratios of healthcare workers on infant and child mortality (Robinson and Wharrad, 2000). It was concluded that female literacy is a stronger indicator of these two mortality rates than the ratio of healthcare professionals.

Over the past decade research into female literacy, education, and reproductive and child health has been increasingly focused on maternal survival. McAlister and Baskett (2006) examined the relationship between the gender-related development and cross-national differences in maternal mortality. The researchers looked at several factors that can be considered descriptors of equity, including maternal mortality rates, fertility rates, female literacy rate, female education enrolment ratios, year women received the right to vote, number of seats in parliament held by women, and female economic activity rates. These factors were investigated along with the HDI, the

Gender-Related Development Index (GDI), and the Gender Empowerment Measure. The authors found that the HDI was the most powerful predictor of variation in maternal mortality rates, and that the GDI was also a powerful predictor with each of these indices having a negative correlation with maternal mortality. The authors measured female education by including literacy and formal schooling. These measures were powerful predictors of maternal mortality. Other measures including infant mortality and total fertility rates were shown to be powerful predictors of maternal mortality (McAlister and Baskett, 2006).

It has also been found that the link between reproductive and child health and maternal education persists across countries with widely diverse educational systems, suggesting that quality of education is not an important element either (Cleland, 2010). Cleland found across countries that even a few years of primary schooling is advantageous for child survival, even when the years of schooling are insufficient to impart functional literacy.

Gakidou et al. (2010) conducted an analysis of 175 countries between 1970 and 2009. They found that improvements in the education of women of reproductive age might account for half of the reduction in mortality in children aged under 5 years since 1970, stating that of the 8.2 million fewer deaths in children they estimated that 4.2 million, slightly more than half, could be attributed to increased educational attainment.

Several studies have found a heightened propensity for the use of basic health care services that may be a link between education and better health outcomes. One way in which this manifests is an increased likelihood of the use of vaccinations (Abuya et al., 2011; Gokhale et al., 2002; Jayasundara, 2009; Wang, 2007). In India Gokhale et al. (2002) found that female illiteracy was strongly associated with all variables relating to maternal care and also with infant mortality rate. Women who were 75% illiterate had rates of infant mortality that were much higher than women who were found to be 11% illiterate; a difference of 90.99 to 24.0 out of 1000 live births. He also found that with an increase in literacy the mother's use of maternal services including vaccination went up from 23.8% to 64.9%.

In addition to infant and child death, there is also a direct relationship with child health. Maternal education is significantly associated with underweight and stunting in children under five, even after controlling for all the other variables (Gyaltsen, 2010). The same study determined that maternal health behaviors such as hand washing and not smoking account for only

some of the relationship between female education and child nutritional status. In addition to also correlating children's lower odds by 94% of having stunted growth with maternal education, Abuya et al. (2011) found that children born to mothers with a primary school education were 2.17 times more likely to be vaccinated.

While Kumar et al. (2012) found that maternal education was the most important factor in under-five survival, they also found that place of residence was next. Children are less likely to survive in rural areas (Gokhale et al., 2002; Kumar et al., 2012). However, this is not true of maternal mortality rates. Koch et al. (2012) found that when modulating for other variables including access and utilization of maternal health facilities, changes in women's reproductive behavior and improvements to the sanitary systems, increasing education results in decreased rates of maternal mortality. As recently as Tunçalp et al. (2014) it has been found that even after adjusting for confounding factors, women with lower levels of education are at greater risk for severe maternal outcomes. They found that several interventions were more likely to be given to more educated women.

Is it solely education and literacy of either parent that matters? Caldwell's (1979) research was groundbreaking in that he discovered that it is the mother's, and not the father's education that makes the difference. Caldwell (1979) found that when one parent has no education and the other has primary schooling their child mortality index falls 10–20% lower than couples with no schooling if it is the father, but 61–85% lower if it is the mother. Dreze and Sen (1995) found that with other variables being kept constant, an increase in the female literacy rate from 22% to 75% reduced the under-five mortality from 156 per 1000 to 110 per 1000. A comparable improvement in literacy rates for men only reduced the under-five mortality from 167 per 1000 to 141 per 1000. As recently as the last five years this relationship has been tested and it has been found that the father's schooling, while not irrelevant, is less decisive than the mother's (Cleland, 2010).

Special attention also must be paid to the variable of economic advantage. It is often assumed literate, educated women in the developing world also are the product of socioeconomic advantage, and that it is this advantage that increases the likelihood of their and their children's survival. Is the survivorship of mothers and children reliant on economic advantage? As with many things the answer is mixed. Morrisson and Jütting (2005) did find that in countries where women are less educated than men they also participate less in economic activity. However, they then go on to speculate that this may be a mechanism of institutional

framework citing that social institutions "are the most important single factor determining women's participation in economic activities outside the household" (Morrisson and Jütting, 2005: 1076). Dreze and Sen (1995) found that a 50% reduction in poverty only reduced the under-five mortality from 156 per 1000 to 153 per 1000. When controlling for all other variables, Dreze and Sen (1995) found that increasing the rate of female literacy drastically reduced the rates of under-five mortality more than increasing the literacy rates of men or reducing poverty.

As far back as Caldwell's (1979) groundbreaking work, it was reported that:

> in the early 1970s income per head for India as a whole, Kerala and Sri Lanka was around $120. However, their literacy levels were 36 per cent, 60 percent and 85 percent respectively, and female levels were closer to male levels in Kerala and Sri Lanka. Infant mortality rates were around 130, 65 and 50 respectively. (Caldwell, 1979: 398)

Cleland and Van Ginneken (1988: 398) also found that one to three years of schooling is associated with a 20% decline in childhood mortality after adjustment for economic factors. There have been multiple studies confirming that an increase in education is associated with a reduction of child mortality, even after controlling for economic variables (Cleland, 2010; Gakidou et al., 2010; Govindasamy and Ramesh, 1997; McTavish et al., 2010; Merrick, 1985; Messias, 2003; Pebley and Stupp, 1987; Wang, 2007). Gakidou et al. (2010) write that analyzing four decades of statistics from 175 countries shows that trends in educational attainment and income only demonstrate a yearly correlation of .27.

Why do these relationships exist?

Many researchers have speculated on why literacy and education improve reproductive and child health. Despite the fact that maternal education is a more substantive benefit to family health then economic advantage, the boon of a larger income is still important. Schell et al. (2007) determined that major causes of child deaths including malaria, HIV/AIDS, respiratory infections, gastrointestinal infections, and measles, were indirectly preventable through socioeconomic progress that in turn affects nutrition, housing, hygiene, and education. Schell et al. (2007) found that GNI per capita, young female illiteracy, and income equality predicted 92% of the variation in infant mortality rates, but that in low income countries female illiteracy was more important than GNI per capita.

McTavish et al. (2010: 1962) also found in a multi-national study that societal influence is a strong determinant of both if a woman will seek maternal health care and if it is available to her. They found that in countries with lower female literacy levels poor women were less likely to seek care than poor women in countries with higher literacy levels. They speculated that:

> countries where women's status is higher and where resources are more available for women to become educated may also have in place greater legal protections and more progressive policies that enable women to access and use household-resources such as greater personal safety and physical integrity.

Schell et al. (2007) and McTavish et al. (2010) made significant statements with the idea that gender equality could be a contributing factor. A previously mentioned study predicted that rural and mostly illiterate Ethiopian women are at a higher risk for HIV infection than males (Bogale et al., 2011). The researchers of this study speculated that a reason for this is that in their culture women are expected to be subservient and are limited in their ability to negotiate sexual matters with their partners. They are at risk of infection directly because of the imbalance of power in their sexual relationships. Shen and Williamson (1999) found this to be the truth not simply in Ethiopia, but also across 79 developing countries. By studying WHO data they found that women's status is a strong predictor of maternal mortality. The authors wrote that the rates of maternal mortality demonstrate greater disparity between developed and developing countries than any other single indicator, including infant mortality.

Another reflection of the low status of women is female genital mutilation. This procedure is still practiced in 30 countries (WHO, 2017) and is also associated with obstetric morbidity as well as stillbirth (Glasier et al., 2006). Because this is a cultural practice that is condoned by society yet requires the countenance of family members it is possible to speculate that it reflects not only the subjugation of women in their society, but also their own homes.

Other researchers have speculated that educational attainment influences the woman's power and status in the home. Caldwell (1979) stated that the education of women greatly changes the traditional balance of familial relationship with profound effects on child care. Cleland and Van Ginneken (1988) ascertained that educated mothers have greater decision-making authority on matters related to health, have a deeper understanding of disease prevention and cures, and

are more likely to adopt healthy behaviors such as cleanliness.

To expand upon this, the autonomy to dictate health-related issues is a fundamental reason many researchers have found that lower status in the household signifies less autonomy to utilize health care (Rahman and Chowdhury, 2007). For example, a study in 2006 found that 19% of women felt that they had to use the pill covertly, and these women were much more likely to have experienced intimate partner violence (McCarraher et al., 2006).

This heightened propensity for the use of basic health care services is another reason that is frequently given for the link between education and better health outcomes. Cleland (2010) wrote that exposure to primary schooling increases a mother's likelihood to seek modern health services for her children. One way in which this manifests is an increased likelihood of the use of vaccinations (Abuya et al., 2011; Gokhale et al., 2002; Jayasundara, 2009; Wang, 2007). In India Gokhale et al. (2002) found that female illiteracy was strongly associated with all variables relating to maternal care and also with infant mortality rate. Women who were 75% illiterate had rates of infant mortality that were much higher than women who were found to be 11% illiterate; a difference of 90.99 to 24.0 out of 1000 live births. He also found that with an increase in literacy the mother's use of maternal services including vaccination went up from 23.8% to 64.9%.

The findings of Gokhale et al. (2002) confirmed another study from India a decade earlier which found that education profoundly impacts a woman's use of maternal health services. In this study, the researchers found that even after controlling for economic variables: "maternal education results in improved child survival because health services that effectively prevent fatal childhood diseases are used to a greater extent by mothers with higher education than by those with little or no education" (Govindasamy and Ramesh, 1997: 25).

More recently these studies have been collaborated with work in several areas of the world that have found that increasing educational levels decreases maternal mortality (Jayasundara, 2009; Karlsen et al., 2011; Koch et al., 2012; Okereke et al., 2013). For example, Koch et al. (2012) examined the impact of a law that was enacted in Chile mandating free primary education for eight years. This caused a rapid increase in female education from 3.1 to 12 years and, in turn, a subsequent decrease in the maternal mortality rate. Koch et al. (2012) and his fellow researchers speculated that education promotes autonomy and responsibility for knowledge and

self-care. This in turn explains the effects on maternal mortality reduction, as education promotes the efficient utilization of health facilities.

This also corroborates previous findings that literacy affects maternal use of health care (Karlsen et al., 2011; McTavish et al., 2010). Karlsen et al. found that lower levels of education were associated with higher rates of maternal mortality, even when access to care was equal. However, increasing education promotes the ability of women to obtain, understand and follow through with prenatal care and reproductive health services. The education of the women also assists them in being more confident and better able to ask questions about their own health needs (Karlsen et al., 2011).

And what would the women ask their health care worker about? Family planning methods are certainly high on the list. McAlister and Baskett (2006) found that along with infant mortality rates, total fertility rates are powerful predictors of maternal mortality. Stover and Ross (2010) agreed, citing that family planning reduces the number of times a woman is exposed to risk. In this study, the authors found that between 1990 and 2005 over 1 million maternal deaths were avoided because the fertility rate in the developing world declined. Caldwell (1979) also found that child mortality is somewhat lower when the mother has practiced birth control than when she has not. Dreze and Sen (1995) discovered correlation between higher literacy rates and lower fertility rates.

In Jayasundara's dissertation (2009) the author discusses the relationship between social development and reproductive health and choice. She cites that the combination of choice-based abortion policies, contraceptive availability, decreased child marriage, prenatal care and trained delivery staff are products of social development that in turn positively affect outcomes including rates of maternal mortality, infant mortality levels, and children's growth.

Pebley and Stupp (1987) wrote about how shorter child spacing affects infant mortality by depleting the mother physically thus producing a weaker child, creating more competition for resources, and the spreading of infectious diseases more easily between siblings of similar ages. It was found that more educated women were able to mitigate longer birth intervals, therefore improving the children's chance of survival.

Regardless of whether maternal and child health is bettered by a woman's improved status in society or her family, or by her ability to actualize her own potential and negotiate for herself, it seems clear from the literature that the effect is her increased access to health care for both herself and her children. The

Table 1. Articles related to maternal education and literacy.

Maternal education and child health
- Abuya et al. (2011)
- Caldwell (1979)
- Cleland (2010)
- Cleland and Van Ginneken (1988)
- Filmer and Pritchett (1999)
- Gakidou et al. (2010)
- Govindasamy and Ramesh (1997)
- Gyaltsen (2010)
- Kumar et al. (2012)
- Lee et al. (1997)
- McAlister and Baskett (2006)
- Merrick (1985)
- Pebley and Stupp (1987)
- Sandiford et al. (1997)
- Shen and Williamson (1997)

Maternal literacy and child health
- Dreze and Sen (1995)
- Esrey and Habicht (1988)
- Gokhale et al. (2002)
- Robinson and Wharrad (2000)
- Sandiford et al. (1995)
- Schell et al. (2007)

Maternal education and maternal health
- Govindasamy and Ramesh (1997)
- Karlsen et al. (2011)
- Koch et al. (2012)
- Lee et al. (1997)
- McAlister and Baskett (2006)
- McTavish et al. (2010)
- Shen and Williamson (1999)
- Tunçalp et al. (2014)

remainder of this paper will explore what reproductive health information needs are and how literacy and educational interventions have successfully been applied to the women in the developing world.

Table 1 provides a simplified organizational list of articles by their main idea into categories of each of the principle concepts discussed so far. Included in these are maternal education and its effect on child health, maternal literacy and its effect on child health, and maternal education and its effect on maternal health. Articles may be listed for more than one topical area.

Table 2 once again lists articles by their central concept. The main subject areas are the effect of gender equality and reproductive health and articles that demonstrate that socioeconomic variables including income and health care access are not as statistically significant as maternal literacy and education.

This concludes the examination of the literature of the relationships between maternal education,

Table 2. Articles related to gender equality and reproductive health, and significance of education.

Gender equality and reproductive health
- Bogale et al. (2011)
- Coker (2007)
- Diop and Askew (2009)
- Glasier et al. (2006)
- Jayasundara (2009)
- Jejeebhoy (1998)
- McAlister and Baskett (2006)
- McCarraher et al. (2006)
- Morrisson and Jütting (2005)
- Pallikadavath et al. (2005)
- Rahman and Chowdhury (2007)
- Schell et al. (2007)
- Shen and Williamson (1997)
- Shen and Williamson (1999)
- Wang (2007)

Education more significant than socioeconomic variables
- Caldwell (1979)
- Cleland (2010)
- Cleland and Van Ginneken (1988)
- Dreze and Sen (1995)
- Filmer and Pritchett (1999)
- Gakidou et al. (2010)
- Govindasamy and Ramesh (1997)
- Koch et al. (2012)
- Kumar et al. (2012)
- Merrick (1985)
- Messias (2003)
- Robinson and Wharrad (2000)
- Sandiford et al. (1995)
- Wang (2007)

literacy, and health outcomes. Next, the procedures and results of the content analysis will be discussed.

Content analysis: Reproductive health information needs

What are the pieces of information necessary for a woman to maintain her own reproductive health? This section will discuss findings from a content analysis of literature that discusses reproductive health-related information needs in the developing world. A content analysis is "a systematic analysis of the occurrence of words, phrases and concepts" (Powell, 1997: 50). There is a dearth of articles on the reproductive health information needs of women in the developing world. Many of the articles that engage in the assessment of health information needs in these regions examine reproductive health as a broad category instead of breaking it down into specific topics, as is the case in Kapadia-Kundu et al. (2012). Articles that discuss specific topics of reproductive health information

seeking were collected and analyzed for terms that describe reproductive health-related information needs, and these terms were grouped into categories. From these categories themes were determined.

In 1997, a rural reproductive health project was conducted in Bangladesh (Cash et al., 2001). During this project, the indigenous people were interviewed and asked to participate in focus groups in which they discussed sexual needs and behaviors. Of each study in the literature, this research produced the most extensive list of essential components of reproductive health education including 14 different categories of potential information needs.

Focusing on specifically maternal care, Fullerton et al. (2005) worked with mothers and their home birth attendants in Uttar Pradesh to help them learn how to recognize life-threatening situations. The authors taught three specific strategies to work for better outcomes for women during delivery. These included basic maternal and neonatal life-saving interventions within the home and community, teaching efforts to reduce delays in transport to referral units where life-threatening complications can be managed, and the increased use of postpartum and post-abortion family planning (Fullerton et al., 2005).

A year later another team of researchers working in the Sudan acknowledged that reproductive health as defined by the WHO addresses the following specific components of the reproductive process including: its functions and system, the ability to have a safe sex life, and the implicit freedoms associated with reproductive choice. In the case of the Sudanese adolescents that they were working with, they determined that the reproductive health skills that were important to teach were sexuality education, pregnancy prevention, pregnancy-related health services, pregnancy, abortion, and childbearing (Moukhyer et al., 2006).

Another project in a Guianese refugee camp targeted women of reproductive age who were mostly unschooled and illiterate. This project focused on the content areas of safe motherhood, family planning, sexually transmitted infections, HIV/AIDS, and gender-based violence (McGinn and Allen, 2006).

Halpern et al. (2008) determined that Brazilian and Kenyan adolescents required education on the following reproductive health topics: substance use, sexuality, contraception, voluntary HIV counseling and testing, abortion law, and intimate partner violence.

In that same year, another team of researchers (Rao et al., 2008) found that educational interventions could bring about positive outcomes with adolescent girls in India. The topics that they chose to focus on were menstruation, menstrual hygiene, pregnancy, antenatal care, and various methods of contraception.

McMichael and Gifford (2009) studied the reproductive health information needs of people with refugee backgrounds living in Australia. They found their primary needs to be related to sexual health issues, HIV/AIDS, STIs, contraception, pregnancy, the initiation of sexual relationships, sources of information, and use of health services. During the same year, another safe motherhood initiative was being conducted in an attempt to reduce maternal mortality rates of Afghan refugees in Pakistan (Purdin et al., 2009). That initiative contained three components that were considered to be crucial including education on the danger signs in pregnancy, improving access to emergency care, and an improved health information system. This was meant to reflect the Global Safe Motherhood Initiative which had the key elements of family planning, skilled delivery care, and access to emergency obstetrical care (Purdin et al., 2009). The key components of a safe motherhood campaign that took place in northern Nigeria were pre- and postnatal care, maternal danger signs, emergencies, and safe birthing practices (Okereke et al., 2013). Finally, pregnant women in Argentina were found to have reproductive health-related information needs regarding pregnancy and newborn health, and including prenatal and infant dietary information, activities and things to avoid during pregnancy, when to call a doctor during pregnancy, lactation counseling and infant skin care (Cormick et al., 2012).

Having performed a content analysis of the available literature, it is possible to synthesize what are the most substantial reproductive health information needs, as determined by successful interventions, in the developing world. They are:

- family planning;
- HIV/AIDS;
- sexually transmitted infections;
- violence against women;
- sexuality;
- pregnancy education;
- emergency obstetric care.

With a clearer understanding of the informational needs that reproductive health education should address, this paper will now turn to the literature on previous successful interventions in the developing world.

Successful interventions

Each intervention presented in the literature had some sort of pedagogy as a component. While many of the treatments were classic classroom instruction, others had additional aspects that aided their success.

Two interventions used pictorial depictions of the problem or action messages that were being taught to the students (Cash et al., 2001; Fullerton et al., 2005). Fullerton found that knowledge retention and recognition skills were enhanced by the images therefore improving understanding of maternal bleeding and newborn sepsis. Cash and the other researchers in Bangladesh also used picture stories and intervention picture flipcharts. Another interesting aspect of this intervention was the attempt by the instructors to integrate reproductive health education into indigenous health activities (Cash et al., 2001).

Another study of the Reproductive Health Literacy Project in Guinea, West Africa, integrated reproductive health and cultural context into the content of an adult literacy class (McGinn and Allen, 2006). Of the 2325 women enrolled in the program, each had an average of 3.8 years of schooling. The women who participated had a high level of reproductive health knowledge and reported an increase in literacy skills. They also reported a greater feeling of empowerment. Women who had previous schooling did better and gained more for the treatment, but both groups had increased knowledge retention and positive behavior.

The Bogale et al. (2011) study referenced previously tested the effectiveness with audio messages that included narratives on HIV/AIDS prevention for illiterate rural females in Ethiopia. This treatment was also adapted to the cultural context of the women. The women were pre- and post-tested, and it was found that self-efficacy increased with knowledge and intention to use condoms. The authors felt that the audio treatment was influential with the rural and illiterate women.

Another very successful project took place with adolescents in a rural Nigerian community (Mba et al., 2007). The authors of this study did a pre-test, gave the adolescents a course on sexually transmitted diseases, HIV/AIDS, and family planning, and then gave them a post-test six weeks later. This intervention was given with a study and control group. The participants in the study group showed a drop in the number of sexual partners from 12 to 5, an increase in the number that practiced pregnancy prevention from 15 to 35, and an increase in the intention to use condoms. The intervention also dissuaded some of them from their previous beliefs such as sexually transmitted diseases being only for prostitutes and doubt of the existence of HIV/AIDS.

Purdin et al.'s (2009) study carried out as a more traditional classroom intervention, but with trained local volunteers that were then tasked with spreading the information to the rest of the community. After their efforts, the maternal mortality ratio of the

Afghan refugees in the area improved from 291 per 100,000 live births in 2000 to 102 per 100,000 live births and the births attended by trained delivery staff increased by 5% in 1996 to 67% in 2007 (Purdin et al., 2009).

Using a combination of classes and community meetings, Diop and Askew (2009) were able to educate many people in a Senegalese town about the dangers of female genital mutilation. Their efforts brought about a significant impact on family behaviors and attitudes.

Two more studies used traditional classroom structures, and these studies focused specifically on health literacy. Health literacy is a term that has been developed in part because of the strong, consistent relationship between poor literacy skills and requisite adverse effects to health status (Nutbeam, 2008). It is a widely-encompassing term that refers to literacy-related capacities that act as mediating factors in health and clinical decision making (Baker, 2006). Padhyegurjar et al. (2012) taught school-based health and reproductive health education sessions centered on improving health literacy. They found both that the intervention worked immediately following the intervention and that the raise of knowledge was maintained throughout the school year. Ohnishia et al. (2005) were successful using a traditional classroom structure to teach maternal health literacy in Paraguay to women that had not completed compulsory education. The women participated in the program three times and it was found that their knowledge regarding health literacy increased. Improvement was present with both women who had completed compulsory education as well as those who did not.

Table 3 summarizes the articles listed in this review that are relevant to reproductive health information needs and successful reproductive health interventions.

Conclusion

There are many substantial and hugely detrimental gaps in knowledge suffered by women in the developing world that negatively impact their and their children's health and well-being. There are still places in the world where women do not know about HIV/AIDS or sexually transmitted diseases. In a study in Guatemala in 2006 it was found that in some parts of the country 42.1% of the population had not heard of HIV (Roberts, 2006). This same study found that only 21.7% of the indigenous population used any form of contraception. Another study in India reported that in Maharashta only 47% of rural women knew of HIV, while only 16% possessed accurate knowledge of its

Table 3. Articles related to reproductive health information needs and successful health interventions.

Reproductive health information needs
- Cash et al. (2001)
- Cormick et al. (2012)
- Fullerton et al. (2005)
- Halpern et al. (2008)
- Kapadia-Kundu et al. (2012)
- Mba et al. (2007)
- McGinn and Allen (2006)
- McMichael and Gifford (2009)
- Moukhyer (2006)
- Okereke (2013)
- Purdin et al. (2009)
- Rao et al. (2008)

Successful reproductive health educational interventions
- Bogale et al. (2011)
- Cash et al. (2001)
- Diop and Askew (2009)
- Fullerton et al. (2005)
- Mba et al. (2007)
- McGinn and Allen (2006)
- Moukhyer et al. (2006)
- Okereke et al. (2013)
- Ohnishia et al. (2005)
- Padhyegurjar et al. (2012)
- Purdin et al. (2009)
- Rao et al. (2008)

transmission (Pallikadavath et al., 2005). The researchers found that women from socially and economically disadvantaged groups were less likely to be aware of AIDS or HIV prevention. Likewise, amongst rural women in Nigeria there was generally poor safe motherhood knowledge (Okereke et al., 2013), and in the Sudan only one-third of the respondents had knowledge of modern contraception (Moukhyer et al., 2006). The majority lacked basic understanding of the reproductive process.

These are just a few of the examples of these knowledge gaps recorded in the literature, but they exemplify the disparity of by those who live in developing countries. Until these imbalances are breached by efforts to increase the women's educational and literacy, disproportionate suffering related to reproductive health will continue to plague women and children of the developing world.

This review set out to answer the following questions:

> What is the relationship between female literacy and education and child and maternal mortality? What does the current canon of literature produce as evidence of the reproductive

health informational needs among women in the developing world?

What educational interventions have demonstrated success in order to ameliorate the gap suffered by undereducated or illiterate women?

To answer the first question concerning the relationship between female literacy and education and child and maternal mortality, an examination of the literature determines that there is a definite positive correlation between literacy and maternal and child health outcomes. This relationship has been affirmed through research conducted since the 1960s through today. Separately, there is a positive correlation between maternal education and the previously mentioned health outcomes. These relationships establish that maternal and child mortalities are improved for women and children by greater rates of maternal literacy or education; an important finding demonstrating that formal schooling is beneficial but unnecessary. Further, explorations of maternal literacy have demonstrated that adult acquisition also improves health outcomes (Sandiford et al., 1995). The purpose of pointing out these findings is twofold. First, they clearly signify the significance of female literacy and education as a means by which to promote better health in the developing world and work towards the fulfillment of the MDGs. Second, understanding that literacy education at any age is beneficial means that it is not too late for adult women of or approaching childbearing age residing in the developing world today. This is a point that bears repetition: today educational measures can be initiated for women aged past traditional schooling. There is potential for better health for a generation of adult women, not just their children.

Finally, in establishing these relationships it was repeatedly determined that socioeconomic factors including income and access to medical services were not as significant as maternal literacy and education.

In order to determine the current reproductive health informational needs among women in the developing world a content analysis was conducted. The results of this analysis concluded that these needs are family planning, HIV/AIDS, sexually transmitted infections, violence against women, sexuality, pregnancy education, and emergency obstetric care. It is the goal of this research that a clearer understanding of the specific needs of women in these regions will inform the creators of educational interventions meant to target them.

Finally, the last question asked what educational interventions have demonstrated success in ameliorating the gap suffered by undereducated or illiterate women? Several interventions were presented in this report. Each one involved a combination of pedagogical interventions that were geared toward the needs of that particular community. For example, in order to prevent female genital mutilation Diop and Askew (2009) incorporated both classes and community intervention in Sudan, as this practice is one that cannot be prevented by only educating the potential victims. Bogale et al. (2011) used culturally sensitive audio messages to reach illiterate Ethiopian women. Cash et al. (2001) integrated reproductive health education into indigenous health activities. McGinn and Allen (2006) taught reading and literacy to adult women while integrating reproductive health and cultural context into the content. It would seem that while there are many successful interventions, a commonality is flexibility in reaching a target population as they are most likely able to receive them.

Having not individually answered all of the research questions the principal contribution of this review for researchers and practitioners is this: increasing female education and literacy in developing regions of the world will improve mother and child health. In order to best care for themselves, these women need specific reproductive health information which has been listed above. And, there are many ways in which to create fruitful interventions, but the hallmark of their success is cultural sensitivity in both content and delivery.

While there is a significant amount of literature that addresses reproductive health disparities, there is little that examines them from the perspective of the informational needs of the populations. This paper is an attempt to fill that gap. However, as this is an analysis and content review of previous study and the current canon of work is very limited, the results reported here are equally finite. A great deal of further study is needed to assess the reproductive health-related informational needs of women in the developing world.

Admittedly, this examination covered a wide breadth of literature reviewing studies conducted through culturally disparate parts of the world. This synthesis is meant to be a beginning. Further exploration into the specific reproductive health informational needs and productive interventions of individual regions must be conducted in order to determine best practices to reach specific cultures.

Winkoff and Sullivan (1987) predicted that family planning was the most effective way to reduce maternal mortality rates, and that one-quarter of all maternal deaths are avoided because of general reductions in fertility. Ten years later Shen and Williamson

(1997) wrote that policies that make effective means of contraception readily available will contribute to an increase in child survival, as will policies that increase the educational levels for women. Two decades later female education and literacy, reproductive education, and effective family planning methods have still not caught up with these goals.

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Academic libraries in four Sub-Saharan Africa countries and their role in propagating open science

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Abstract

The study aims at examining libraries in four Sub-Saharan Africa countries and their role in propagating open science. It also seeks to explore existing open science practices, ascertain the level of participation of academic libraries in open science activities, identify the strategies used in marketing open science platforms and enumerate the challenges hindering the success of open science in the selected countries. The study was guided by the qualitative school of thought where the researcher builds a complex, holistic picture, analyses words, and reports detailed views of informants, and conducts the study in a natural setting. The study employed the multiple case study research design approach to assess how academic libraries in Ghana, Nigeria, Tanzania and Uganda promote open science. The findings show that there are few scholarly journals which exist in open access for most African academies in Ghana, Nigeria, Tanzania and Uganda. Though not massively adopted, open access institutional repositories have been used to preserve and publicize the digital contents in some academic institutions in Africa such as theses, dissertations, administrative and heritage materials, conference proceedings as well as pre-prints and post-print of journal articles. The study recommends the intensification of open science advocacy in academic libraries in Sub-Saharan Africa; institutions should ensure that there is a stable electricity supply as well as reliable internet connectivity, introducing regular training on emerging media technologies to the community members and strengthening the libraries consortium in Sub-Saharan Africa as an enabling platform to share intellectual productivity of their member countries.

Introduction

Despite the numerous intellectual activities that are happening in Africa, only 2% of global research output is attributable to the continent (Moahi, 2012). This declining trend makes the countries which lie

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south of the Sahara Desert, commonly known as Sub-Saharan Africa countries (SSA), to account for less than 1% of the world's research output (World Bank and Elsevier, 2014).

Issues of copyright as well as inadequate and unsustainable indigenous journals have led to the dwarfing of most research from African universities and research institutes (Alemna, 2005). This reality leaves African academia with no alternative but to publish in internationally renowned peer-reviewed journals in order to ensure academic promotion and tenure. However, not many of these make it into such journals, and the few, when they do, are beyond the reach of most universities, thereby making access to them nearly impossible. This results in the repetition of research due to the lack of a reliable platform for sharing research. This means therefore that the concept of open science has not been widely enough embraced in most African institutions to enable most African scholars to share knowledge through this phenomenon.

Open science is seen as the movement to make scientific research, data and findings accessible to all levels of an inquiring society (David, 2014). The concept draws its strength from the broader definition of science which is generally described as the collecting, analysing, publishing, critiquing and re-using data. The concept of open science, as a response to the societal demand for access to collective scientific knowledge, was evident from at least the 17th century in the development of scientific societies and their journals (McClellan, 1985). Practices such as publishing research, campaigning for open access, encouraging scientists to practice open access and freely communicating scientific knowledge are what embody open science activities.

The proponents of open science indicate that financial constraints, restrictions on data usage, poor formatting of data and cultural reluctance to publish data often affect scholarly dissemination of scientific data. However, open science platforms and practices such as data curation, open source software, open access journals and open access institutional repositories (IRs) have significantly bridged the gaps in scientific research communication especially in most developing countries.

Developing countries are potentially one of the greatest beneficiaries of open science platforms due to the fact that, currently, some universities find it very difficult to pay for subscriptions required for current journals. In Africa, there has been a marked response to open access (OA) – a vehicle which drives the open science phenomenon – through a steady development of IR initiatives particularly among universities and research institutions.

SSA region consists of 42 countries located in SSA mainland and in addition six island nations (New World Encyclopedia, 2015). However, the Directory of Open Access Repositories (DOAR) currently lists only 18 SSA countries with 126 repositories in SSA countries whose contributions to world's data research is merely 0.03% as compared to 1.4% of world's research articles (Onyacha, 2016; Open-DOAR, 2017). This is a very small contribution which may be associated with the presence of few countries in SSA which have IRs.

The major contributors in this small contribution to the world's data research from SSA countries are South Africa 63.7% followed by Kenya 14.3%, Cameroon 11.1% and Ghana 2.7%, whereas as the least contributors are Tanzania and Burundi 0.1% followed by Zambia and Sudan 0.2% (Onyancha, 2016).

The option for openness is driven by a growing appreciation of the fact that lots of investment in research could have much greater impact if the outcomes are freely shared beyond borders. Open access journals, open source softwares, open knowledge communities and open access IRs have taken the lead in driving the open science movement over the last two decades (Jain, 2012; Schwartz, 2012; Suber, 2007). It is believed that the digital networked environment will continue to support this agenda so long as artificial barriers are removed. Literature abounds with the benefits and successes of open science platforms in developed world. Software engineering protocol has improved to make the creation of OA platforms easier, due to the existence of numerous open source software. Globally, it could be observed that many library associations have either signed major open science declarations or created their own open science strategies. In a survey by the Association of Research Libraries (ARL) (2008), it was discovered that 65% of surveyed libraries were either involved in journal publishing or were planning to be so in the near future (ARL, 2010). In the midst of the above strategies and practices espoused, very limited research exists as to how academic libraries in SSA are promoting open science in their academic communities. For instance, a closer look at the literature concerning IRs in Africa reveals that many of them unfortunately crash out shortly after their take-off (Christian, 2008; Corletey, 2011; Moahi, 2009). Due to the peculiar position they occupy on most campuses, librarians are expected to lead most education and outreach initiatives to the academic community about the benefits

of open science. Librarians are among the information professionals who believe in the need to remove price barriers and permission barriers which scuttle scholarly communication.

With the availability of softwares, coupled with the increasing proliferation of open science platforms, what are the corresponding strategies needed to promote these initiatives for increased usage and sustainability? Study draws attention to some concerted comprehensive efforts instituted by information professionals to ensure the free sharing of knowledge without barriers:

- training users about search technique in order to explore resources in open access platforms;
- persuading authors to contribute with self-archiving;
- establishing a standard metadata and comprehensive catalogue system;
- understanding of software and giving training to authors to comprehend and work with some open source software;
- collection management and stewardship of collections.

Software and engineering protocols for open science

Generally, a number of software programs exist to support open knowledge sharing and scholarly communication initiatives of academic libraries. These are in areas of Web 2.0 platforms such as blogs, wikis and social networking sites, integrated library management and IRs software. Among the open software programs and platforms for sharing and advancing the course of knowledge are ARNO[1], CDSware[2], DSpace[3], ePrints,[4] FEDORA[5], MyCoRe,[6] Invenio[7] and Koha[8]- ILS, VRE[9] and CoP[10].

Enabling environment. Several supportive institutions have supported the open science movement in SSA. Besides the various consortia in the different countries, there are other bodies such as the International Network for the Availability of Scientific Publications (INASP) and the Carnegie Corporation of New York, the Database of African Theses and Dissertation and the Association of African Universities (AAU).

Benefits of open science

As open science platforms open up access to their holdings, their benefits to researchers and the public cannot be overemphasized. They provide diverse advantages to academic institutions, researchers, funding agencies, publishers and the entire nation. In the view of Jain (2012), it is an effective vehicle to information exchange between and among countries.

With the availability of insufficient funding to libraries, Christian (2008) believes this type of unrestricted access to information helps researchers in the developing world. Canada (2009) further stresses that considering the limited financial resources available; the potential for researchers, educators and institutions in developing countries to benefit from OA platforms is great. OA repositories for instance lead to an increased global visibility and prestige and serve as a marketing tool to attract funding, students and quality staff. They also provide an avenue for the centralization and long-term curation of all types of institutional outputs (Johnson, 2002; Lyte et al., 2009). It is also a way of maximizing availability, accessibility, discoverability and functionality of scholarly research outputs at no cost to the users (Vrana, 2011).

Several benefits also accrue to authors who utilize the services of OA journals and IRs in terms of greater security and longer-term accessibility (Lyte et al., 2009; White, 2009).

In her briefing paper on OA repositories, advocate Swan (2010) sums up the advantages that repositories bring to an institution as:

- opening up outputs of the institution to a worldwide audience;
- maximizing the visibility and impact of these outputs as a result;
- showcasing the institution to interested constituencies – prospective staff, prospective students and other stakeholders;
- collecting and curating digital output;
- managing and measuring research and teaching activities;
- providing a workspace for work-in-progress, and for collaborative or large-scale projects;
- enabling and encouraging interdisciplinary approaches to research;
- facilitating the development and sharing of digital teaching materials and aids, and
- supporting student endeavors, providing access to theses and dissertations and a location for the development of e-portfolios.

Disadvantages of open science

Despite the benefits outlined above regarding open science to knowledge sharing, there are some

perceived disadvantages (Nielsen, 2011). In summary, these include the fact that too much unsorted information overwhelms scientists since increasing the scale of science will make verification of any discovery more difficult. Some are also of the belief that removal of barriers could result in science being used for bad things, considering the fact that the public may misunderstand science data.

Methodology

The study was guided by the qualitative school of thought where the researcher builds a complex, holistic picture, analyses words, reports detailed views of informants, and conducts the study in a natural setting (Creswell, 1998). The study employed case study research design approach which is an empirical inquiry enabling a researcher to select a small geographical area or a very limited number of individuals as the subjects of study and to closely examine the data within a specific context (Creswell, 2009; Zaidah, 2007).

In this study therefore, four countries in SSA, that is Ghana, Nigeria, Tanzania and Uganda, were purposively selected because they are in a state of infancy in OA terms. The design enabled the assessment of how academic libraries in the four selected countries promote open science in the respective countries. Empirical documents such as books, journal articles and websites were clearly reviewed to ascertain the level of adoption of open science, various practices to propagate open science, the avenues to market such platforms and the challenges faced in promoting open science in the countries under study. In particular, the following databases and search engines were relied upon to gather resources for the study: Emerald, African Journals Online, Science Direct, LibMagazine, Library Philosophy and Practice, Google search engine, Google Scholar, Google Advance and DOAJ.

Findings

Nigeria

The state of open science adoption in Nigeria. The OA model of scholarly communication is yet to be fully adopted by researchers and other stakeholders in Nigeria (Christian, 2008). According to Gbaje (2010), in an effort to popularize OA initiative in Nigeria, a conference to bring together all stakeholders was organized in 2008 at Ahmadu Bello University, Zaria. Nigeria has 221 OA journals in African Journals Online (AJOL). Some examples of such journals are *Abia State University Medical Students'*

Association Journal, *African Journal of Anaesthesia and Intensive Care*, *African Journal of Economic Policy* and *African Journal of Library, Archives and Information Science*.[11]

Ridwan (2015) noted that some institutions that have already installed IRs in Nigeria are University of Jos, having content such as conferences, references, learning objects and multimedia; University of Nigeria, Nsukka having content such as theses and articles; Ahmadu Bello University, Zaria with contents like theses and conferences paper, postgraduate theses and dissertations (Abdulkadir and Mohammed, 2013; Ahmadu Bello University, 2015; Musa et al., 2014); Federal University Technology Akure having contents such as theses, articles and references. He observed that DSpace and E-prints, which are both open source software programs, have been relied much upon to create the repositories. Also, the OpenDOAR (2017) lists the universities that currently have OA IRs in Nigeria in Table 1. The trend shows that the earliest IR to be established in Nigeria is that of Ahmadu Bello University, Zaria in 2005 whereas the recent ones are that of Federal Universities of Lokoja and Ndufu-Alike Ikwo in 2015.

Marketing and promotion of open science by academic libraries in Nigeria. Marketing is regarded as the anticipation, management and satisfaction of demand through the exchange process (Evans and Berman, 1985). Academic communities share a common characteristic with other non-profit organizations, i.e. instead of a tangible product, they offer services. In Nigeria, several strategies have been relied upon to market, promote or publicize open science in general of which institutional repositories and open journals are part. Among these techniques are:

1. using creative repetitive communication through word of mouth (informal), notices, posters, banners and campus radio announcements;
2. inclusion in annual reports, brochures and newsletters;
3. user education/training;
4. meetings and various fora, seminars/workshops and special events such as open days;
5. the library's homepage, other websites, face book, blogs and email.

Efforts at marketing, during the early stages, focus heavily on the use of handouts, pamphlets, bookmarks and other paper collateral to reach target audiences. Workshops and other 'mini-conferences' on the changing scholarly communication model,

Table 1. Available institutional repositories in Nigeria.

	Name of institution	Name of IR	URL	Launch date	Number of items as at 2016
1	Ahmadu Bello University, Zaria	Open Access Institutional Repository at Ahmadu Bello University	http://kubanni.abu.edu.ng:8080/jspui/	2005	5919
2	Covenant University	Covenant University Repository	http://eprints.covenantuniversity.edu.ng/	2012	5832
3	Ebonyi State University, Abakaliki	Ebonyi State University Institutional Repository	http://ir.ebsu.edu.ng:8080/	2013	341
4	Federal University Lokoja	Federal University Lokoja Institutional Repository	http://repository.fulokoja.edu.ng/	2015	66
5	Federal University Ndufu-Alike Ikwo	Federal University Ndufu-Alike Ikwo Repository Archive	http://dspace.funai.edu.ng/xmlui/	2015	256
6	Federal University of Technology Minna	Federal University of Technology, Minna Institutional Repository	http://dspace.futminna.edu.ng/jspui/	2013	4435
7	Federal University of Technology, Akure, Nigeria.	Institutional Repository of the Federal University of Technology	http://dspace.futa.edu.ng:8080/jspui/	2011	2346
8	Federal University Oye Ekiti	Federal University Oye-Ekiti Institutional Repository	http://repository.fuoye.edu.ng/	2013	1103
9	Landmark University	Landmark University Repository	http://eprints.lmu.edu.ng/	2013	197
10	University of Jos	University of Jos Institutional Repository	http://irepos.unijos.edu.ng/jspui	2009	1221
11	University of Lagos	University of Lagos Institutional Repository	http://repository.unilag.edu.ng:8080/xmlui/	2013	619
12	University of Ilorin	UILSPACE	http://uilspace.unilorin.edu.ng:8080/jspui/	2013	147
13	University Of Nigeria	University of Nigeria Institutional repository	http://repository.unn.edu.ng:8080/jspui/	2008	2300

Source: OpenDOAR(2017).

the OA movement or educating faculty on related IR issues such as copyright, publishing processes, and citation analysis to draw attention to larger issues facing higher education are also useful. This is because by capturing the attention of faculty with these issues, many opportunities unfold to highlight the value and use of the IR in a broader context as indicated by Ramirez and Miller (2011).

Establishment of digitization centre and processes. IR has the following four characteristics as outlined by Johnson (2002):

- institutionally defined (as opposed to discipline- or subject-focused);
- scholarly (containing the products of faculty, research staff and students);
- cumulative and perpetual (the content should be preserved on a long-term basis); and
- open and interoperable (attentive to the Open Archives Initiative-Protocol for Metadata Harvesting).

Consequently, the digitization centre purposely established for the IDR project performs the following tasks:

- digitization of non-digital born theses and dissertations submitted for the award of postgraduate degrees and certificates of the university for ingest into the university IR;
- uploading digital born theses and dissertations into university IR;
- collection and uploading of post-print and pre-print scholarly publications of the scholars within the university community and also from outside the university as the case may be; and
- collection and uploading of other relevant information resources generated within the university committees such as inaugural lectures, conference proceedings; seminar and workshop papers.

Challenges of open science in Nigeria. Christian (2008) noted some of the issues identified in Nigerian universities that adversely militate against the development of free dissemination of scholarly research. Among these are:

- Lack of awareness among researchers and academics in the country's academic and research institutions about the many open science platforms for generating and sharing knowledge. This may partly be due to the low level of advocacy on the part of information professionals.
- Inadequate information and communication technology infrastructure, particularly the high cost of internet bandwidth in Nigeria.
- The problem of inadequate and erratic electricity supply to power ICT facilities in academic institutions.

- Inadequate funding also constitutes another problem. Most of the academic and research institutions in Nigeria are funded by the government. These institutions continue to grapple with percentage decline in budgetary allocations.
- Lack of support from the community in terms of usage and uploading of content. (Musa et al., 2014: 19)

Uganda

The state of open science adoption in Uganda. The situation in Uganda depicts a steady and slow approach to Open Science (GOAP, 2015). Uganda has six public universities and 30 private universities. Of these, five public and 15 private institutions belong to the Consortium of Ugandan University Libraries (CUUL). There are currently 12 Ugandan journals in the AJOL database mainly focusing on the science disciplines (http://www.ajol.info/). Some of these journals include but are not limited to: *African Health Sciences* (published by the College of Health Sciences, former Faculty of Medicine), *Makerere Journal of Higher Education* (published by the former Department of Higher Education, now an institute), *African Crop Science Journal* (published by the African Crop Science Society, with an editorial secretariat at the Department of Crop Science, Faculty of Agriculture), *Eastern Africa Journal of Rural Development* (jointly published by the Ugandan Agricultural Economics Association and the Department of Agricultural Economics and Agribusiness, Faculty of Agriculture).

There are currently two operational academic IRs in the country dominated by theses and dissertations (Di Salvo et al, 2015; OpenDOAR, 2016). Makerere University became the first to establish an OA repository which was launched as the Uganda Scholarly Digital Library (USDL) in 2006. The other operational academic IR is that of Regional Universities Forum for Capacity Building in Agriculture (RUFORUM IR) which was established in 2013. The details of IRs in Uganda are presented in Table 2.

Marketing and promotion of open science by academic libraries in Uganda. The Makerere University Library has been in the lead in the operational activities of the repository collaborating with other campus stakeholders towards its creation and management. The library often organizes training programmes for members of the campus community to ensure buy-in and support. Several strategies have been employed to publicize the repository of USDL and other

Table 2. Details of institutional repositories in Uganda.

Name of institutional repository	Name of institution/ organization	URL	Launch date	No. of items as at 2016	Content
Makerere University IR (Mak IR	Makerere University, Uganda	http://makir.mak.ac. ug/	2006	513	articles, conferences, theses, unpublished, books
RUFORUM IR	Regional Universities Forum for Capacity Building in Agriculture, Uganda	http://repository.ruforum.org/ oai	2013	1421	articles; conferences; theses; unpublished; books; learning objects; multimedia; special

Source: Nnam et al. (2016); OpenDOAR (2017).

repositories in Uganda such as RUFORUM. The chief among them is the use of institutional communication channels, for example flyers, posters and social channels to reach out to the campus community to notify them about new publications residing in the repositories. The fliers especially answer some frequently asked questions and then link clients to the repositories (Nnam et al., 2016*)*.

Challenges of open science in Uganda. Generally, the barriers to open science in Uganda have been the absence of comprehensive OA policies and lack of awareness among key stakeholders (Di Salvo et al., 2015; Nannozi and Kamusiime, 2013). These, coupled with poor ICT infrastructure, little zeal on the part of researchers, lack of skilled staff to manage open science projects, low search ability and restricted access to some publications (Nnam et al., 2016) stifle the growth of open science in Uganda.

Ghana

The state of open science adoption in Ghana. In Ghana, the concept of open science is followed strenuously (Asamoah-Hassan, 2010). This is evidenced by the number of journals in OA as well as the adoption of the concept of OA, IRs and the use of open source software to manage and share knowledge. Mention could be made of 27 Ghanaian journals which are all found in the AJOL Platform. These include but are not limited to: *Ghana Journal of Medical Sciences*, *Ghana Journal of Geography*, *Ghana Journal of Linguistics*, *Ghana Medical Journal* and *Ghana Mining Journal*.[12] The use of open source software is also evident in the country. The Koha- ILS Software and the D-Space repository software are relied upon by many Ghanaian academic libraries to manage resources and create OA repositories respectively.

All these initiatives are driven by the academic libraries of most institutions. Ghana has 11 public and over 60 privately owned universities (Adam and Mahmoud, 2014). Of these institutions 37 (including all public universities) belong to the Consortium of Academic and Research Libraries in Ghana (CARLIGH). Five out of the 10 public universities as well as six of the over 60 private universities have IRs at various stages of development and operation (Bossaller and Atiso, 2015; Corletey, 2011). However, this study seeks to report on the repositories as are presented in Table 3. In all the universities, the library and IT units directly deal with the technical issues of repository development whilst collaborating with other units to oversee the operations and marketing. The Universities of Kwame Nkurumah and of Cape Coast became the first to establish IRs in 2008.

In all the repositories, there are electronic theses and dissertations, reports, journal articles, or heritage and administrative materials. However, there were differences in the proportions of such components. None of the institutions had audio or audio-visual materials in its repository. A breakdown of the respective constituents has been shown in Figure 1.

Marketing and promotion of open science by academic libraries in Ghana. The word of mouth approach of publicizing the IR as well as the use of the main university website was common to all four universities under review.

Again, education or orientation programmes were a common feature in all the study sites. Furthermore, OA week celebrations and university open days as well as campus-based radio stations were used to promote the repository. It also emerged that religious fora were also employed to reach out to the campus community about existing open science initiatives. In all these, the university library spearheads the marketing process, with irregular support coming from the Public Relations departments.

Table 3. Open access repositories of Ghanaian academic institutions.

IR name and URL	Institution/organization	Launch date	Items as at 2016	Content
KNUSTSpace: http: //dspace.knust.edu.gh:8080/ oai/request	Kwame Nkurumah University of Science and Technology (KNUST), Ghana	2008	5916	articles, references, conference, theses
UDS Institutional Repository (UDSspace): http://udsspace.uds.edu.gh/oai/ request?verb=Identify?	University of Development Studies, Ghana	2014	538	articles, references, conference, theses, unpublished materials
University of Cape Coast Institutional Repository: http:// erl.ucc.edu.gh/	University of Cape Coast, Ghana	2008	1390	articles; theses; unpublished; learning objects
UGSpace (University of Ghana Digital Collection): http:// ugspace.ug.edu.gh/	University of Ghana, Ghana	2012	7154	books, special materials

Source: OpenDOAR (2017).
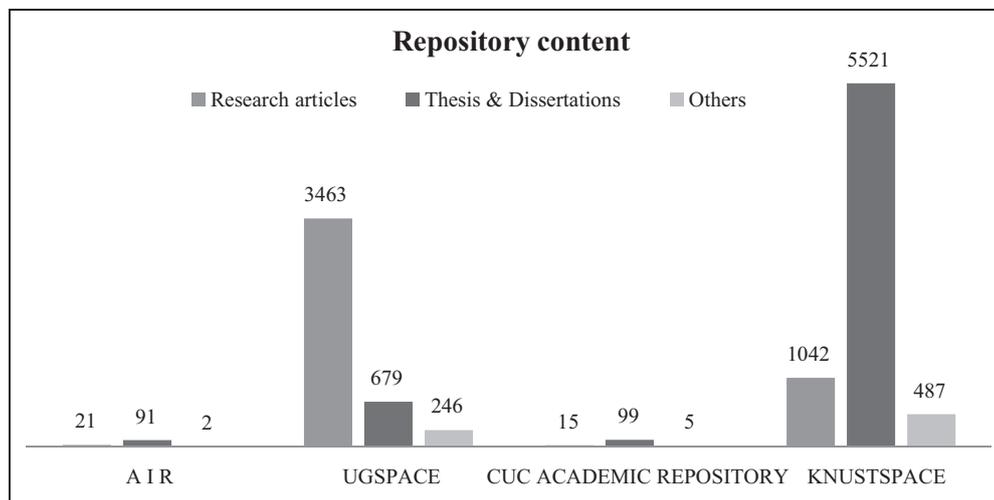
Figure 1. Materials in the various repositories. (The colour version of this figure is available in the online issue.)
Source: OpenDOAR (2017).

Challenges of open science in Ghanaian academic institutions. The list of issues thwarting the effort of open science is never exhaustive. In general, there is a negative attitude to contents that are openly accessible. It is often misconstrued that publications in OA are not worthy or credible. This seriously defeats several efforts at consolidating the minimal gains made in OA.

It must be noted that most of the open science initiatives dwell on computer application. For that reason, computer experts become crucial. However, such human resource is very scarce in the country. Due to the lower rate of retention of IT experts, it often becomes difficult to sustain open science initiatives. Again, internet connectivity is not only expensive but often erratic. As a result, it becomes unreliable to dwell on resources online. Library users

are such that if a result is not found as and when it is sought, then it is not worth searching.

Closely related to the issue of erratic internet connectivity is the lack of stable power in the country. Since most digital initiatives rely on electricity, a lack of it really affects the smooth operations and cost of most libraries. Therefore, when it becomes difficult to meet the traditional mandate of academic libraries, little or no room is left to consider innovations such as open science. What is more, the issues of copyright and intellectual property rights usually affect the rate of populating open science platforms with contents. It often occurs that African academics sign away their right as authors completely to commercial publishers, thus making it impossible to freely disseminate their publications.

Tanzania

The state of open science adoption in Tanzania. Despite the potential for OA to facilitate scholarly communication, it has not been fully exploited in Tanzania (Lwoga and Chilimo, 2006). Open access to scholarly communication is a relatively new innovation among researchers in Tanzania. By the end of 2010, Tanzania had only two OA journals (both biomedical journals) and no OA repositories (Dulle, 2010).

A study by Mgonzo and Yonah (2014), confirmed by the DOAR, revealed that Tanzania had eight open access IRs by the end of 2014. This shows an implementation rate of only 9.8% of the 51 total numbers of institutions in Tanzania. However, OpenDOAR (2017) shows that by the end of 2016 there were nine academic institutions with IRs in Tanzania.

Tanzania lists 19 journals which are all found in the AJOL Platform. These include but are not limited to: *African Journal of Economic Review*, *Huria: Journal of Open University of Tanzania*, *Tanzania Journal of Science*, *Journal of Development Studies* and *Journal of Health Research*.[13] The institutions with IRs, items deposited and the contents are presented in Table 4. In that table Muhumbili University of Health and Allied Sciences pioneered the establishment of IRs in Tanzania by the year 2001 which was followed by the Open University of Tanzania after 10 years. The recently established IRs in the list are that of Mzumbe and Nelson Mandela Universities.

These Universities, Colleges and many others form the Consortium of Tanzania Universities and Research Libraries (COTUL) and if continued efforts are adopted to strengthen it, there will be more knowledge sharing among the consortium members.

Marketing and promotion of open science by academic libraries in Tanzania. Most academic institutions in Tanzania employ far-reaching communication tools such as campus-wide announcements, newspaper articles, letters, post cards, brochures, bookmarks, group e-mails, give-aways, workshops, flyers, meetings, training, workshops and press releases to raise awareness.

Challenges of open science in Tanzania. The growth of open science in Tanzania is bedeviled by numerous challenges. To begin with, slow Internet speed, emanating from low Internet bandwidth supplied to most academic institutions is a great disincentive (Dulle et al., 2010). There is also the lack of a clear open science policy within the country's universities. Swan and Brown (2005) observed that policies are considered important not only for motivating the researchers

to publish in OA systems but also as a means of clarifying the objectives, processes and procedures relating to the OA activities. Unfortunately, the opposite is the case in most Tanzanian academic institutions. Furthermore, there is generally a low level of researchers' information search and publishing skills. Most researchers in the country face challenges in their inability to access and disseminate scholarly content. Other challenges include: inappropriate training opportunities for library and information professionals to keep abreast of skills and new media tools used in creating local content; lack of authors' desire in depositing their works in the institutional repository; limited financial resources for purchasing high quality scanner, digital cameras and the like.

Cross-cases analysis of the various countries

It could be realized that academic libraries have seen the worth of open science platforms to widely disseminate research across space and time. For that matter, not only are open science platforms such as open access journal and repositories relied upon to advance scholarly communication, but they are often done with open source software. Other resources such as blogs and wikis have been greatly relied upon to communicate among academic communities of practice without recourse to any physical barriers. These initiatives have really led to African research rising.

It could be observed from the above discussions that a few scholarly journals exist in OA for most African academies in Ghana, Nigeria, Tanzania and Uganda. Again, though not massively adopted, OA institutional repositories have been used to preserve and publicize the digital contents in some academic institutions in Africa such as theses and dissertations, administrative and heritage materials, conference proceedings as well as pre-prints and post-prints of journal articles.

In spite of various benefits, developing countries' road to open science has not been smooth which among other things has to do with policy issues. Experiences suggest that a repository for instance, will only function to its full capacity when a mandate is in place to populate it. However, in many instances, open science initiatives are implemented long before relevant policies are formulated.

Again, the high cost of ICTs, connectivity and poor telecommunication in developing countries makes the sustainability of OA repositories very difficult (Canada, 2009; Giarlo, 2005). According to Dicovitsky (2010) developing countries are still struggling to achieve broadband services even though significant improvements have been made in access to mobile

Table 4. Institutional repositories in academic institutions in Tanzania.

Name of the institutional repository	Name of the institution/ organization	URL	Launch date	No. of items as at 2016	Content
Digital Library of Open University of Tanzania	Open University of Tanzania	http://repository-out.ac.tz/cqi/oai2	2011	338	articles, references, theses
Digital Library of Tanzania Health Community - e-Health	Ifakara Health Institute	http://ihi:eprints.org/cqi/oai2	2012	3055	articles
Mario Mgulunde Learning Resource Center Repository	Saint Augustine University of Tanzania	http://41.59.3.91:8080/xmlui	2013	28	articles, theses, learning objects, unpublished materials
MUHAS IR	Muhumbili University of Health and Allied Sciences (MUHAS), Tanzania	http://ir.muhas.ac.tz:8080/oai/request	2001	1681	articles, conferences, theses, unpublished materials
Mzumbe University Scholar Repository	Mzumbe University, Tanzania.	http://scholar.mzumbe.ac.tz/	2015	1449	articles, references, theses, books
NM-AIST Repository	Nelson Mandela African Institution of Science and Technology, Tanzania	http://dspace.nm-aist.tz/cai/request	2015	19	articles, theses, multimedia
Sokoine University of Agriculture IR	Sokoine University of Agriculture, Tanzania	1.http://www.suaire.suanet.ac.tz/oai/request	2012	646	conferences theses, unpublished materials
	Tanzania Climate Change Information Repository (TaCCIRE)	2.http://www.taccire.suanet.ac.tz/xmlui	2013	447	articles and unpublished materials
SUZA Repository	State University of Zanzibar (SUZA), Tanzania	http://repository.suza.ac.tz:8080/xmlui/	2015	30	articles, theses
University of Dar Es Salaam IR	University of Dar Es Salaam	http://repository.udsm.ac.tz:8080/0ai/	2012	3575	articles, theses, conferences.

Source: OpenDOAR (2017).

technology and infrastructure. Pickton and Barwick (2006) observe that the problem often does not lie in the initial set-up cost but regular maintenance cost.

Another drawback to the growth of repositories in Africa is the lack of institutional support. Christian (2008) opines that many cases in literature suggest that knowledge about the benefits of OA IRs is very low among the major stakeholders like lecturers, researchers, librarians and students. As such, commitment and support seldom come from key stakeholders (Pickton and Barwick, 2006).

The issue of copyright cannot also be overlooked in any discussion of challenges confronting IRs. When it comes to alternative publishing arrangements, it often becomes difficult for researchers to negotiate their intellectual property right to their advantage. In most cases, because some researchers do not have adequate knowledge about intellectual property rights issues, they end up being too careful not to infringe publisher copyright. In the same vein, publishers have developed a subtle opposition to IRs since they see it as a competition and threat to their business (Davis and Connolly, 2007; Moahi, 2012; Pickton and Barwick, 2006). In a typical situation in Nigeria in 2008, the International Institute of Tropical Agriculture (IITA) developed an IR but the repository could not go public

due to some copyright issues. This was because copyright in research works conducted by the researchers at the Institute had been signed away to commercial journal publishers (Christian, 2008).

Closely linked to the intellectual property right issues is the difficulty in generating content, especially in the beginning. This problem stems from the unwillingness on the part of academics to deposit their research work. Research reveals that materials that are openly available hardly achieve any recognition (Davis and Connolly, 2007; Royster, 2008).

Challenges related to technical issues such as human resources, material resources and conversion of materials from their existing format to electronic format also affect the success of repositories.

Future directions

In relation to the various challenges raised above, the following recommendations are made with the key strategies, units and individuals.

In the first place, academic libraries in SSA should intensify their open science advocacy. It had long been realized that the 'build it and they will come' strategy does not work. For that matter, the university library staff should target highly placed individuals in the academic community such as university presidents or vice chancellors, provosts, registrars and faculty deans as well as heads of academic departments to ensure their buy-in of any initiative they undertake. It is only after this that mass promotional activities such as word of mouth, open days, OA weeks, use of notice boards and university websites can actually be effective in promoting the adoption of open science.

Again, there is the need for university administrators to ensure that there is stable electricity as well as reliable internet connectivity in their institutions. There is often the need to invest substantially in these resources since it is the only antidote to low rate of knowledge production and sharing in most African countries.

Furthermore, there should be regular training of the campus community members such as students and faculty members about emerging media technologies. This should also be interspersed with encouraging members to contribute contents into open science platforms to increase the visibility of their institutions and therefore, their own visibility. The academic libraries should assert their authority and lead in the research literacy skills of members in order that they could become reliable content contributors.

Again, in most of the countries above, there already exists a consortium of academic libraries. The consortium libraries and member institutions should consider the establishment of a single platform to showcase and share the intellectual productivity of their member countries. In the same way that they collectively subscribe and pay for journal and database licences, they could create open science platforms to share outputs of their scholars.

Conclusion

The field of information services delivery has really changed. The library has moved from a custodian of resources to a producer of same. For this reason, there is the need to re-think the ways in which libraries in Africa embrace innovations at improving scholarly communication and knowledge sharing. This is possible if there is a readiness by these libraries to consider applying the emerging library new technologies, provided that they fit into their environment. Knowledge and experience sharing are possible if the librarians prepare the forums to discuss various issues concerning their institutions. Providing an opportunity for the library professionals to attend seminars, workshops, conferences and short training sessions prepared at the regional and international levels is of paramount importance. This is considered as an effective way through which libraries and information professionals can engage in building their capacities in order to form meaningful collaborations to push the agenda of open science in their academic communities to harness the benefits associated with OA. Developed countries should consider removing access barriers so that research findings are made available to as many academics as possible free of charge. This will accelerate research activities, enrich education and knowledge sharing.

Notes

1. Arno is the first virtual network functions (NVF) software platform released from Open Platform Network Function (OPNFV). OPNFV is said to be a 'develop-focused' release designed to foster the development of NFV, virtual network functions and use case-based testing. Available at: www.rcrwireless.com/20150605/ . . . nfv/opnfv-unveils-arno-nfv-software-platform-tag2

2. Stands for CERN Document Server Software. CDSware supports the creation of electronic preprint servers, Online Public Access Catalogs (OPACs) and document systems on the Web. It complies with the OAI-PMH (Open Archive Initiative – Protocol for Metadata Harvesting) and uses MARC 21 as its underlying bibliographic standard. It is open source software, licensed under the terms of the GNU General Public License (Sitas, 2006)

3. Is an open source repository application developed by the community and stewarded by DURASPACE. Available at: http://www.dspace.org/introducing

4. An EPrints institutional repository is an information hub designed to capture research outputs, make them discoverable and re-usable, and preserve them for the future. It was created in 2000 as a direct outcome of the 1999 Santa Fe meeting that decided on the OAI-PMH protocol. Available at: http://www.eprints.org/uk/index.php/openaccess

5. Stands for Flexible Extensible Digital Object Repository Architecture. It is a robust, modular, open source repository system for the management and dissemination of digital content. It was in the first place established in 1997 as a research project at Cornell University. Available at: http://fedorarepository.org/about

6. Is a framework for presentation and management of digital contents. Available at: http://www.mycore.de/

7. Invenio was born at CERN as a digital library software solution to run the CERN document server, managing over 1,000,000 bibliographic records in high-energy physics since 2002. It covers articles, books, journals, photos, videos, and more. Available at: http://invenio-software.org/

8. Is an Open Source - Integrated Library System which was created in New Zealand in 2000. Koha is used worldwide in libraries of all sizes and it includes modules for acquisitions, circulation, cataloging, serials management, authorities, flexible reporting, label printing, multi-format notices, offline circulation for when Internet access is not available. Available at: https://koha-community.org/about

9. A virtual research environment comprises a set of online tools and other network resources and technologies interoperating with each other to facilitate or enhance the processes of research practitioners within and across institutional boundaries. It facilitates collaboration amongst researchers and research teams providing them with more effective means of collaboratively collecting, manipulating and managing data, as well as collaborative knowledge creation (JISC, 2013).

10. 'Communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly' (Wenger-Trayner and Wenger-Trayner, 2015).

11. http://www.ajol.info/index.php/index/browse/country?countryId=156&browsePage=3)

12. (http://www.ajol.info/).

13. (http://www.ajol.info/).

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Perspectives on university library automation and national development in Uganda

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Abstract
Academic libraries in universities store large volumes of research that can be used for development purposes to support teaching, learning, research, innovation, community outreach and partnerships. Library automation incorporates the adoption of integrated library systems. Effective adoption of an integrated library system enables broad-based access to global and local knowledge sources to solve local, regional and national development challenges. Using a sequential mixed methods approach in a case study of a Ugandan public university, Kyambogo University, this study investigated the perceptions of librarians, information workers and other university stakeholders with respect to library automation and the contribution thereof to national development. The results confirmed that the integrated library system improved library operations and played an important role in supporting national development. This study also highlights the continued challenges of adopting an integrated library system in developing countries such as Uganda, which, if addressed, could further improve information service delivery for a nation's socio-economic transformation.

Introduction

Academic libraries in universities store large volumes of research conducted at universities and other research institutions that can be used for development, support teaching, learning, research, innovation, community outreach and partnerships (Bossaller and Atiso, 2015: 26). As such public – and private – academic libraries can play a central role in the collection and dissemination of both international and local content by providing access not only to students, faculty and researchers but also to the broader community and society.

Information and communication technologies (ICTs) are central in facilitating the effective storage, communication and dissemination of information. The World Summit on the Information Society (WSIS) declared that: 'local authorities should play a major role in the provision of ICT services for the benefit of their populations' (WSIS, 2003). Fostering digital opportunities strengthens capacities for scientific research, information sharing, cultural creations and exchanges of knowledge (UNESCO, 2005). The International Federation of Library Associations and Institutions (IFLA, 2016) further believes that increasing access to information and knowledge across society with the help of available ICTs greatly

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supports sustainable development and contributes to improving people's lives. ICTs hold the potential to bridge socio-economic divides (Bossaller and Atiso, 2015: 27) and those in positions of authority have a responsibility to do so.

Library automation is the direct application of ICT to library functions such as acquisition, circulation, cataloguing and serials control (Amekuedee, 2005). Libraries automate their library services using integrated library systems (ILS) to improve efficiency and enhance access to library resources (Webber and Peters, 2010). The effective adoption of ICTs such as an ILS in academic libraries will 'accelerate the level of knowledge acquisition and consequently improve national development' (Ani et al., 2005: 706).

Librarians and information workers were among the first to realise the importance of the Internet in the provision of information services to the public (De Saulles, 2007: 5). Librarians therefore partly fuelled the expansion in the quantity and communicability of information by adopting ICTs such as the ILSs and the Internet in their libraries. The libraries' ability to make information available electronically directly facilitates interaction with information seekers in a more cost-effective manner (Amekuedee, 2005: 442). Individuals thus play an important role in ICT adoption and this is reflected in virtually all technology adoption models, such as the perceived usefulness and perceived ease of use in Davis et al.'s (1989) Technology Acceptance Model (TAM) and in Rogers' (2003) Diffusion of Innovations (DoI) theory.

The purpose of this article is to determine the perceptions of the librarians and information workers involved in library automation and other stakeholders in Uganda with respect to library automation and the contribution thereof to national development. This paper is structured as follows: after a discussion of the role of universities in Africa and Uganda, a brief history of library automation is presented. Thereafter the methodology of the study, the results and a discussion follows. We conclude the paper with the key perspectives on the role of library automation on national development.

The role of universities in Africa and Uganda

The former United Nations Secretary-General, Kofi Annan, stated that, 'The university must become a primary tool for Africa's development in the 21st century' (Annan, 2005). According to Sutz (2005: 53): 'To increase their contribution to development through the production and distribution of knowledge, universities in developing countries need to transform themselves into developmental universities'. Among others, such developmental universities must clarify, analyse and solve local, regional and national problems in partnership with government, industry, community and other research organizations and make resulting developmental knowledge available and accessible to the broader society regardless of socio-economic status (Fredua-Kwarteng, 2015, 2016).

The African Union (AU) agreed on a set of goals that all African countries are expected to achieve by 2063 (African Union Commission, 2015: 5). Rooted in pan-Africanism, Agenda 2063 provides a robust framework for addressing past injustices and the necessary infrastructure that supports accelerated integration and growth, technological transformation and development through African integration. In an effort to develop the capacity of Africa's citizens to be effective change agents for the continent's sustainable development as envisioned by the AU and its Agenda 2063, the African Union Commission has developed an Africa comprehensive 10-year continental education strategy. On 31 January 2016 heads of state attending the 26th African Union Summit in Addis Ababa approved the Continental Education Strategy for Africa 2016-2025 (CESA 2016–2025). The objectives of CESA 2016–2025 include building, rehabilitating and supporting education infrastructure, and revitalising and expanding tertiary education, research and innovation, particularly at a postgraduate level, to address continental challenges and promote global competitiveness.

Uganda is an East African landlocked country with a geographical area measuring 241,038 square miles with a population of 37 million people (BBC, 2016) that gained independence in 1962. Although Uganda is a multi-lingual country with more than 40 different languages, English was inherited from the colonial period as the language of government and education. Uganda, by Sub-Saharan African standards, is one of the leading countries with a vibrant media sector with nearly 200 private radio stations, dozens of television stations and print outlets. By 2011, Uganda had 4.2m Internet users (BBC, 2016).

There are seven public universities licensed by the Uganda National Council of Higher Education. The majority of public and private universities are located in Central Uganda. Public universities have been established in other regions in recent years, the most recent being Lira University (2012) and Muni University (2014) in the Northern region, and Soroti University (2015) in the Eastern region. Although some universities are entirely new, several universities were formed by upgrading and/or merging tertiary and technical colleges; for example, Bishop Tucker

Theological College (1913) became the Uganda Christian University in 1997 (chartered in 2004), and Kyambogo University (established in 2003) was formed by merging the Uganda Polytechnic-Kyambogo (UPK), the Institute of Teacher Education-Kyambogo (ITEK) and the Uganda National Institute of Special Education (UNISE).

The Cabinet of the Republic of Uganda (2013: iii) approved a national vision for 'a transformed Ugandan society from a peasant to a modern and prosperous country within thirty years'. The Republic of Uganda (2013: 51) therefore plans to facilitate and nurture human resources and skills development to support national development. To achieve this, emphasis will be put on research and development, acquisition of modern scientific knowledge and technology, and building of knowledge networks. This will further be supplemented by building partnerships with local and international institutions. All this cannot be achieved without the dissemination of scientific information and knowledge through academic libraries that are automated and networked by means of an ILS.

Brief history of library automation

Library automation initiatives are first reported in the United States of America in the 1930s and later in Western Europe but took major strides in 1960s when the Library of Congress designed the Machine Readable Catalog (MARC) format for communicating library bibliographic data on magnetic tape (Borgman, 1997: 21; Saffady, 1989: 273). Thereafter libraries started using key punched cards in combination with sorters, collators, and other unit record equipment, replacing manual record keeping practices (Saffady, 1989: 270). In the 1970s more libraries started automating by sharing computer infrastructure which was very expensive at the time. This was the period that saw the writing of single-purpose software of cataloguing, circulation, serials control and other library functions. By this time other countries had developed their own MARC format and IFLA convened an international meeting to develop the Universal MARC (UNIMARC) standard.

The late 1970s and the 1980s saw the transition from in-house built library systems to integrated library systems. Through their local area networks and dial-up modems, libraries set up online catalogues while others shared bibliographic data and set up union catalogues (Borgman, 1997: 223). It was also around this time that this technology started to be adopted in some leading African libraries most especially in South Africa. In Sub-Saharan Africa the library automation campaign was spearheaded by the United Nations Education Scientific and Cultural Organisation (UNESCO). Computerised Documentation Services/Integrated Set of Information System (CDS/ISIS) was developed and distributed to many academic and public libraries in this region to automate their bibliographic information (Mutula, 2012: 295). CDS/ISIS was not only used in Africa but was widely used by libraries, information and documentation centres throughout the world where no predefined library automation structures or standards were available (De Smet, 2009: 63).

Not very differently from the African experience, many Asian and Central and Eastern Europe libraries entered the 1990s with minimal library automation with mostly bibliographic databases and applications on standalone computers (Borgman, 1997: 223). This is confirmed by Husain and Ansari (2007: 146) who report that library automation gained some momentum in India in the 1990s driven mainly by the sharply dwindling prices of computer hardware, availability of ILSs and the increased enthusiasm of library professionals for embracing technology. Haider (1998) also reports on the same scenario in Pakistan. The emergence of the Internet in the 1990s added a new flavour to library automation as both library workers and users started to remotely access the library catalogue (Mutula, 2012: 294). The 21st century came with free and open source software (FOSS) as an intervention to the digital divide that had by this time been created between the automated libraries in the developed world and the traditional and manual libraries in the developing world like Uganda. There were a number of FOSS that were developed around this time like Koha and Evergreen (Mutula, 2012: 295). UNESCO also upgraded the CDS/ISIS which was DOS-based to WINISIS for MS Windows and later to ABDC for a web-based environment (De Smet, 2009: 63).

Today significant advancements in sophisticated ICTs have triggered dynamic changes in software, hardware, networks and mobile technology which are constantly increasing the capacities of ILSs (Rosa and Storey, 2016). Cloud computing is creating highly scalable platforms that facilitate quick access to hardware and software over the Internet, in addition to easy management and access by non-expert users (Romero, 2012: 110). Coupled with the mass penetration of mobile smartphones and tablets, broad-based adoption and access is increasingly possible.

Methodology

A single case, Kyambogo University (KyU), was selected and studied in depth using a sequential
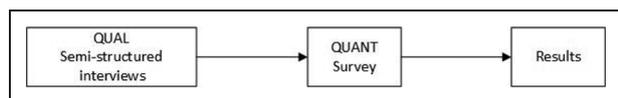
Figure 1. Research design.

exploratory mixed methods design (shown in Figure 1) to elicit the perspectives from the target population, KyU staff and students, on library automation and the role the ILS plays in supporting national development. Although a single case limits generalizability of the study, the access and familiarity of the lead author ensured the case was information rich with respect to the topics under investigation (Patton, 2002).

In the qualitative strand, semi-structured interviews were conducted in English with 26 purposively selected participants, representing 28.6% of the target population. Semi-structured interviews allowed the researchers to ask standard questions supplemented by individually tailored questions to probe research subjects' reasoning or to get more clarification (Leedy and Ormrod 2010: 188). In the subsequent quantitative strand a questionnaire, also in English, based on results from the first strand was used to survey the entire target population for which the overall response rate was 91.2%. Table 1 provides the detail on the target population and sampling strategies for each strand.

Document review was used to inform and support the development of data collection instruments as well as the analysis and interpretation thereof. Documents included published and unpublished reports from KyU, administrative documents, newspapers, journal articles and books in print and electronic format (Nieuwenhuis, 2016: 88). The document data gathering technique helped in reconstructing events, critical incidences and their social relationships.

Sequential mixed data analysis was used to analyse the data collected from the interviews (Teddlie and Tashakkori, 2009). All quantitative data was analysed using SPSS statistical software to generate descriptive statistics.

Background on the case

Kyambogo University (KyU) is one of the seven public universities of Uganda (Uganda National Council of Higher Education, 2016). As mentioned above, KyU was established in 2003 by amalgamating three existing institutions. Following the merger of the three institutions, the three institutional libraries were merged to form the Kyambogo University Library Service (KyULS) (Kyambogo University, 2016). There is hardly anything reported about the automation initiatives before the merger. Mutula (2000) briefly reports that UPK library was accessing the

African Virtual University Digital Library, which was searchable via the Internet. Attempts at automating the Kyambogo University library catalogue post-merger with an in-house built solution were initiated by the staff members based on the local needs of the three branch libraries in 2009 using Microsoft Access. The respective databases were never integrated as each branch used a stand-alone computer and there was no network linking the branches of KyULS.

In 2011 KyULS started entertaining the idea of adopting an ILS. This idea was given further credibility by the Consortium of Uganda University Libraries (CUUL) that organised training in 2012 for its member institutions, which included KyU, in Koha. Koha is an open source, predominantly web-based ILS and is widely being adopted by academic libraries with low cost budgets around the world. CUUL has actively encouraged academic libraries across East Africa to adopt Koha and has conducted several training sessions on Koha since 2011 (Adoma and Ponelis, 2015). The KyULS staff member who attended CUUL's Koha training was supposed to train other staff members at KyU and a one-week Koha training session was organised at KyU for a few key staff in April 2013. Koha software was then installed on the university server and customised beginning in June 2013. Another Koha orientation for a selected number of library staff was carried out in August 2013 and thereafter Koha was launched in KyU.

Study programmes and student intakes are increasing yearly. KyU's current enrolment is over 20,000 students on campus and over 60,000 students from 63 affiliated institutions, mainly primary and secondary teacher training colleges. KyU's physical library space is not in any way able to house the 80,000 students, staff members and external users and the only alternative is to access the library online. The adoption of Koha opened up KyU to a number of benefits of ILSs enumerated by Ayankola and Ajala (2012) including flexibility, speed, ease of updating and manipulation of bibliographic data, remote access to an item by multiple users simultaneously. However, as at the University of Malawi's academic libraries, there is a low level of computer technology replacement (Mapulanga, 2013). A few computers and ICT equipment donated to support library automation initiatives in KyULS are almost obsolete.

Study results
Contribution of library automation to library operations

The majority of respondents indicated that library automation contributes to academic library operations

Table 1. Target population and sample response rates.

KyU Section/Unit	Total population	Interviews (n)	Interviews (%)	Survey (n)	Survey (%)
KyU top management	8	1	12.5	6	75
KyULS Management team	9	3	33.3	9	100
ICT Unit	6	5	83.3	5	83.3
General library staff	32	12	37.5	31	96.9
KyU Library Committee members	13	2	15.4	12	92.3
KyU ICT Unit (e-Kampus)	5	1	20	4	80
The Students Guild	18	2	11.1	16	88.9
Total	**91**	**26**	**28.6**	**83**	**91.2**

KyU: Kyambogo University
KyULS: Kyambogo University Library Service

Table 2. How library automation supports library operations.

Theme	Frequency (n)	(%, n=83 respondents)	(%, n=592 responses)
Tracks library records	78	94	15.9
Saves time	74	89.2	15.1
Increases productivity	73	88	14.9
Eases work	70	84.3	14.2
Increases efficiency	68	81.9	13.8
Allows interoperability	64	77.1	13
Saves costs	59	71.1	12
Ensures accuracy	59	71.1	12
Increases library's influence	47	56.6	9.6

(79 respondents, 95%). Respondents were asked to identify scenarios of where and how automation of academic libraries and information centres improves library information services (Table 2).

Contribution of library automation to national development

In the first strand, interviewees were asked to assess whether library automation contributes to national development, directly or indirectly, and the majority (88%) stated that it does. Those interviewees who felt that library automation contributed to national development were asked to elaborate on reasons for their affirmation. A list of possible impacts of automation in university libraries was provided from which

Table 3. Library automation and impact on the Millennium Development Goals.

Positive impact	Frequency (n)	(%, n=83 respondents)
Provides faster and easier access to information	65	78.3
Enables mass storage of information	54	65.1
Facilitates research for development	54	65.1
Supports scientific innovation	31	37.3
Provides a competitive advantage for KyULS	17	20.5

KyULS: Kyambogo University Library Service

interviewees selected the following as the top contributions:

- speeds up service delivery;
- improves access for those with physical disabilities;
- promotes the library as a centre of excellence;
- increases the visibility of the nation's local content; and
- aligns the library with the national vision.

Survey respondents in the second strand were provided with a list of the 8 Millennium Development Goals (MDGs)[1] and asked about the contribution of library automation to the achievement of the MDGs. (At the time of data collection, the United Nations had not yet launched the Sustainable Development Goals or SDGs.) According to the results of the study, 83.1% of the respondents affirmed that library automation directly or indirectly contributed to the achievement of the MDGs. These respondents further elaborated on the different ways library automation has contributed to the achievement of the MDGs. As shown in Table 3, the primary contribution of library automation to MDGs is seen to be enabling faster and easier access to large stores of information with support for research and innovation a secondary contribution.

Survey respondents in the second strand were also asked whether library automation facilitates collaboration and networking among library workers and users for purposes of development both nationally and internationally. As shown in Table 4, the majority of respondents (63.9%) believed that library automation created a firm foundation of international cooperation, networking and collaboration. The respondents who believed that library automation enhanced collaboration and networking reasoned that library automation allows library staff members and users to

Table 4. Library automation facilitates collaboration and networking for national development.

Answer	Frequency	
	(n)	*(%)*
Yes	53	63.9
No / No opinion	30	36.1
Total	**83**	**100**

Table 5. Experience of external collaboration as a result of library automation.

Level of experience	Frequency	
	(n)	*(%)*
Very good	23	43.4
Good	25	47.2
Fair	5	9.4
Poor	-	-
Very poor	-	-
Total	**53**	**100**

Table 6. Barriers to library automation.

Barrier	Frequency	
	(n)	*(%, n=83 respondents)*
Internet instability	70	84.3
Procurement bureaucracies	70	84.3
Inadequate top management support	69	83.1
Lack of infrastructure	65	78.3
Shortage of funding	68	81.9
Inadequate staff skills	52	62.7
Ever-changing technology	33	39.8
Technophobia*	5	6.0
Lack of initiative*	4	4.8
Initial stage not well managed*	1	1.2
Lack of champions*	1	1.2

*As specified under 'Other' option in questionnaire responses

collaborate with developmental experts, researchers, innovators and (potential) investors online and generally share experiences of accessing information online. These respondents were requested to rate their prior experience of collaboration through library automation. All 53 respondents rated their experience as either very good, good and fair with 43.4% assessing their experience as very good (Table 5).

Challenges to adopting integrated library systems in developing countries

Challenges confounding successful adoption and use of the ILS were mentioned by several interviewees. Survey respondents were thus asked to indicate challenges encountered in library automation. Table 6 lists the barriers to library automation at KyULS.

Discussion

The results show that library staff at KyU reported that the ILS improved library operations, including the ability to catalogue their holdings for users' benefit by improving information service provision. The relatively recent automation of KyULS gives the staff a good basis for comparison in terms of improvements to library operations before and after the ILS implementation. The results also confirm the benefits of library automation and implementation of an ILS that has been widely reported in the literature; for example, Walsh (2012: 43) reports how libraries have

migrated from sending paper messages to sending them by email or SMS using their ILSs which saves time, postage costs, reduces delivery staff and space. Respondents in this study demonstrated support of the ILS as well as its role in supporting national development, particularly by making knowledge, both global and local, widely accessible and supporting research and innovation. Thanks to ILSs, countries and their citizens can expect their public academic libraries to be able to provide seamless connections to information sources, facilitate remote access to local and international databases to meet their various information needs, support research and innovation and, ultimately, contribute to their national development agendas. Furthermore, the ILS' facilitation of collaboration and sharing across institutional boundaries is also seen as contributing to national development efforts.

When library users find it easy to access information through the ILS, the nation's education sector is automatically supported as thousands of students, investors, policy makers and all information seekers remotely access all the information they need to execute their duties for the nation's benefit. Healy (2008: 185) posits that university libraries and most especially public ones are uniquely positioned to increase access to information since they provide services such as Internet access to members of the community. Providing access to the Internet coupled with a functional information searching and retrieval tool, the ILS, is a significant step toward providing access to information for national development.

Universities and institutions of higher learning have long been the primary producers of original

research that has lead to many world changing innovations (De Saulles, 2012: 41). Traditionally universities have been disseminating this research information through peer-reviewed journals; however, the trend is shifting to institutional repositories which are linked to ILSs which ease access to this research and innovation information in universities. Conversely, the lack of timely access to textbooks and other relevant information materials leads to students losing interest in learning and thus they no longer invest time in reading. Therefore this has had a negative impact on their innovativeness, literacy and general knowledge (UNCST, 2012).

As reflected in the results above, library automation enhances collaboration and networking between other academic institutions which can be used to develop the career path of information and knowledge seekers through peer learning support, mentorship and placement services. For example, according to Mutula (2012: 300), library automation offers access to a diversity of electronic resources from different providers and this digital scholarship encourages collaboration and networking in all aspects of the library users' learning experience. Library automation further contributes to knowledge dissemination since KyULS' Online Public Access Catalog (OPAC) enables worldwide access and thus increases the visibility of a nation's local content. Librarians at KyULS should explore creative ways that can increase the visibility of their academic libraries through working with different faculties, schools and colleges to promote the use of ILSs (Liu and Luo, 2011: 235).

As library users are inspired to read, learn, complete assignments, reflect and think, this impact can be felt even on the national level. Missingham and Moreno (2005: 32) allude to this fact that national development needs to involve all sectors of a nation. Players in national development have to put platforms like ILSs which allow all-inclusive participation and resource sharing on local and international networks. Bossaller and Atiso (2015: 34) state that stable and sustained ILSs allow scientists in developing nations to share their work, create collaborative relationships, and create solutions for the most pressing issues in their countries. Academic libraries as leading agencies of disseminating knowledge, create an egalitarian platform for all (Eklow, 2012: 481). The results show that KyU staff see that library automation contributed to the achievement of the MDGs. With the introduction of the SDGs, libraries continue to have an essential role through providing access to information to the public to support development (Bradley, 2016: 118). The library further uses its ICTs to preserve and

ensure ongoing access to developmental information for future generations.

Because ICT plays such a central and highly visible role in library automation it is easy to forget that library automation as an innovation encompasses more than just the hardware and ILS software. Successful adoption and adaptation of information systems such as an ILS requires the diffusion of supporting higher-context dependence innovations around techniques, procedures, education and training, funding policies and governance policies (Lor, 2014). The respondents' concerns with respect to the challenges of ILS implementation and use are similar to those widely reported in the literature on library automation in Sub-Saharan Africa: a lack of infrastructure (reliable power supply, equipment, connectivity), skills base (LIS education and training), management support and supporting policies and procedures (operational, funding, procurement). Consider for example, the Ugandan Government's plan to provide free solar-powered laptops to all Ugandan university students, which would reduce costs associated with buying printed textbooks, photocopying teaching materials, and improve access for persons with disabilities (Anguyo, 2014: 26). This plan, however, is questionable since there is no corresponding infrastructure to enable access to information through, for example, broadband connectivity. The biggest impediment is funding. While funding is necessary it is not sufficient. Given sufficient funds, any library can purchase ICTs but it takes considerable skill to implement an ILS because it changes the way people work, the processes of the library and users' relationship with the library (Negash et al., 2012: 270).

Library automation may still not deliver on access to information to the relevant stakeholders without skills and leadership. According to Scheeder and Witt (2016: 83), IFLA proposes the first level of change agenda as reskilling, if library automation is to significantly influence the achievement of national and international development. Librarians must personally embrace the required skills that are needed to use ILSs to offer services that can positively transform society. Reskilling automatically calls for high levels of creativity and innovation among librarians. This may also entail LIS training institutions equipping students with up-to-date skills in the use of ILSs. In order to empower academic libraries to positively influence national development, leadership development should be considered. Mutula (2012:301) suggests that these common challenges can be overcome by partnering with consortia, and imparting continuous pedagogic training in library automation to academic library staff.

The lack of appreciation by policy makers of the role libraries play in the development of Uganda reported by Okello-Obura and Kigongo-Bukenya (2011) is a critical issue. Libraries and university management should play a leading role in advocating for libraries, and creating greater awareness of the central role that academic libraries play in national development is vital, particularly given initiatives to transform higher education through the AU's Agenda 2063 and CESA 2016–2026 and the Ugandan Government's Vision 2040. The recently released Omaswa Task Force Report (Nakkazi, 2016) recommends the formation of 'innovation universities' in Uganda to serve as engines of industrialisation and economic growth, requiring substantial restructuring of Uganda's nine public universities. Furthermore, the Minister for Higher Education, Science and Technology, Hon. Tickodri-Togboa, stated that higher education institutions must be transformed into 'vehicles of industrialisation, employment-wealth creation, inclusive and sustainable development and socio-economic transformation in line with Uganda Vision 2040' (Nakkazi, 2016). Libraries and their institutional leadership need to ensure that they are adequately empowered and enabled to support a successful transformation.

Challenges that inhibit library adoption and ILS implementation and use are unlikely to be adequately addressed without a greater appreciation of the important role that libraries play. Given that inadequate top management support was seen as a major barrier, librarians should commence by advocating internally to canvas support for initiatives and also to increase awareness among policy makers with respect to development. Libraries are also not mentioned in any of the SDGs, in spite of the Lyon Declaration on Access to Information and Development launched at the World Library and Information Congress in 2014 and the vital role libraries and other information centres can play in support of all 17 SDGs (IFLA, 2016).

Conclusion and implications

Academic libraries are among the leading agencies supporting knowledge production and disseminating knowledge within a country. This study shows that academic librarians in research and tertiary institutions such as KyU can make a difference that will support national development through ensuring operational ILSs in their libraries that connect all citizens through library automation so that they can communicate and share knowledge with others locally, nationally, regionally and globally. Academic libraries should lobby their university management and policy makers in national governments to support libraries and, in general, to implement ILSs. It will also be necessary to have an accompanying infrastructure with updated computers, connectivity, and LIS education and training. There can be no library automation without investment in the supporting infrastructure. Governments and development partners should fund academic libraries so they may improve information service delivery through their ILS to assist with socio-economic transformation. Ultimately, such funding for university libraries is vital for the achievement of Uganda's Vision 2040 and, more broadly, the AU's Agenda 2063.

Declaration of Conflicting Interests

Funding

Notes

1. See the United Nations Development Programme's overview and achievement of the MDGs at: http://www.undp.org/content/undp/en/home/sdgoverview/mdg_goals.html.

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Effect of knowledge management on service innovation in academic libraries

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Abstract

Effective management of all knowledge in an organization is a key criterion for innovation. Academic libraries are beginning to realize the importance of knowledge management in this regard. However, there are no quantitative studies studying knowledge management and service innovation in the context of libraries. Islam, Agarwal and Ikeda arrived at a framework for knowledge management for service innovation in academic libraries (KMSIL). Through a survey of 107 librarians from 39 countries, this study investigates the effect of knowledge management (and knowledge management cycle phases) on service innovation. The study found that knowledge capture/creation and knowledge application/use both significantly impact service innovation in academic libraries. The effect of knowledge/sharing and transfer on innovation was found to be insignificant. The study also demonstrated the relationship between the knowledge management phases. The findings support the KMSIL framework. They should help academic libraries in the process of service innovation by utilizing phases of the knowledge management cycle.

Introduction

Changes brought about by technology, increased user expectations and shrinking budgets have led to innovation becoming the lifeblood of every organization. Innovation allows organizations to come up with new and improved services for their user communities. However, innovation is extremely dependent on the availability of relevant knowledge. Due to a huge amount of knowledge generated in organizations, the process of innovating has become complex (Du Plessis, 2007). This complexity needs to be managed. A number of studies have reaffirmed the importance that knowledge management (KM) plays in improving innovation and organizational performance (Adams and Lamont, 2003; Darroch and McNaughton, 2002; Du Plessis, 2007; Pyka, 2002). Innovation is very

important to libraries as well. User demands are changing, leading to transformation of offerings, especially in the digital environment. An increasing number of authors are highlighting the challenges facing academic libraries and future scenarios (Alvite and Barrionuevo, 2011; McKnight, 2010). To keep pace with the changes in user expectations, libraries need to leverage their strengths such as physical space and collections, and to innovate to provide more responsive and flexible services (Li, 2006). This becomes even more pertinent in the age of

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connectivity, mobile usage, huge digital data, and an increasing mix of digital and physical worlds. Adopting KM will help libraries provide innovative services (Islam et al., 2015a). Townley (2001) writes that KM offers academic libraries the opportunity to improve effectiveness, both for themselves and for their parent institutions/universities. Using the metaphor of knowledge as a pyramid, Townley describes data and unfiltered facts at the bottom, which becomes information with the addition of context from cataloging and classification. This information then becomes intelligence through the addition of inference through interaction and public services such as reference. This intelligence can then be combined with certitude to become knowledge, and synthesized to become wisdom (Townley, 2001: 47), that helps in decision making. While libraries have excelled in creating information and intelligence from data, they have not tended to create knowledge (Townley, 2001). Libraries need to embrace a scenario where knowledge is not just managed by the library (in the form of books or periodicals) but created within the library. Thus, libraries need to leverage employee and user knowledge, along with rapidly evolving technology (Islam et al., 2015a).

However, while there have been studies on KM in libraries (e.g. Maponya, 2004; Sarrafzadeh et al., 2010; Wen, 2005) and on innovation in the context of libraries (e.g. Islam et al., 2015a; Jantz, 2012; Li, 2006; Scupola and Nicolajsen, 2010; Ward, 2013; see Brundy, 2015 for a literature review), the extant literature is yet to provide empirical evidence linking KM with service innovation in academic libraries (apart from the qualitative data by 17 librarians gathered by Islam et al. (2015a) in their study).

Objective of the study

This study investigates the effect of KM on service innovation in academic libraries. The following research questions guide the study:

1. How does KM affect service innovation in academic libraries?
2. How do different phases of the KM cycle affect service innovation?
3. How do the different phases of the KM cycle affect each other?

KM is operationalized through three phases of the KM cycle: (1) knowledge capture/creation, (2) knowledge sharing/transfer, and (3) knowledge application/use (Agarwal and Islam, 2014; Dalkir, 2013). The service innovation framework by Hertog (2000) is used to explain service innovation. In order to relate

KM and service innovation, the KM for Service Innovation in Libraries (KMSIL) framework by Islam et al. (2015a) is used. This study will empirically test the framework by designing survey questions based on the framework. Apart from knowledge capture/creation through interaction among library employees, we will also see if interaction with users (value creation) and working closely with the user (value co-creation) has any impact on innovation (Islam et al., 2015b). These are included as control variables.

Literature review

KM and the library

Nonaka and Takeuchi (1995: 3) define KM as the capability of 'a company as a whole to create new knowledge, disseminate it throughout the organization, and embody it in products, services and systems'. In knowledge organizations such as libraries, KM is needed for managing user knowledge (their need, who to contact, information seeking), resource knowledge (sources, services, where these services are available, and other features) and personnel practice knowledge (expertise available, the quality of service they provide) (Agarwal and Islam, 2014).

The *knowledge management cycle* can be understood as the process of transforming information into knowledge as a strategic valuable asset for an organization. It consists of a series of knowledge-processing steps such as knowledge capture/creation/contribution, knowledge filtering/selection, knowledge codification, knowledge refinement, knowledge sharing, knowledge access, knowledge learning, knowledge application, knowledge evaluation and knowledge reuse/divestment (Dalkir, 2013: 32, 51–53). Based on Dalkir's KM cycle integrated from approaches by different researchers, Agarwal and Islam (2014) simplify the KM cycle steps to knowledge capture/creation, knowledge sharing/transfer, and knowledge application/use. Each of these steps is a part of knowledge management. For example, knowledge creation can be understood to be an integral part of knowledge management.

Townley (2001) writes that a library needs to select the knowledge that is most critical to help it achieve its goals. For example, if the goal is to achieve the effectiveness of the library portal, usage data could serve as data for knowledge creation, which could be compared with other libraries and lead to best practices or lessons learned (Harloe and Budd, 1994; Townley, 2001). If the goal is to increase patron satisfaction, organizing focus groups, and carrying out surveys and interviews of patrons, for example, could provide useful data. This, combined with usage

statistics, could lead to knowledge of user needs. Moreover, KM can help improve communication among library personnel and between users and service providers, between top management and staff, and can promote a culture of knowledge sharing (Teng and Hawamdeh, 2002). Townley (2001) writes that librarians can also use KM as a way to expand the library's role to areas such as administration or support services, where libraries have had little impact in the past. A few studies have looked at KM in the context of academic libraries – KM practices in a library (Maponya, 2004), need for KM in libraries (Wen, 2005), the relationship between KM and libraries (Roknuzzaman and Umemoto, 2009; Sarrafzadeh et al., 2010), librarians' awareness/perceptions (Siddike and Islam, 2011), KM in state-of-the-art digital libraries (Islam and Ikeda, 2014), library adoption of KM using Web 2.0 (Islam et al., 2014) and mapping KM tools and cycle for libraries (Agarwal and Islam, 2014).

Service innovation

Service innovation refers to changes that affect service characteristics and offer value to the provider, and are new to others (Gallouj and Weinstein, 1997). It can be related to changes in the service concept, the client interface, the delivery system and technology use (Hertog, 2000). Combining changes in these dimensions are most widely recognized as new services (Heskett, 1986; Miles, 1993). We use Hertog's dimensions in our study to operationalize service innovation. Service concept relates to how the customer needs are to be satisfied and what is to be done for the customer. Interface relates to the design of the interface between service providers and clients. Delivery refers to the way of providing services. Technology works as facilitator or enabler.

Service innovation and the library

Innovation is extremely crucial for libraries for their continued growth and survival (Islam et al., 2015a; Jankowska and Marcum, 2010; Li, 2006; Scupola and Nicolajsen, 2010). Lesneski (2015) identified critical thinking, communication, collaboration and creativity (4Cs) as the fundamentals of innovation. Adapting these in the library setting is important for innovation. Being ready to adopt new ideas, respond to changes in the environment and in user needs, and to embrace advances in technology makes the academic library and its services more innovative.

A lot of innovation has been happening in libraries – from modern, futuristic physical spaces (e.g. as in the Library of Picture Books in Iwaki, Fukushima,

Japan, the Danish Royal Library, the Seattle Public Library, etc. – Best Colleges Online, 2016; Teicher, 2014), libraries without books (e.g. Florida Polytechnic University – Kellogg, 2014) to libraries offering various kinds of innovation in technology and services (Best Colleges Online, 2016). Examples of the innovation in services include sending a welcoming text message to the patron's phone when entering the library, use of RFID for books and cards, stations for podcasting and videocasting, and a planned 'genius bar' for technology help to patrons (Delft Public Library, Netherlands), organizing related materials in one place by subject, whether they are books, DVDs, CDs or magazines (Turku City Library, Finland), reinventing itself as an idea store by encouraging patrons to hang out in the library, meet friends, have coffee, and pursue hobbies and learning courses (Bow Idea Store, UK), etc. (Best Colleges Online, 2016). The Nashville Public Library in Tennessee, USA even provides seed exchange services whereby patrons can borrow vegetable, herb and flower seeds, grow plants while being cheered by librarians, and return the seeds at the end of the harvest season (Nashville Public Library, 2016). The Knight Foundation launched a challenge to give away $1.6m for ideas for innovation in libraries, with 14 winning proposals in 2016 among the more than 600 that were submitted (Barr and Zenni, 2016). For example, one of the winning proposals was by the Online Computer Library Center that proposed making library resources more accessible to Wikipedia editors and engaging librarians as contributors to Wikipedia through a national training program that will include community outreach to increase local information literacy (Barr and Zenni, 2016).

Service innovation and the academic library

While a lot of innovation described above is happening in public libraries, some academic libraries are trying to be innovative by responding to strategic campus and business needs, having technology infused in every aspect of service, embracing flexibility, and providing places to engage (Lukanic, 2014). Innovation in academic libraries has moved from a consideration to a necessity (Brundy, 2015). A few studies have looked at innovation in different areas of academic libraries – relationship between library size and innovation in digital reference services (White, 2001), knowledge innovation culture (Sheng and Sun, 2007), innovation ideas in academic libraries (Jing and Jin, 2009) and customer role for service innovation (Scupola and Nicolajsen, 2010). By facilitating open access publishing, Utrecht University

Library has become involved in research data management, which helps them provide new services, for example giving advice on where to find other people's research data (Elves, 2015). Yeh and Walter (2016) proposed a framework called the Resources-Processes-Values framework to help library administrators become innovators and to foster an innovation culture. Yeh and Ramirez (2016) have also developed a conceptual model based on the development of new products, services, and service-dominant logic. The model shows an interaction between critical resources and digital technologies in an interactive process for delivery of service innovation in academic libraries. The ACRL Research Planning and Review Committee (2016) produced a list of top trends in academic libraries. They identified research data services, digital scholarship, collection assessment trends, ILS and content provider mergers, evidence of learning, new directions with the ACRL Framework for Information Literacy, altmetrics, emerging staff positions, and open educational resources as new and emerging areas for academic libraries in the US and Canada.

KM and service innovation in libraries

Salomann et al. (2005) conceptualize customer KM as the utilization of knowledge for, from and about customers in order to enhance the customer-relating capability of organizations. In academic libraries, knowledge for customers refers to satisfying patron requirements for knowledge about services and other relevant items. Knowledge from customers refers to ideas and suggestions that would be useful for the library to implement. Knowledge about customers refers to understanding the patterns of patron information needs – those that have been met through library services, and those that are still not met. Kim and Abbas (2010) investigate the adoption of Library 2.0 functionalities by academic libraries and users through a KM perspective. They have found that RSS and blogs are widely adopted by academic libraries while users widely utilized the bookmark functions. For example, blogging enables the library to aggregate knowledge from users. However, this needs to be supplemented with the librarians' own knowledge, critical thinking ability, and continuous learning from external and internal sources. Rowley (2011) states that new service development ability of an academic library depends on its employee skills/knowledge, availability of tangible and intangible resources, IT adoption, management support, user knowledge, and innovation processes. To offer new and innovative services to the user communities, libraries need to generate creative and implementable ideas based on
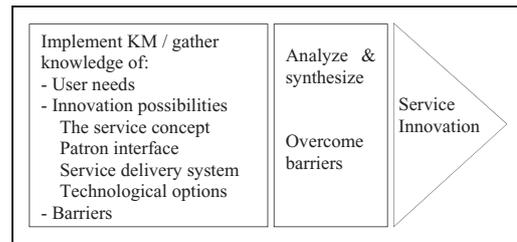
Figure 1. A theoretical framework of KM for service innovation in libraries (Islam et al., 2015a).

their knowledge from direct customer contact. While KM is important for innovation in libraries, Islam et al. (2015a) is the only study thus far that has proposed combining innovation and KM in the context of academic libraries through their KMSIL framework (see Figure 1).

Through their qualitative study, Islam et al. (2015a) found that for any change management or service innovation, being responsive to user needs and continuously gathering knowledge of those needs is important. This can be done through evaluation and assessment, staff-patron interaction, and through outreach (either in person or using social media). Along with user interaction, library staff must also keep themselves informed of innovation possibilities. However, even if the librarians know what the user wants, and can imagine the possibilities, they cannot move much ahead if they do not understand systematic and other barriers prevalent in the library. Service innovation requires knowledge of barriers that need to be overcome before innovation can happen. Islam et al. (2015a) define KMSIL as gathering knowledge of user needs, innovation possibilities and barriers, analyzing and synthesizing these to overcome barriers, leading to service innovation in libraries. We adopt the KMSIL framework as a theoretical lens in this study.

Research model

To empirically test Islam et al.'s (2015a) framework and to answer the research questions for this study, we propose a research model which is helpful in demonstrating the relationships between the variables of interest (Figure 2). Service innovation is the dependent variable. Three integrated phases of the KM cycle (Agarwal and Islam, 2014; Dalkir, 2013) – knowledge creation/capture, sharing/transfer and application/use are independent/mediating variables. The relationship between these are hypothesized through H1, H3 and H5. Hypotheses H2 and H4 investigate the relationship between the KM cycle phases. A set of control variables pertaining to value
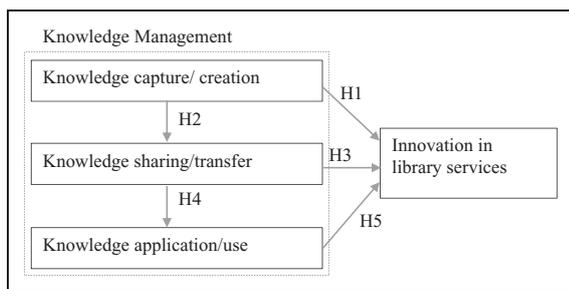
Figure 2. Research model.

creation, value co-creation (Islam et al., 2015b) and demographics are also added to see if they have any influence on service innovation.

Review of variables and hypotheses

We review specific variables identified in the research model and arrive at hypotheses.

Innovation in library services (dependent variable)

Hertog (2000) had come up with a 4-dimensional model to operationalize service innovation, with changes being related to the service concept, the client interface, the delivery system, and technology use. Islam et al. (2015a: 41) defined service innovation in libraries as 'new/improved technology or interfaces, improved services, outreach or organization methods, and other continuous work for patron satisfaction'. In this study, we operationalize innovation in library services as focusing on satisfying user needs through novel ideas and services, improved user interface, new outreach and delivery methods, and new technology applications.

Knowledge creation/capture (independent variable)

In the knowledge creation/capture phase of the KM cycle, tacit knowledge is identified or captured, explicit knowledge is organized or coded, and/or new knowledge is created (Dalkir, 2013). Here, the knowledge refers to the knowledge held by library employees. Based on Nonaka's (1991) socialization, externalization, combination, and internalization (SECI) model, knowledge creation in libraries is all about continuous transfer, combination, and conversion of the different types of knowledge. Incorporating the left part of Islam et al.'s (2015a) KMSIL framework, we opererationalize knowledge creation/capture in the context of libraries as gathering knowledge of user needs, of innovation possibilities (incorporating Hertog's 4 dimensions), and of barriers to innovation.

The ability to create new knowledge is often at the heart of the organization, as knowledge creation and innovation have a strong relationship (Darroch, 2005; Schulze and Hoegl, 2008). McAdam et al. (2006) conceptually established the relationship between knowledge creation and idea generation. Capturing and making sense of existing knowledge from different sources, identifying the gaps and then creating new knowledge to fill those gaps is a key aspect of service innovation in libraries (Islam et al., 2015a). Hence, we hypothesize:

> **Hypothesis 1:** Knowledge creation/capture will positively affect innovation in library services.

As per Dalkir (2013) and Agarwal and Islam (2014), the created/captured knowledge is assessed and then shared and disseminated to the concerned people. Therefore, we hypothesize:

> **Hypothesis 2:** Knowledge creation/capture will positively affect knowledge sharing/transfer.

Knowledge sharing/transfer (mediating variable)

Once knowledge has been captured and codified, it needs to be shared and disseminated throughout the organization (Dalkir, 2013). Through knowledge sharing, employees can mutually exchange their knowledge and contribute to innovation for the organization (Wang and Noe, 2010). For the present study, we operationalize knowledge sharing as an activity through which knowledge (i.e. skills, expertise or information based on experience, as well as reports, manuals and documents pertaining to user needs, innovation possibilities, barriers and other areas) is exchanged through informal dialogues, face-to-face meeting, and group discussion.

For innovation, an organization depends upon its employees' tacit knowledge (skills or experience) or explicit knowledge (institutionalized approaches or practices) (Lundvall and Nielsen, 2007). A library that can promote knowledge-sharing practices among employees, or between employees and user communities is likely to generate new opportunities/ideas for innovation. Therefore, we hypothesize:

> **Hypothesis 3:** Knowledge sharing/transfer will positively affect innovation in library services.

As per Dalkir (2013) and Agarwal and Islam (2014), the shared/transferred knowledge is contextualized and applied/used. Unless relevant knowledge is

shared and acquired by those who need it, it cannot be effectively utilized. Therefore:

Hypothesis 4: Knowledge sharing/transfer will positively affect knowledge application/use.

Knowledge application/use (mediating variable)

Knowledge application/use is the final phase of the integrated KM cycle (Agarwal and Islam, 2014; Dalkir, 2013). When knowledge has been captured/coded, and shared/transferred, it becomes available for actual use. KM succeeds when knowledge is used. Without that, other cycles of KM will be in vain (Dalkir, 2013). In this study, we operationalize knowledge application/use to incorporate the right half of Islam et al.'s (2015a) KMSIL framework. We define it as an activity through which the knowledge of user needs, barriers, innovation possibilities, and the overall knowledge of employees and users is analyzed and synthesized to come up with creative/innovative ideas to overcome barriers to innovation and to enhance library services. This process of synthesis and application is key to the development of new services. Cavusgil et al. (2003) show that firms that create and use knowledge rapidly can lead to innovation faster than others. Therefore, we hypothesize:

Hypothesis 5: Knowledge application/use will positively affect innovation in library services.

Value creation/co-creation (control variables)

While libraries in general work to provide resources and services to address user needs and gather their feedback (value creation), very few actually involve the user in decision making and in creation of new services (value co-creation). Islam et al. (2015b) propose a framework for value co-creation in academic libraries. In libraries, knowledge creation/capture is an outcome of an interactive process between employee, employee-user and co-creating with users (Agarwal and Islam, 2014). We include value creation and co-creation as control variables and operationalize them for creating/capturing knowledge on user needs, of innovation possibilities (incorporating Hertog's 4 dimensions), and of barriers to innovation based on the employee-user interaction and co-creating with users.

Methodology

For the present study, we relied upon the survey questionnaire method as the questions related to the perceptions of librarians regarding KM and service innovation in their libraries. This allowed us to reach a wide pool of academic librarians in different countries.

Study population and sample

Academic librarians worldwide are the target population for this study. We chose academic libraries because they speed up knowledge creation and transmission by offering innovative services to students, researchers, and faculties. Libraries worldwide were chosen because we were interested in exploring the phenomenon of the effect of KM on service innovation in academic libraries in general, as opposed to the effects of the setting in a particular country. Also, as service innovation is relatively new, casting our net wide would open us to different perspectives, and help us better understand the phenomenon. The study population was academic libraries that were accessible using the International Federation of Library Associations and Institutions mailing list (IFLA Mailing Lists, 2015). Apart from these, we also reached out to academic librarians in USA (listing maintained by US Department of Education, n.d.), Canada (Universities in Canada, n.d.), UK (listing maintained by University of Wolverhampton, n.d.), Australia (list maintained by Council of Australian University Librarians, (2015), and other countries such as Bangladesh (through Librarians and Information Scientists, Bangladesh Google group (LISBD), 2015), Malaysia, India, Singapore, Thailand, Vietnam, Belgium, France, Denmark, where universities were found using Web search. We tried to reach out to academic libraries in different countries where their contact details were accessible online. This ensured coverage of diverse socioeconomic and educational environments. However, we had to use convenience sampling as it would be difficult to obtain a sampling frame consisting of academic librarians across the world. Data was gathered using a web-based questionnaire. The collected data was statistically analyzed to determine support for our hypotheses.

Instrument development

The items developed for the four constructs of our research model, as well as other control and demographic variables are listed in Table 1. The control variables were not of theoretical interest but were included to see if they had any effect on the dependent variable. Where possible, survey items were taken from prior studies or adapted to suit the needs of this study. For other cases, the items were self-developed. The questionnaire used the 5-point Likert scale.

Table 1. Constructs and items included in the questionnaire.

Construct/Variable	Code	Item/Question In our library:	Source
SI - Innovation in library services (dependent)	SI1*	We always focus on ways to satisfy user needs.	Edvardsson and Olsson (1996)
		We provide:	
	SI2*	A user-friendly interface (OPAC, website, etc.) for our services.	Self-developed
	SI3*	An interface through mobile apps or mobile website.	
	SI4*	An effective presence in social media (Facebook, Twitter, etc.)	
	SI5	We have an excellent service delivery system (automated circulation, inter-library loan, online reference, etc.)	
	SI6	We use state-of-the-art technology (RFID, QR code, digital library, etc.).	
	SI7	We are always quick in coming up with novel ideas or services for library users.	Wang and Wang (2012)
	SI8	Our services are often perceived as very novel by our users.	Kör and Maden (2013)
KC - Knowledge capture/ creation (independent)		We spend a lot of time on learning by interacting amongst ourselves (library employees – reference, circulation, etc.) about	Islam et al. (2015a)
	KC1*	the needs of our users	Self-developed
	KC2	innovation possibilities (new ideas, suggestions or solutions for the well-being or users)	Schulze and Hoegl (2008)
	KC3	what the concept of service means for the library and its users	Self-developed
	KC4	what the user interface should be like (physical or electronic)	
	KC5	the service delivery system that we can have (automated circulation, inter-library loan, online reference, etc.)	
	KC6	the technological options / tools we can adopt	Agarwal and Islam (2014)
	KC7*	the barriers to innovation that we face	Islam et al. (2015a)
KS - Knowledge sharing/ transfer (mediating)		In my library:	
	KS1*	people frequently share knowledge based on their experience.	Wang and Wang (2012)
	KS2	informal dialogues, face-to-face meeting and group discussion are used for knowledge sharing.	Self-developed
	KS3*	people frequently share codified knowledge like existing reports, manuals and official documents with their colleagues.	Wang and Wang (2012)
	KS4*	we capture best practices and lessons learned and make them available to all other employees.	Kör and Maden (2013)
	KS5 a-d	people frequently share the knowledge they're gathered on a) user needs b) innovation possibilities c) barriers to innovation d) other areas	Islam et al. (2015a)
	KS6*	people share the knowledge relevant for users (e.g. our products, services and other issues) with them.	Xu (2011)
KA - Knowledge application/use (mediating)		In our library:	
	KA1	there is strong emphasis on using employee knowledge for enhancing library service activities.	Self-developed
	KA2	the management is always supportive of using/applying creative or innovative thinking for our services.	
		people spend a lot of time analyzing and synthesizing the knowledge we gather:	
	KA3	- From our users on their needs	Islam et al. (2015a)
	KA4	- From our employees on barriers to innovation	
	KA5	- From our employees on innovation possibilities	
	KA6	- The overall knowledge we gather from employees and users	Self-developed
		Once we capture/create new knowledge or ideas:	
	KA7*	- we apply them for the development of library services.	
	KA8*	- we come up with ways to overcome barriers to innovation	Islam et al. (2015a)

(continued)

Table 1. (continued)

		Item/Question	
Construct/Variable	Code	In our library:	Source
VC - Value creation (control)	VC1* VC2-3 VC4* VC5-6 VC7*	We spend a lot of time on learning by getting user feedback and making changes accordingly (creating value) about [VC1 – VC7 map to KC1 – KC7]	Islam et al. (2015a)
VCC - Value co-creation (control)	VCC1-6 VCC7*	We spend a lot of time on learning by working with the user in decision-making (co-creating value) about [VCC1 – VCC7 map to KC1 – KC7]	Islam et al. (2015a)
	VCC8	Please provide any examples of the way in which you "co-create with user"	Self-developed
Demographic (control)	NEMP LOC ROLE DEPT. NYR GEN AGE EDN CMT	Number of employees in your library City and country Work role and position Department working in Number of years in the library field Gender Birth year Education Do you have any other comments	Islam et al. (2014)

*removed after exploratory factor analysis.

Table 2. Demographics ($N = 107$).

Gender	Age (years)	Education
Female: 57 (53.27%)	Mean: 42.66	Master's: 78 (72.9%)
Male: 45 (42.06%)	SD: 11.56	PhD: 16 (14.95%)
Prefer not to say: 3 (2.8%)	Min: 25	Bachelor's: 12 (11.21%)
Other: 1 (0.93%)	Max: 69	Diploma: 1 (0.93%)
Unspecified: 1 (0.93%)	N = 94 (unspecified 13)	

Data collection and analysis

The survey instrument was pre-tested to check for any question wording issues. Minor changes were made based on suggestions. The questionnaire and the design of the study were approved by the Simmons College Institutional Review Board. Filling out the questionnaire implied consent. A web-based version of the instrument was created using Google form (the final survey is accessible at http://tinyurl.com/km4si). None of the questions were made compulsory. Thus, a participant could choose not to answer a question s/he was uncomfortable with. In order to protect the identity of the librarians, no names, email addresses or library names were gathered. Based on the names of universities gathered, the respective library websites were searched. From the listing of library staff, email addresses of librarians were gathered and collated. While some library websites listed emails of individual staff members, others had a common contact email for all external mails. About 946 librarians were individually contacted, with the rest in mailing lists. It was not clear how many librarians had subscribed to the mailing lists where the invitations to participate were sent out. In total, 110 librarians (107 valid responses) from 39 countries in six continents filled out the questionnaire after 1–2 follow-up emails (at weekly intervals) and efforts at reaching respondents and mailing lists. As the survey was anonymous, it was not easy to distinguish how many of the responses were from individual emails and how many from mailing lists. Thus, it would be difficult to arrive a precise number for the response rate. If we were to disregard the number of people in mailing lists, the response rate would be 110/946 or = 11.63% (though the actual rate may be lower). As the responses were difficult to get, and the response rate not too high, no separate pilot data was gathered. Rather, exploratory factor analysis was done on the main data itself. Data was gathered in a six-week period from mid-January to end-February 2015. PSPP 0.8.4, the open source alternative to SPSS, was used for statistical data analysis. The authors also had access to IBM SPSS 22. The results generated by PSPP were equivalent, and thus sufficient for analysis.

Demographics

Table 2 shows the demographic distribution of the survey respondents.

Table 3 shows the library experience of the respondents and the number of employees in their library.

Table 3. Library experience ($N = 107$).

No. of years in the library field	No. of employees in library
Mean: 14.99	1–19: 32 (29.91%)
SD: 10.16	20–49: 21 (19.63%)
Min: 0.5	50–100: 23 (21.5%)
Max: 40	101–500: 26 (24.3%)
	> 500: 5 (4.67%)

Table 4. Library location ($N = 107$).

Continent	Countries
Asia (44)	Bangladesh 18; Thailand 7; India 5; Malaysia 4; UAE 2; Singapore 2; Vietnam, Pakistan, Hong Kong, China, Lebanon and Iran 1 each.
North America (22)	USA 17; Canada 3; Saipan and Cuba 1 each
Europe (18)	UK 5; Poland 2; France 2; Estonia 2; Denmark, Belgium, Croatia, Bosnia and Herzegovina, Ukraine, Albania and Italy 1 each.
Africa (11)	Nigeria 2; Kenya 2; Burundi, Ghana, RSA, Tanzania, Egypt, Zimbabwe and Uganda 1 each
Australia (8)	Australia 8
South America (2)	Chile and Colombia 1 each
Unspecified (2)	

Table 5. Position and department ($N = 107$).

Work role / position	Department working in
Director/Head 26 (24.3%)	Library service 52 (48.6%)
Librarian 72 (67.29%)	Reference 13 (12.15%)
Library assistant 6 (5.6%)	Administration 9 (8.41%)
No response 3 (2.8%)	Technology 7 (6.54%)
	Technical services 5 (4.67%)
	Research/innovation 5 (4.67%)
	Customer service 4 (3.74%)
	Project 1 (0.93%)
	Communication 1 (0.93%)
	No response 10 (9.35%)

The survey was international, with respondents coming from 39 countries in all continents excluding Antarctica (see Table 4). Along with individual librarians reached out from university libraries in specific countries, this distribution also reflects the international nature of the mailing lists targeted.

The work roles or positions specified by the respondents were classified into three categories based on hierarchy (see Table 5). The table also shows the library departments of the respondents.

Exploratory factor analysis

Psychometric analysis was performed as per the procedure recommended by Anderson and Gerbing (1988). Exploratory factor analysis (EFA) with principal component analysis (Hair et al., 1995) was used to extract the factors, followed by Varimax rotation. The procedure helps identify the underlying relationships or latent constructs between measured variables. In order to carry out EFA and to test for construct validity, it is recommended that 3–5 survey items are developed for each factor or variable. In our case, the number of items for constructs ranged from 7–9, as some of the constructs had multiple dimensions to address the theoretical basis for our operational definitions (see Table 1). From the variables of the research model, 12 survey items – SI1, SI2, SI3, SI4, KC1, KC7, KS1, KS3, KS4, KS6, KA7 and KA8 were found to be problematic (as well as four items from the control variables). Some of these did not load well together as they related to different dimensions of the constructs. These items were examined statistically and theoretically and removed. Table 6 shows the rotated component matrix for the five variables/factors in the research model of Figure 2, with eigenvalue greater than 1. The extracted factors together explained more than 77% of the variance. All items loaded correctly on their respective constructs. This indicates a high degree of convergent and discriminant validity, and thus construct validity for the four constructs of the research model. However, the items for the control variables value creation and value co-creation loaded together. This could be because both these required the library to reach out to the user (with the latter requiring greater user involvement), which could not be sufficiently distinguished by the respondents.

A reliability analysis was carried out using Cronbach's alpha. Table 7 shows the descriptive statistics and Cronbach's α for the four constructs in the research model, as well as the control variables VC and VCC.

The internal consistency was above 0.85 for all constructs. It is interesting to note from Table 7 that the librarians scored their role in value co-creation (involving the user in what they do) much lower than their scores for the other constructs.

Hypothesis testing

After completing the validity and reliability analysis, hypothesis testing was done using multiple linear regression.

Table 6. Rotated component matrix.

		1	2	3	4	5
SI - Innovation in library services	SI5	0.03	0.16	0.84	0.16	0.08
	SI6	0.19	0.07	0.81	0.35	0.17
	SI7	0.47	0.28	0.61	0.12	0.41
	SI8	0.33	0.26	0.72	0.22	0.33
KC - Knowledge capture/ creation	KC2	0.28	0.26	0.19	0.67	0.34
	KC3	0.35	0.33	0.22	0.62	0.15
	KC4	0.36	0.24	0.31	0.79	0.21
	KC5	0.37	0.26	0.24	0.85	0.24
	KC6	0.36	0.15	0.24	0.84	0.23
VC - Value creation	VC2 (control)	0.66	0.23	0.15	0.35	0.53
	VC3 (control)	0.65	0.23	0.21	0.37	0.37
	VC5 (control)	0.75	0.23	0	0.57	0.4
	VC6 (control)	0.89	0.11	0.1	0.54	0.39
VCC - Value co-creation	VCC1 (control)	1.04	0.22	0.32	0.12	0.2
	VCC2 (control)	1	0.3	0.11	0.19	0.31
	VCC3 (control)	1.14	0.25	0.2	0.17	0.24
	VCC4 (control)	0.99	0.18	0.27	0.37	0.18
	VCC5 (control)	1.1	0.22	0.05	0.45	0.3
	VCC6 (control)	1.21	0.19	0.15	0.4	0.25
KS - Knowledge sharing/transfer	KS2	0.02	0.66	0.32	0.04	0.22
	KS5a	0.31	0.81	0.14	0.2	0.34
	KS5b	0.22	0.78	0.13	0.4	0.32
	KS5c	0.36	0.88	0.01	0.19	0.33
	KS5d	0.23	0.8	0.17	0.35	0.19
KA - Knowledge application/use	KA1	0.33	0.41	0.22	0.14	0.66
	KA2	0.21	0.22	0.41	0.16	0.75
	KA3	0.42	0.17	0.14	0.3	0.66
	KA4	0.31	0.25	0.01	0.22	0.72
	KA5	0.19	0.32	0.14	0.29	0.72
	KA6	0.21	0.3	0.21	0.14	0.6
	Eigenvalue	11.05	4.62	3.35	5.2	4.96
	% of variance	29.35	12.27	8.9	13.82	13.17
	Cumulative variance	29.35	41.62	50.52	64.34	77.51

Table 7. Descriptive statistics and Cronbach's alpha.

Code	Construct	No of items	Mean (1-5)	SD	Reliability α
KC	Knowledge capture/ creation	5	3.77	0.95	0.93
KS	Knowledge sharing/ transfer	5	3.53	0.92	0.92
KA	Knowledge application/use	6	3.56	0.85	0.90
SI	Innovation in library services	4	3.65	0.9	0.85
VC	Value creation	4	3.44	1.05	0.93
VCC	Value co-creation	6	2.97	1.19	0.96

We looked at the effect of the independent variable knowledge creation/capture (KC) and the mediating variables knowledge sharing/transfer (KS) and

Table 8. Effect of KC, KS and KA on SI.

		Standardized Coefficients		
		Beta	t	Sig.
	(Constant)	0	2.98	0.004
H1 supported	KC	0.33	3.24	0.002
H3 not supported	KS	0.11	1.01	0.315
H5 supported	KA	0.32	2.89	0.005

knowledge application/use (KA) on the dependent variable innovation of library services (SI).

Table 8 shows the β-coefficients for the effect of KC, KS and KA on SI. Hypothesis 3 (effect of KS on SI) was not supported, while H1 (effect of KC on SI) and H3 (effect of KA on SI) were strongly supported ($p < 0.01$).

The adjusted R-square (coefficient of determination) was 0.45.

Table 9. Effect of KC on KS.

		Standardized Coefficients		
		Beta	t	Sig.
	(Constant)	0	4.29	0.000
H2 supported	KC	0.63	8.35	0.000

Table 10. Effect of KS on KA.

		Standardized Coefficients		
		Beta	t	Sig.
	(Constant)	0	5.26	0.000
H4 supported	KC	0.71	10.39	0.000
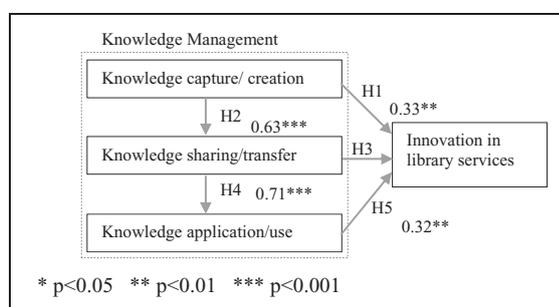
Figure 3. Results of hypothesis testing (β values and significance).

We then regressed KS on KC (see Table 9).
The adjusted R-square was 0.39
To test for H4, we regressed KA on KS (Table 10).
The adjusted R-square was 0.5
The results of the hypotheses testing are also summarized in Figure 3.

To test our first research question, we computed the average of KC, KS and KA to arrive at scores for overall knowledge management (KM) on a scale of 1–5 as provided by each respondent. On regressing SI on KM, we found that KM strongly affects SI ($p = 0.000$, $\beta = 0.67$, adjusted R-square = 0.45).

Post-hoc testing

After the hypothesis test, step-wise regression was carried out to see any potential effect of the control variables VC, VCC on the dependent variable SI. The effect of value creation and co-creation on service innovation was found to be non-significant.

Regression was repeated to see the effect of the demographic variables gender, age, education, number of employees in the library and number of years in

the library field on SI. None of the demographic variables had any significant effect on SI. However, upon including these variables, the effect of KA on SI was found to be very strongly significant at the $p < 0.0001$ level ($p = 0.000$, $\beta = 0.45$), while the effect of KC on SI was significant at the $p < 0.05$ level ($p = 0.012$, $\beta = 0.29$).

Regression was also repeated to see if any of the deleted items from the independent and control variables of Table 1 would have an effect on the dependent variable SI. Of all the deleted items, only VC4 (we spend a lot of time on learning by getting user feedback and making changes accordingly – creating value – about what the user interface should be like – physical or electronic) was found to have a significant effect on SI ($p = 0.022$, $\beta = 0.27$).

Regression was repeated by treating each of the deleted items of SI as the dependent variable, and regressing the independent and control variables on it. There was no significant effect observed.

To see if the individual items of VCC (value co-creation) would have any effect on SI, we regressed VCC1-7 on SI. None of the items were significant. However, two items VCC1 ($p = 0.056$, $\beta = 0.37$) and VCC4 ($p = 0.057$, $\beta = 0.3$) came close to significance ($p < 0.06$). VCC1 pertained to working with the user on identifying user needs, and VCC4 was about working with the user on the user interface design.

As Dalkir (2013) and Agarwal and Islam (2014) showed a circular relationship from KC→KS, KS→KA and KA→KC (the applied knowledge is updated and based on gaps identified, new knowledge is captured or created), we repeated the analysis to see if there was any causal relationship from KA to KC. We found that KA strongly affects KC ($p = 0.000$, $\beta = 0.66$, adjusted R-square = 0.44). On testing KC, KS and KA against each other for correlation, these three variables were found to be strongly correlated ($p < 0.0001$). The Pearson correlation r of KC with KS was 0.63 ($p = 0.00$) and of KC with KA was 0.66 ($p = 0.00$). This explains the circular relationship.

Discussion

In this study, we set out to answer three research questions on the effect of KM on service innovation in academic libraries. The first research question was answered with a strong relationship established between knowledge management and service innovation in academic libraries. The second research question was addressed whereby a strong relationship was found between knowledge capture/creation and service innovation, and between knowledge application/use and service innovation. Both those phases

are an integral part of Islam et al.'s (2015a) KMSIL framework. The formal refers to the left part of the framework, the latter refers to the right part. While no direct relationship was established between knowledge sharing and service innovation, an indirect effect was established whereby the created/captured knowledge affected the shared/transferred knowledge, which in turn positively affected knowledge application/use. This addressed the third research question showing the relationship between phases of the integrated KM cycle. The cycle established from knowledge capture/creation to knowledge sharing/transfer to knowledge application/use and back to knowledge capture/creation support the integrated KM cycle frameworks in Dalkir (2013) and Agarwal and Islam (2014) and most other frameworks of the KM cycle.

The findings support the view that academic libraries with more capability of knowledge creation are likely to offer more innovative services to their user communities. Similarly, academic libraries with better-developed knowledge application/use practices are likely to be offering more new services. The entire process of synthesis and application of the knowledge captured (as per the KMSIL framework) is crucial for the enhancement of existing services and the development of new services in academic libraries. The relationship between knowledge creation/capture and service innovation, and between knowledge application/use and service innovation is conceptually supported in the literature, although not well supported with empirical evidence. Our findings are in accordance with prior studies outside the library context such as Darroch (2005), Schulze and Hoeglb (2008) and Du Plessis (2007), which found that innovation is extremely dependent on knowledge creation and its proper application. These studies found that creating knowledge and applying of that knowledge effectively leads to the innovation of new products and services in the organization. The results also support McAdam et al.'s (2006) study where they conceptually established the relationship between knowledge creation and idea generation. The important finding in the study is that while knowledge sharing/transfer is a key component of KM, sharing in itself is not sufficient if the shared knowledge is not applied/used in the process of idea generation and synthesis leading to innovation. It is only when this knowledge is used and applied that it leads to innovation. This supports the assertion by Dalkir (2013) that in the absence of knowledge application/use, the other phases of the KM cycle are in vain. Thus, academic libraries with a knowledge sharing/transferring capability do not necessarily offer innovative services.

Conclusions and implications

The present study has explored the underlying phases of the KM cycle and their relationship to service innovation. The study found that academic librarians, in general, are practicing knowledge creation/capture, knowledge sharing, and knowledge application activities, with the first and the third phase playing an important role in their offering of innovative services to their valued users. Overall, the study points to a positive relationship between KM and innovation in libraries.

The study sheds light on how librarians perceive KM and service innovation, and the role of the former in bringing about changes in library services. Even in the process of gathering data, the study helped raise awareness of the role of KM in service innovation for libraries. Knowing the perceptions of librarians about the effect of KM on SI is the first step in determining whether academic libraries are ready to adopt KM or not. The process of filling out the questionnaire itself might prompt libraries to start thinking about KM seriously. After having participated in the study, librarians might be encouraged to view any discussions on KM adoption more positively, and perhaps even consider adopting KM in their libraries. However, even if librarians know about KM or its importance, they would need to develop expertise in KM processes and implementation, or seek outside help in this area. Adopting KM would lead to more responsive libraries, service innovation, and libraries moving seamlessly towards the libraries of the future, while surviving budget cuts, competition from online sources such as Google and other challenges.

The study also has implications for researchers – both in the KM cycle and service innovation areas. Bringing these two together opens up further areas of research, and is a primary contribution of this study. The study lends quantitative evidence to Islam et al.'s (2015a) KMSIL framework, which had earlier only been tested through a qualitative study of a small sample.

The study had a few limitations. First, a bigger sample than 107 would yield more data. One of five hypotheses was not supported. A larger sample could help determine if knowledge sharing does have any direct effect on service innovation. The response rate might have been affected by mails going to recipient's spam folders, and possibly also by people receiving emails at odd times, as respondents were in different time zones. A lot of people also tend to ignore survey requests in the absence of any tangible incentives. Second, a large number of survey items had to be dropped during analysis. This issue could have been

prevented by adopting a two-step sorting procedure described by Agarwal (2011). The procedure, when carried out, helps improve the construct validity of survey items with a limited number of judges before carrying out the data collection. Third, convenience sampling was used. This would limit the generalizability of the findings. Finally, while the study supports the KMSIL framework, some of the dropped items limited the validation provided by the study. Next, a strength of the survey is its wide global reach. However, this reach is also a weakness because the diversity of academic libraries worldwide – in terms of their funding, their legislation and mandate, their histories and institutional contexts – make it difficult to probe deeper. As KM ideas may not be all that familiar to academic libraries and/or applied on a regular basis, the questionnaire method for validating the model must be supplemented with interviews and case studies of libraries within a specific geographical region.

Future studies should continue to test the framework. While this study looked at different phases of the KM cycle (knowledge capture/creation, knowledge sharing/transfer, and knowledge application/use) and its effect on service innovation, further studies could concentrate on a single phase such as knowledge creation or application and study its impact on service innovation. Finally, the findings of the study could be supplemented with interviews of librarians to get a more in-depth picture of their perceptions about the effect of KM on service innovation in academic libraries. The study has shown the value of utilizing both users' and librarians' innovation potential. Future work will show how to cultivate both these sources for service innovation in libraries.

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Approaches to impact evaluation in academic libraries: A review of a new ISO standard

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Abstract

This article is a review and summary of the *ISO Standard 16439, Information and Documentation: Methods and Procedures for Assessing the Impact of Libraries* which gathers together recent thinking and approaches to the difficult question of seeking and finding evidence that an academic library indeed makes a tangible difference to its users. Both librarians and library administrators who are grappling with the increasingly imperative need to demonstrate the value of their services will find this article of interest.

Keywords

ISO 16439, library impact assessment, principles of Library and Information Science, standards and standardization of LIS practices, value of academic libraries

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Impact assessment in academic libraries

Academic libraries are cost intensive enterprises. In environments where budgets are constrained, the provision of tangible evidence of the extent to which expenditure on the library adds to the institutional goals, are inevitably expected and even demanded (Poll and Payne, 2006: 547–548). Academic libraries therefore continually explore different approaches to finding objective and incontrovertible indicators for evaluating the impact of their activities on their stakeholders. For this purpose, the gathering of reliable and verifiable data is essential. Oakleaf (2010), in her major report on the value of academic libraries, critically considered recent research, showing that the value of academic libraries can only be demonstrated when libraries use objective evidence from their interactions with their various stakeholders.

Responding to this need for identifying and standardizing approaches to assessing the value added by academic libraries, the International Standards Organization (ISO) set about developing a set of standards: *Information and Documentation: Methods and Procedures for Assessing the Impact of Libraries (ISO 16439)* which was published in 2014. The Standard was intended to be a definitive statement on methods

and approaches to impact assessment in all kinds of libraries. This current article on *ISO 16439* should not be seen as a review of the entire body of literature on library impact evaluation which has by now become fairly extensive. Its intention was to review the Standards document as far as its recommendations are relevant to academic libraries.

ISO 16439 defines library impact as 'the influence of libraries and their services on individuals and/or on society' at large (ISO, 2014: 13). Such impact, according to the Standard, refers to identifiable differences that the library has made to individuals or society and as such is neutral, in the sense that differences may be experienced either positively or negatively. Impact may also be tangible or intangible, intended or unintended, immediate or long-term, and different groups or individuals may experience such impact in different ways. The kinds of impact that may be expected in academic libraries according to earlier work by Markless and Streatfield (2013: 80),

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may be 'affective' when attitudes or levels of confidence have improved in individuals or groups; 'behavioural' when people learn to do things differently; or either 'knowledge-based' or 'competence-based' depending on the nature of what has been learnt.

The Standard (ISO, 2014: 14–15) expresses the effects of impact on individuals in terms of improvement in skills and competencies, or changes in attitudes and behaviour of individual library users; or more successful studies or research activities; and possibly also when library use results in enhanced career prospects and improvement in individual well-being. Impact on the academic library's parent institution or community may be found in more positive visibility of the library in the community and the library's success in attracting a new population of students who might previously have experienced the library as a foreign or alienating environment that they might have tended to avoid (ISO, 2014: 16).

Although social impact of libraries might mainly be regarded as a function of public libraries, social impacts of academic library interventions may be evident as well. They include increased experience of social inclusion and cohesion which might have resulted from working in a group or participation in information literacy classes; access to and assistance with information technology; Internet access; support in education; increased awareness of local culture (for example from exhibitions) and the acknowledgement of cultural diversity (ISO, 2014: 16).

ISO 16439 also identifies substantial challenges (ISO, 2014: 18) inherent in attempts to evaluate library impact, which are intangible and difficult to quantify, as the influence of the library is often not the only, or even the strongest, variable affecting student experience. It is acknowledged that the same library services may also have different impacts among different target groups, that the data on which impact assessment is based is mainly qualitative and therefore subjective, and that the workload associated with impact assessment is strenuous and may be daunting (ISO, 2014: 18–19).

While academic librarians already steeped in impact assessment may therefore find that the Standard does not bring a great deal that is truly new, it gathers together a very practical overview of possible approaches to the process. It does not pretend to be a 'standard' in the sense of a cataloguing standard that aims to produce identical products when applied under the same circumstances, but nevertheless it is deliberately methodological in that it offers different perspectives to providing demonstrable evidence of impact. From the range of choices offered, each library will be able to develop its own programme based on its own needs and strategic priorities. A particularly useful aspect of the Standard will also be found in the appendices or 'Annexes' that give practical examples of assessment instruments and additional guidance on approaches that may be used or adapted according to specific circumstances or needs (ISO, 2014: 65–79).

Demonstrating impact with *ISO 16439*

The mainly qualitative nature of impact assessment and the difficulties of finding credible evidence in a qualitative environment are acknowledged. Citing Streatfield (2002, in ISO, 2014: 21), it is proposed that such evidence may be established in three ways: by *inference* from other regular library data or in combination with qualitative data; *solicited* by asking library users about their experiences; or *observed*, by studying user interactions with library activities whether in person or by proxy: when, for example, evidence is explored from video recordings or log files reflecting the use of the library or library databases and other resources. As single measures and interventions by themselves tend to give limited evidence of impact, it is then recommended that quantitative outputs such as measures and other numerical indicators should be presented in combination with observations and narratives to demonstrate the value of particular services or initiatives (ISO, 2014: 21–23). The following approaches are discussed.

Inferred evidence (ISO 16439: 24)

Library statistics that are routinely collected may be used to infer aspects of impact. Use and user statistics, especially if measured over time, may show whether and how frequently particular groups visit the library, or access its electronic resources, or attend training or information literacy sessions. If such numbers increase over time, it may suggest that value or impact is being derived from these activities. Similarly, library visits or high seat occupancy rates by the groups being investigated may show that working in the library is a desired activity, although it should also be emphasized that a single or only a few indicators of this nature would not provide sufficient evidence of impact and should be supported by other, more qualitative, indicators as noted above.

The availability of large datasets from sophisticated computerized library systems has more recently facilitated new interest in inferring impact from regularly collected library statistics. In Australia, for example, Haddow and Joseph (2010) and Haddow (2013) used book circulation data and log-ins to computer terminals and online library resources, to

demonstrate that library use correlated positively with student retention. At the University of Cape Town also, it was found that evidence from increasing undergraduate gate counts, together with undergraduate LibQUAL+® responses and responses to deliberately designed surveys, enabled one to infer that undergraduates highly valued the library as a safe space to work and study (De Jager, 2015).

Solicited evidence (ISO 16439: 28)

Evidence is solicited when individuals or groups are asked questions about their experiences in using the library or their perceptions of the value of library resources and services. Surveys, interviews or focus groups may be employed for this purpose and, although it may be possible to analyse results using statistical techniques, the results reflect the affective or qualitative perceptions and personal opinions of the respondents. Surveys of various kinds have been some of the most common approaches to exploring users' perceptions of the impact and value of library services (ISO, 2014: 28); major studies such as that of Kuh and Gonyea (2003: 259) analysed some 300 000 responses to the 'College Student Experiences Questionnaire' in the United States to explore the role of the academic library in promoting student engagement in learning.

ISO 16439 notes specifically (ISO, 2014: 28) that users' 'satisfaction in itself is not a direct impact', although reports of satisfaction may point to activities or services that could have had an impact on recipients' skills or knowledge. Reports of satisfaction therefore, should be combined with the results of other investigations to provide evidence of value and *ISO 16439* explains in detail how libraries could proceed to design, construct and format instruments for soliciting evidence of impact. Institutions seeking to establish the impact of interventions by soliciting evidence from users will find (ISO, 2014: 28–46) much information together with examples of different kinds of questions that they could use for constructing appropriate research instruments to assess library impact beyond recording satisfaction, as respondents may express satisfaction even if no actual impact had taken place.

Observed evidence (ISO16439: 46)

Observation involves looking closely at how users interact with library services and may be categorized as either open or covert observation, depending on whether subjects are aware of being observed or not (ISO, 2014: 48). Especially in the case of covert observation, ethical issues such as the need for informed consent (ISO, 2014: 47) have to be taken into consideration. Usability testing of a library web site, to find for example whether students engage with it successfully and are able to find what they seek, is an example of open observation. Respondents are tasked with finding answers to pre-set questions and an observer notes how the tasks are attempted and accomplished. Usability testing may be used to improve the design of library web sites and consequently enhance user experience. Studies, for example that of Manzari and Trinidad-Christensen (2006), provide guidelines for the conducting of such investigations and the value that may be derived from them.

Covert observation takes place for example when computer log files of search transactions are analysed. When activities of particular users or groups are tracked over a period of time, it is possible to see how much time is spent on searching, or how behaviour may have changed, for example after training. Changes in behaviour may reflect that an impact has occurred. The article by Jamali et al. (2005) provides a comparative analysis of the different methodological approaches to log analysis and considers both the advantages and limitations of this approach.

One of the most common ways in which libraries may demonstrate an observable impact on the knowledge or competencies of users, is through teaching what is generally known as 'information literacy', which is defined by *ISO 16439* as:

> more wide-ranging than knowing how to use a library, but an aspect of lifelong learning that refers to attributes of people who are able to find, assess and use information wherever it may be located. This includes the skills for using information technology to access and retrieve information. (ISO, 2014: 50)

In order to be sure that learning has taken place after an information literacy intervention or training course, *ISO 16439* recommends that tests, whether standardized or specifically designed, are administered before the training begins and then also afterwards to establish whether a measurable difference in knowledge or skill can be demonstrated. The differences between 'basic information literacy skills' and 'higher order competencies' (ISO, 2014: 51) are discussed and approaches to testing are considered. Walsh (2009: 19) had critically reviewed the different approaches to information literacy assessment evident from the literature and had particularly noted a lack of carefully designed assessment instruments. *ISO 16439* therefore offers extensive advice on how to implement different approaches to testing information literacy skills and their impact on learning. Annex A

(ISO, 2014: 65–70) provides examples of impact surveys that may be used or altered to suit specific circumstances.

Combining methods (ISO 16439: 53–57)

Although references to combining the results from different datasets or studies to extract evidence of impact are frequently noted throughout *ISO 16439*, this separate section gives more specific guidelines for measures that may be meaningfully combined, along with potentially problematic issues that may arise. The considerable advantages of combining data are noted briefly (ISO, 2014: 57).

Indisputable evidence that library use contributes to student success, whether in studying, learning or qualifying, has always been an important but elusive goal in academic libraries. Nevertheless, attempts to link evidence of library use with student success data have been reported, both in the print as well as more recently in the digital domains. *ISO 16439* acknowledges this work and discusses (ISO, 2014: 55) how data from library systems (for example document downloads, circulation, gate counts) may be combined in large data warehouses with student records of examination results, to explore whether there are correlations between student success and library use. As university entrance and performance data from the entire student population are included in such systems, results from identified student groups may be extracted and correlated separately. It therefore becomes possible to investigate the relationship between library use and the academic achievement of students from specific cohorts or disciplines. Studies from Australia (for example Cox and Jantti, 2012), the UK (for example Stone and Ramsden 2013) and the USA (for example Soria et al., 2013) have been combining data from very large datasets to investigate library impact. Cox and Jantti (2012: 311) could show that there was a strong correlation between use of library resources and student marks. Stone and Ramsden demonstrated a statistically significant relationship between student achievement and either e-resource use or book borrowing, while Soria et al. (2013: 160) found that even one instance of library use, whether loans or log-ins (to web sites, databases, electronic books, journals or workstations), not only resulted in higher grade point averages in comparison with those students who had not used the library, but that the library users were also more likely to return in the following semester.

All these authors acknowledge that correlations do not demonstrate causality. *ISO 16439* also acknowledges (ISO, 2014: 56) that there may be institutional ethical constraints to obtaining access to student data but, provided that individual anonymity is guaranteed, this approach could nevertheless demonstrate that library use correlates positively with student achievement and retention, and that the library may play a demonstrable role in student success.

Assessing the economic value of libraries (ISO 16439: 57–64)

Although not a simple issue, libraries may be expected to account for their budgets by demonstrating the economic impact or value of their activities. While academic library services are not normally perceived in economic terms by their users, the library materials and resources that are essential for research activities tend to be expensive and such expenses may need to be justified. Quantifying the extent of library input into research outputs, products and especially research grants is explored in this section.

The main approaches include calculating replacement costs if users are forced to use alternative, commercial approaches to finding the information they require; or estimating the costs of using the library, i.e. users' transport costs and the cost of their time spent in the library (expressed as proportions of their salaries), although users might not be able to give realistic estimates if asked about the value of library services (ISO, 2014: 57–61). In addition, estimates of the costs of a service do not necessarily demonstrate the benefit that the service provides.

Contingent evaluation is used to assign economic value to non-market items. Carefully constructed surveys are used, mostly in the public library arena, to establish how much libraries and library services are valued by people who use them. A now-famous study at the British Library in 2004 was able to show that for every £1 of public funding the library received, £4.4 was generated for the British economy (Pung et al., 2005).

In academic libraries, one of the approaches to establishing economic value of library services has been *return on investment* (ROI) which aims to link money spent on the library with money generated by library services. University libraries do not normally generate money, but income from research grants may indeed be generated with the assistance of library resources, so that it becomes possible to calculate the amount of money that the library generated for the university, compared to the amount that the university spent on the library (ISO, 2014: 62). In a well-known study conducted at the University of Illinois, it was calculated that for every dollar that the university

spent on the library, the university gained $4.38 in grant funding (Kaufman, 2008: 42–43).

This study formed the first part of a major investigation into the value of academic libraries which expanded the examination of ROI at the University of Illinois to include a further eight universities in eight countries (Tenopir, 2011: 10).The results of the ROI calculations varied, depending on whether the institutions were research intensive, in which case the ROIs were higher, or focused on teaching in countries where fewer sources of competitive grants were available, where ROI was lower (Tenopir, 2011: 11). More recently, a study at the Syracuse University was able to show that for every $1 spent on the library, a value of $4.13 was generated (Kingma and McClure, 2015: 73–74). *ISO 16439* (ISO, 2014: 62–63) briefly discusses and illustrates practical approaches to calculating ROI in order to assist libraries in seeking evidence that the value derived from the library by its stakeholders, exceeds the financial input into the library's resources.

Conclusion

This brief overview of the approaches to impact assessment proposed and discussed in *ISO 16439* summarizes the main approaches to academic library impact evaluation and emphasizes the importance of each library using evidence of its own activities to demonstrate the difference that it makes to its own community. Different methodologies for deriving evidence are proposed and discussed, and it is shown how evidence may be derived by inference, or that it may be solicited, or observed. From the large range of choices and aided by examples, librarians are able to construct their own investigations, based on their own needs. This article therefore aims to demonstrate that *ISO 16439* could indeed serve as a guide to finding explicit and objective evidence for the positive academic impact that a library can make to all its users. It has also shown that librarians and administrators are indeed able to demonstrate with objective evidence, the extent to which the library adds tangible value to the institutional enterprise.

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Community engagement, cultural competence and two Australian public libraries and Indigenous communities

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Abstract

Two examples of community engagement in Australian public libraries, drawn from the author's experience, are analysed using Sung and Hepworth's (2013) community engagement model for public libraries and Overall's (2009) definition of cultural competence in a library and information science framework. The examples are examined for the community engagement characteristics identified by Sung and Hepworth; each is also considered for cultural competence, using the domains which Overall posits are the sites where this competence occurs or is developed. A virtuous circle of community engagement is extrapolated from the second example. 'Hierarchical equivalence' between organizations, a group's proportional presence in a population and the nature of each group's aims, are suggested as further factors in sustainable community engagement. That culture is an asset on which communities draw to engage with libraries and the broader community, and that communities will respond to engagement approaches if they offer the possibility of meeting community aspirations, is evident in both examples.

Keywords

Autoethnography, community engagement, cultural competence, libraries, practitioner-research, virtuous circle

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Introduction

Two examples of community engagement in Australian public libraries are discussed in this article, using autoethnography, Sung and Hepworth's (2013) model of community engagement for public libraries and Overall's (2009) definition of cultural competence. In the first example, at the Alice Springs Public Library, in the Northern Territory, senior staff initiated and sourced funding for projects to improve services for Aboriginal library users; outcomes included the creation of an Indigenous Knowledge Collection and the establishment by the Town Council of a permanent Indigenous Services Officer position on library staff. In the second, in Canberra in the Australian Capital Territory (ACT), I aimed to involve all staff, branches and management in engagement between Libraries ACT and the Aboriginal and Torres Strait Islander community.

In each example, Australia's Indigenous people were involved. Traditional Owners, i.e. members of the tribe or nation that occupied each particular region prior to European colonization, were key participants. In Alice Springs the project worker (not myself) collaborated with the Arrernte Traditional Owners and other Aboriginal groups and organizations. In Canberra, as the Community Engagement Librarian, I made contact with the Ngunnawal Traditional Owners and Aboriginal and Torres Strait Islander organizations. While engagement focused on Indigenous communities, the outcomes were not

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intended to exclusively benefit those groups; each target group envisaged a benefit for the broader community. Any inference that culturally competent community engagement focuses on groups identified by their ethnicity is erroneous; as Jaeger et al. (2011) and Helton (2010) point out, cultural competence is central to effective community engagement, whether the community is defined by ethnicity, age, sexual preference, physical ability or impairment, or recreational activity.

This article illustrates the slightly different trajectory of practitioner-research to that of academic research; it counters suggestions that practitioner-research is, or should be the same as, academic research (McCrystal, cited in Wilson, 2013). I identified the question – effective cross-cultural service provision in libraries – and its potential solution – community engagement and cultural competence – during practice, not through reading to find a gap in the literature (as suggested, for example, by Pickard, 2013). Rather than incorporating the gamut of relevant literature into this article, texts are selected for their usefulness to current reflection. (Literature critical of key concepts, or which offered varying formulations, is not ignored. Such literature proved useful in crystallizing my understanding while learning about the concepts.) Study and research answered some aspects and raised others. Practice and informal professional development currently provide the stimulus for continuing to consider and discuss the topic.

Key concepts are introduced, which inform discussion. The examples are described and mapped against the elements of those key concepts to explore the degree of fit between the examples and the concepts. Features of each example that are not covered in those key concepts are identified.

Approach

Practitioner-research

Practitioner-research is emerging as a credible form of research (Wilson, 2013). In my experience, practice is primarily where both problems and potential solutions are identified. Study has enabled exploration of those solutions; practice is the place where they are tested, professional development occurs and knowledge is communicated to colleagues.

Kolb (cited in Fox et al., 2007: 178–180) suggests a learning cycle implicit in practitioner learning and development, characterized by:

- conceptualizing the problem in the workplace;
- putting principles into practice, by devising solutions based on training, operations and prior or tacit knowledge;

- experiencing the efficacy of those solutions;
- reflecting on outcomes.

Further conceptualization occurs if the solution is not sufficiently effective or ceases to be effective, followed by the other elements in the cycle. This only approximates my experience. One solution – cultural competence – to my problem – cross-cultural provision – was identified during practice but not as a result of applying principles. Rather it was revealed by a colleague from a different field while I was still attempting to conceptualize the problem. Further, research is not explicit in Kolb's formulation and study and research were fundamental to me understanding the concept's potential.

Wilson (2013) discusses a number of formulations of 'practitioner-research' and 'practitioner-researcher', concentrating on the attributes of the latter to define the former. Her view is that:

> rather than being on the outside looking in, the practitioner-researcher is someone on the inside looking around, observing and attempting to understand what's going on for the benefit of how things are working on the inside. (Wilson, 2013: 2)

The importance of research methodology as devised and applied in academic research, is emphasized in many of the commentators Wilson summarizes. However, the constraints identified by Wilson, particularly time and financial and management support, and the continuing stimulation and opportunity for reflection offered by practice, suggest that the balance between applying rigorous academic methodology and the demands and opportunities offered by practice should not be tipped heavily towards the former. One result of such an imbalance could be the continuing divide between the work produced by researchers and librarians' workplace requirements. Another might be to obscure the particular features of practitioner-research.

Authoethnography, intrinsically autobiographical and discursive, enables the writer to raise research questions about the context in which their experience has occurred (Ellis et al, 2011; Pace, 2012). Analysis of processes in action and critical reflection about personal experience can reveal broader issues, in this case, library services for particular groups. Autoethnography is useful when researchers are using their experience as the data on which to base investigation.

Generalizability, a weakness of autoethnography (McIntyre, 2016; Mendez, 2013), is enabled by description of the writer's experience and analysis of underlying trends and issues, sufficient to enable

other researchers or practitioners to consider and compare their own experience with the writer's and with the theory used by the writer. Dispute or agreement with the writer's findings follows. In this instance, I describe my experience in two public libraries, triangulated against theories postulated by Sung and Hepworth (2013) and Overall (2009).

Identifying the problem

The question of adequate and appropriate cross-cultural provision arose while I was managing the Special Collections, including an Indigenous Knowledge Collection, at Alice Springs Public Library. There was an internal demarcation between technical support for the conventional collections and the Indigenous Knowledge Collection. The Indigenous Services Officer and I were often called upon to manage incidents on the floor involving Aboriginal people, while, for instance, the Children's Librarian was not similarly called upon to manage incidents arising among children. There was a near-complete lack of use by non-Aboriginal people of the Indigenous Knowledge Collection. Issues of cultural competence arose, albeit unrecognized as such:

- I used to say, 'Libraries are western systems', without a confident or articulate sense of what followed from that in cross-cultural situations
- the invisibility of culture for those whose beliefs and systems constitute the norm was demonstrated when a non-Aboriginal town councillor asked, after being shown the Indigenous Knowledge Collection, 'Where are the white people's stories?'

At Libraries ACT, where my role was to build engagement between the library service and Aboriginal and Torres Strait Islander communities, the question broadened to include community engagement, how to embed it in core activities and the broader environment. An education field worker mentioned the notion of cultural competence, which offered answers about the 'how' of both cross-cultural provision and community engagement.

Enrolling in a Master of Information Management course, I researched library and information science and cultural competence (Blackburn, 2015). I came to consider cultural competence fundamental to cross-cultural provision and community engagement: both entail working from a library's particular way of operating (its culture), with groups having other cultures. Ways of seeking information are not similar across cultures, nor is understanding of the ways in which libraries make information available, automatic. Such points of cultural mismatch require cultural competence to resolve.

Questions of appropriate cross-cultural provision or community engagement were not fully answered through study and so I continue to reflect on practice, my own and others', as an insider, because practice provides impetus and the opportunity to discuss issues and solutions with colleagues. This article, and the use of autoethnography, is part of that continuing reflection.

Context

Alice Springs

Alice Springs is the regional town for central Australia, with a population of approximately 28,000 (Australian Bureau of Statistics (ABS), 2010). It provides health, education, banking, social and recreation services to people living in the Northern Territory and parts of Western Australia and South Australia. Aboriginal people are a significant group, forming approximately 20% of the town's population (ABS, 2010).

The Alice Springs Public Library provides information and literacy-based recreational services to town residents and remote workers in other central Australian shires in Western and South Australia. These statements, from a non-Aboriginal man who has lived in Alice Springs for most of his life, 'I would find it difficult to live in this town without the library' (Peter Latz, 2008, personal communication), and an Aboriginal woman, 'I love the library, it's my home' (Rosemary Drover, 2009, personal communication) are indicative of the library's value to residents, non-Aboriginal and Aboriginal alike. With the agricultural show, the annual match between visiting Australian Rules Football teams and the Beanie Festival, the library is one of the few sites where Aboriginal and non-Aboriginal people gather together (2008–2016, various personal communications).

Library services for Aboriginal people include the Akaltye Antheme Collection, an Indigenous Knowledge Collection established in collaboration with the community in 2002, 'Indigilinks', an intranet hosting resources of particular content and format likely to be of interest and accessible to Aboriginal people, management of secret and sacred information according to community norms, and employment of an Indigenous Services Officer. In 2003, Aboriginal people were up to 30% of the library's patronage; anecdotally, this rate of use has not diminished since. In an internal survey of library usage in 2009, Aboriginal people were observed reading, browsing, using the Internet for recreation, information seeking and banking,

socializing, escaping the heat outside and organizing community events. Aboriginal people are the primary users of the Akaltye Antheme Collection, but they also use other collections, particularly the non-fiction collection.

Libraries ACT

Libraries ACT is the library service for Canberra, the capital of Australia, a town of approximately 400,000 people (ABS, 2015). It comprises nine public libraries and a heritage branch. In 2010, management devised a community engagement initiative, to liaise with a range of groups perceived to be infrequent users of library services or who might benefit by increased knowledge and use of library services. In 2011, I gained one of the community liaison positions created to implement this initiative, applying to work with the Aboriginal and Torres Strait Islander community.

Aboriginal and Torres Strait Islander people constitute approximately 1.5% of the ACT population (ABS, n.d). A number of community-controlled organizations represent, advocate for and provide services to the Aboriginal and Torres Strait Islander community. The key organizations for this community engagement initiative were ACT Aboriginal and Torres Strait Islander Elected Body (ATSIEB or the Elected Body), the United Ngunnawal Elders Council (UNEC) and the Yurauna Centre, the Indigenous student support centre at Canberra Institute of Technology.

Key concepts

A community engagement model for public libraries

In analysing three case studies in United Kingdom public libraries, Sung and Hepworth (2013) identified these essential elements to community engagement:

- accountability: the extent that the initiative conformed to or was driven by external organizational imperatives;
- belonging: feelings of ownership and emphasis on relationship-building between the service and the community;
- commitment: the degree of commitment to the project by the relevant stakeholders
- communication: the way in which the service communicated with the community;
- a flexible approach: the variety of methods employed to engage and work in partnership
- genuineness: authenticity or a true reflection of what was said to be;

- relevance: the degree of relevance or benefits to stakeholders;
- sustainability: the impact and continuity of the project.

These occur to varying degrees and interact and influence each other, but all are present. 'Accountability' means the requirement for the library to meet statutory duties or reporting guidelines. This factor strongly influences the process and is likely to be present in all engagements involving public sector organizations. The other elements are exhibited between participants, and can both drive and develop during the process.

Sung and Hepworth (2013) identify two further variables which shape community engagement initiatives profoundly: 'influence of authority' and 'willingness to learn'. The former equates to the extent to which engagement is initiated, shaped or led by management. The latter is defined as the library's capacity to embrace the community's leadership or preferred approach. Sung and Hepworth suggest that the greater a library's willingness to learn, the more authentic and sustainable the engagement.

This model is contrasted with a spectrum of engagement activities, in the framework proposed by the International Association of Public Participation, which begins with 'inform' and progresses through 'consult', 'involve', 'collaborate' to 'empower'. Sung and Hepworth (2013) suggest that this spectrum precludes the possibility of community-initiated or led engagement. They advocate an organic process characterized by community influence and leadership, rather than a service-led, formalized one, arguing that the former will be more effective.

CSV Consulting (2006) provide case studies which concur with this assertion. Press and Diggs-Hobson (2005) describe a health information service delivered outside the library walls and designed to meet the community's specific health information requirements and fit with their ways of seeking information. The latter includes approval or legitimation from community leaders. Pateman and Williment (2013) take this further, arguing that a community-led library is primarily accountable to its community users rather than stakeholders in the bureaucracy.

Groups defined by their ethnicity are not the sole focus of community engagement, which can occur between any library and any group in its user population. None of Sung and Hepworth's case studies engaged specifically with particular ethnic groups. Pateman and Williment (2013) argue that community-led libraries not only can but should engage with all groups within a community with

information needs, regardless of whether groups are defined by age, ethnicity or social status. Grace (2014) and MacKenzie (2015) describe public library community engagement with groups defined by other characteristics, e.g. hearing impairment, autism, low socio-economic status.

Cultural competence

The term 'cultural competence' appeared in US library and information literature in the 1990s, part of a discussion about services for minorities that had begun decades earlier (Mestre, 2010). Kumasi and Hill (2013: 253) describe the following definition as 'the most relevant and in-depth scholarship on cultural competence in the context of LIS':

> [cultural competence is] the ability to recognise the significance of culture in one's own life and in the lives of others; to come to know and respect diverse cultural backgrounds and characteristics through interaction with individuals from diverse linguistic, cultural and socioeconomic groups; and to fully integrate the culture of diverse groups into service work and institutions, in order to enhance the lives of both those being serviced by the library profession and those engaged in service (Overall, 2009: 176).

Cultural competence is acquired in three overlapping domains:

- the cognitive, where the individual or organization learns to understand the role of culture in their own behaviour and day-to-day activities or operations;
- the interpersonal, where the professional learns about the cultures of colleagues and clients and begins to understand the effect of culture on participation or access;
- the environmental, where physical and operational features shaping or inhibiting culturally expressed participation are identified and modified.

These domains reflect the three components to the definition.

That culture plays a fundamental role in public libraries' role and operations is documented by researchers in the United States (e.g. Abdullahi and Josey, 2002; Harrison, 1896; Malone, 2000; Pawley, 2005), as part of a discussion about services for minorities. The cultural basis to library systems and operations demonstrates the importance of the three domains of cultural competence, to successful engagement with groups whose culture differs from that which underpins Western libraries. Press and Diggs-Hobson's (2005) case study demonstrates the centrality of cultural competence to successful community engagement.

Montiel-Overall (2009) argues that culturally competent provision builds on the cultural assets of a community, eschewing a deficit perspective which seeks to improve the lives of minority groups. In culturally competent practice, approaches that interfere with the cultural norms are amended. Others (Andrade and Rivera, 2013; Jaeger et al., 2011) emphasize that acquiring cultural competence is ongoing, that 'achieving' it is constantly open to the demand for further learning and development. Jaeger and Franklin (2007) suggest that optimally a virtuous circle, where the outcomes of each phase influence the development of the next, develops.

The examples

In this section, the Alice Springs and Libraries ACT examples are described in detail. These are the data on which the rest of this investigation is based. In addition, the detail is provided to document initiatives – services for Australia's Indigenous peoples – which are reasonably rare in the library and information sector. The features of each are mapped against Sung and Hepworth's (2013) community engagement model.

Alice Springs

Aboriginal people have always used the Alice Springs Public Library. Neale (Blackburn and Neale, 2008) describes how as a shy nine-year-old in the 1950s, only a few years after the municipal library was established, she was coaxed into the library by the librarian; once there she found another world to enter, through reading. In 2000, the senior librarian looked at the way a regular group of Aboriginal patrons used the library and thought there could be a better way (Glenys Aird, 2008, personal communication).

A two-phase project, to improve services for Aboriginal patrons, was undertaken. In 2001, a project worker and the local Aboriginal community established Kulini Kulini (which translates from the local language Arrernte into English as 'Listen up, listen up'), the Library Lounge project. The intent was to create a space and acquire resources which would encourage Aboriginal youth to use the library more. During the second phase, the Akaltye Antheme Collection was established, the Traditional Owners checked the shelves of the historical collection for items which could cause trouble for Aboriginal people, and the proportion of library users who were Aboriginal established. On completion of the project

the Town Council funded a part-time Indigenous Services position which has become full time.

'Akaltye Antheme' translates into English as 'Giving Knowledge', indicating the intention of the Traditional Owners and other Aboriginal groups involved in the collection's establishment, to showcase local culture. Local Aboriginal-controlled service organizations and local Aboriginal schools donated publications and resources and continue to contribute these items. These ongoing donations are the core of the collection, which is extremely popular with Aboriginal patrons.

The library's historical collection holds a large number of items recording aspects of Aboriginal culture which, if shared with or found by the wrong people, can cause trouble in the community or for the individual. Having these items on the open shelves restricted Aboriginal people's access to the whole collection, because of the risk of finding material not theirs to see. This method of knowledge management – access restrictions and sanctions or punishment for breaches of those conditions – should be familiar to anyone observing, for example, the consequences for public servants of revealing classified information, and is taken seriously by Aboriginal people, who self-police its integrity. Traditional Owners and elders with permitted access to secret or sacred knowledge perused the historical collection and identified items with that content. These have been kept in a locked cabinet since, available to anyone who asks for them. Sequestering them means they will not be accidentally found during browsing and makes the rest of the collection safely accessible. Sequestering these items is also a physical equivalent of the way Aboriginal people manage important or dangerous knowledge, which is withheld until a potential recipient is old enough or has experience enough to have it imparted to them by those who are its guardians. Again, this style of imparting knowledge gradually to those mature enough, is familiar to anyone involved, e.g. in children's sex education.

The project worker was neither an Aboriginal person nor a librarian. She had extensive experience working with the Alice Springs Aboriginal community in other capacities and went outside the library walls immediately to involve the community. Neither Kulini Kulini nor Akaltye Antheme were internally devised initiatives. The first Indigenous Services Officer was also not Aboriginal or a librarian; he too worked outside the walls to bring people into the library. Since 2006, the position has been filled by Aboriginal people. They have seen their roles as 'walking between the two worlds', educating staff about Aboriginal ways, modifying programming to

be inclusive of Aboriginal people and reflect their interests, and building Aboriginal content in the collections.

While the survey in the second phase of the project established that Aboriginal people could be up to 30% of library users, it could not be determined whether Kulini Kulini and Akaltye Antheme increased library use. They definitely changed the ways Aboriginal people used the library, some of which posed great challenges for staff. The senior librarian, who had become library manager during this period, described advocating for the attitudinal and organizational changes necessary to support the Akaltye Antheme Collection, as the hardest work she had ever done (Glenys Aird, 2008, personal communication). Senior (2006) describes the adjustments to work practices, facilities management, attitude and behaviour, including in the community.

For a summary of the elements of community involvement found to be essential in developing the service in Alice Springs Public Library see Table 1. The underlying variables are shown in Table 2.

Libraries ACT

In building engagement with ACT Aboriginal and Torres Strait Islander peoples, I aimed to embed services across the whole organization rather than driving them solely from my position. I envisaged that while I would deliver initial implementation, staff would become motivated to develop contacts with communities near their branch and to initiate their own activities. In taking this approach I hoped to ensure the sustainability of the engagement. In a service of the size of Libraries ACT, successful community engagement required more than one position. I also wanted to avoid the isolation that staff responsible for 'diversity work' can experience (Mestre, 2010), which I had experienced somewhat as Special Collections Manager at Alice Springs and which the Indigenous Services Officer had experienced to a far greater degree. The Aboriginal and Torres Strait Islander Protocols for library, information and records services (the ATSILIRN Protocols or the Protocols) were adopted in 2012 as the mechanism for embedding engagement across Libraries ACT.

The Protocols were compiled by a group of Aboriginal and non-Aboriginal librarians as part of the 1990s Australian reconciliation movement (Garwood-Houng and Blackburn, 2014). The compilers recognized that libraries and information services can contribute to addressing the consequences of European settlement and dispossession of Aboriginal people. The Protocols' intent is to guide library and

Table 1. Alice Springs Public Library and essential elements of community engagement.

Essential elements of community engagement	Alice Springs Public Library
Accountability	The library service sourced funding to improve services for Aboriginal patrons, as a result of senior staff observation of user patterns.
Belonging	In the way that they used the Akaltye Antheme Collection and participated informally and spontaneously in running the library, Aboriginal patrons demonstrated a sense that the library belonged to them. I witnessed instances of Aboriginal people managing disruptive incidents on the floor, often before staff had time to intervene.
Commitment	Library staff, the project officer, Traditional Owners and other Aboriginal people and organizations, demonstrated commitment to improving library services for Aboriginal people.
Communication	The project worker developed the initiative in collaboration with Traditional Owners and local Aboriginal-controlled organizations.
	Responding to changed use of the library by Aboriginal people, and corresponding changes in staff attitudes and user behaviour, required internal discussion and decision-making. It also required negotiation with the community about library roles and responsibilities, and expectations of patron behaviour.
Flexibility	The initiative was developed with the community and was shaped by the community to achieve their own purposes as well as the library's.
	Library management and staff modified practice in the areas of operations on the library floor and facilities management.
	Aboriginal patrons accepted changes in the way they could use the library, in response to staff concerns. For example, they could not leave small children and babies in the care of older children alone in the library.
Genuineness	The community responded authentically to the opportunity, looking to showcase their culture as well as to develop library services for the benefit of the whole community.
	Akaltye Antheme and service changes were ongoing outcomes.
	The challenges to staff required difficult internal negotiation. This suggests that genuineness throughout an organization should not be assumed and may require development. However, staff suggested the initiative be nominated for the 2006 Best of the Best Library Stars Award, indicating pride as well as difficulty with aspects of it.
	The staff demarcation between management of the library's conventional collections and the Indigenous Knowledge Collection, which was considered solely the Special Collections Manager's domain, again suggests that commitment was uneven.
Relevance	The way Aboriginal people use the library – spending hours using the Akaltye Antheme Collection, visiting the library every day, using it as a place in which to connect with family and friends and share information, nominating it as a contact point, for friends and service organizations – demonstrates the relevance of the library very clearly.
	Unfortunately, non-Aboriginal people make very little use of Akaltye Antheme. The relevance of the initiative to the broader community has not been made clear.
Sustainability	An Indigenous Services position was established on library staff. The Akaltye Antheme Collection became the responsibility of the Special Collections Manager.
	However, community involvement in further development of library services ceased in 2002, except where the Indigenous Services Officer consults informally with the community. The outcomes of the project are sustained by key library staff, rather than through continuing community engagement.
	The uneven commitment to maintaining Akaltye Antheme throughout the staff team suggests an area of vulnerability.

information staff in the provision of appropriate services for and about Aboriginal and Torres Strait Islander people. The compilers focused on major state, territory and national institutions but Garwood-Houng and Blackburn (2014) suggest that the Protocols are also useful for public libraries. At Libraries ACT, selected Protocols were used in identifying and planning activities that the whole service could undertake, for example *Protocol 4 Accessbility and Use* covered a suggestion from the community for storytime programming in Aboriginal or Torres Strait Islander languages on Indigenous Literacy Day.

Table 2. Alice Springs Public Library and underlying sustainability variables.

Key underlying variable	Alice Springs Public Library
Influence of authority	The influence of authority – either the granting body or town council – appears minimal in the shape the project took, or its outcomes.
Willingness to learn	The library modified aspects of provision in response to the community during the project. However, with key staff sustaining the outcomes independently of the community, the initiative has become static.

From 2011 until 2014 (interrupted by an eight-month period of review and modification to the entire community liaison approach), I made contacts, consulted and formed relationships with members and key organizations in the Aboriginal and Torres Strait Islander community. In initial consultations, ATSIEB nominated cultural experiences for children, services for residents of a youth detention facility, and employment as relevant engagement activities. UNEC added the visibility of cultural artefacts and artwork in library branches as central to creating a place where Indigenous people would want to come.

From 2013, another staff member began liaising with the Aboriginal and Torres Strait Islander community, concentrating on contacts within her branch community. A small number of other staff began to initiate programme activities involving Aboriginal and Torres Strait Islander people as presenters, primarily to mark events on the Aboriginal and Torres Strait Islander cultural calendar.

Exhibitions were the main vehicle for providing visible culture, beginning with *In Living Memory,* a photographic exhibition drawn from the New South Wales State Records Authority Aboriginal Welfare Board archive. In revealing the people affected by a still-recent government policy of child removal on the basis of caste or colour, it has the potential to move, disturb, inform, enlighten and confirm Aboriginal survival of colonization. Although developed with New South Wales communities rather than the ACT community, it nevertheless served as a means to involve local people in programming to accompany the exhibition and for demonstrating the library's sincerity. Community responses to the opportunity to be involved were vigorous: members assisted in mounting the exhibition, created another

exhibition to counter the potential upset of *In Living Memory* and wrote stories and poems addressing the theme ('In living memory'), which were given at readings during the exhibition.

Further exhibitions were provided by the Yurauna Centre, the Australian Institute of Aboriginal and Torres Strait Islander Studies Photographic Collection and Oxfam.

Providing cultural experiences for children was achieved through storytime programming. Aboriginal or Torres Strait Islander people told stories, danced and collaborated with library staff on significant days such as National Aboriginal and Torres Strait Islander Children's Day, Father's Day and International Mother Language Day.

Aboriginal and Torres Strait Islander people further demonstrated their willingness to engage by participating in the National Year of Reading, speaking during Women's History Week, giving readings to book groups, and beginning to use library facilities for meetings.

Inclusive programming could have been implemented to a far greater degree. It was limited by my location in the heritage unit and constraints on public library capacity to make changes to existing programming and processes. It was not possible to provide services for young people in the youth detention facility as it is the responsibility of the Education Directorate, thus outside the purview of the library's parent Directorate and the library's remit.

A leader in the community had suggested forming a reference group to facilitate Aboriginal and Torres Strait Islander involvement in existing library services, provide advice about the development of further services, and explore avenues for increasing Indigenous employment in the library, when the initiative was halted. The reference group would have been a significant achievement in engaging the library and the community into the future and in driving the library to incorporate Indigenous perspectives and therefore develop cultural competence. The initiative ceased in 2014 due to the need for the service to find budget savings.

This initiative, to the point in time immediately before it ceased, is described by Blackburn (2014). Key findings included:

- a small team can achieve a lot with the support of colleagues and members of the community;
- alignment between the aims of a community group and of the library will facilitate successful engagement;
- the Protocols were useful in planning;

Table 3. Libraries ACT and essential elements of community engagement.

Essential elements of community engagement	Libraries ACT
Accountability	The community engagement or 'community liaison' programme at Libraries ACT was devised and defined by management. Twelve months into the life of the initiative, it was suspended while management reviewed and refined it. Management ceased the programme in mid-2014 as part of a restructure driven by the need to find budget savings.
	The Elected Body conducts annual hearings with all ACT government directorates, investigating their performance in key areas of interest to the Aboriginal and Torres Strait Islander communities. Libraries ACT management attends these hearings.
Belonging	While the community had little sense initially that the library belonged to them, members nevertheless responded positively during the initiative.
	Some staff identified as Aboriginal for the first time.
Commitment	Libraries ACT employed community liaison staff specifically for the initiative, although they were required to participate half-time in operations.
	Implementing the ATSILIRN Protocols in 2012.
	The service-wide initiative ended in mid-2014. Resources were then allocated to a reduced number of positions, wholly dedicated to community engagement; however, the focus of these positions has shifted from community engagement to literacy.
	A small number of staff continue engagement activities in their branches as programming and operations allow.
	The community responded during the initiative, and continue to respond to individual staff outreach.
Communication	I communicated the library's vision for community engagement to peak bodies, and key groups within the community and sought community input for the shape of that vision.
	The Library Director and I appeared at the ATSIEB Annual Hearings.
	As other staff became involved, they made contact themselves with individuals or organizations in their branch community. Some asked me to make or facilitate initial contact. Occasionally I took a greater role, to support staff unfamiliar with community engagement.
Flexibility	Library staff demonstrated a range of approaches:
	by making contact with peak organizations;
	by building up contact with organizations within a branch's community;
	by organizing programming around cultural events;
	by implementing the Protocols.
Genuineness	A virtuous circle had begun to develop between staff and community members and groups, built around community aspirations and implementation of the Protocols.
	Libraries ACT and the community demonstrated a willingness to acknowledge mistakes, repair relationships and continue engagement, while shaping activities according to lessons learned.
Relevance	Individual Aboriginal and Torres Strait Islander people and groups consistently extended initial ideas and put their imprint on activities. Their involvement was based on their aspirations and sense of their culture as an asset, heightening relevance.
	Community members were beginning to suggest ideas that would have developed the service as a whole and were willing to participate in their implementation.
Sustainability	Unfortunately, this initiative did not continue beyond 2014.

- community engagement can be the source of professional development and may be the stimulus to the development of cultural competence;
- the community will meet you more than half-way – ideas suggested by Libraries ACT were taken by the community and shaped and developed further, often resulting in a much larger activity than staff initially envisaged.

For a summary of the elements of community involvement found to be essential in developing the service at Libraries ACT see Table 3. The underlying variables are shown in Table 4.

Table 4. Libraries ACT and underlying sustainability variables.

Key underlying variable	Libraries ACT
Influence of authority	This was very strong: management conceived, defined and halted the initiative. I was able to affect management's approach to engagement with the community and involve management staff in some activities.
Willingness to learn	The library was willing to take responsibility for mistakes and to adopt the ATSILIRN Protocols. Staff from all levels of the organizational structure attended a Protocols implementation workshop and information sessions with Indigenous exhibitors.

Discussion

All eight elements and the underlying variables of Sung and Hepworth's (2013) model are present in each example, manifesting differently and to varying degrees.

One example of different expression is in accountability: in seeking to develop its services Alice Springs Public Library demonstrated accountability to the community, rather than to conventional stakeholders, e.g. Council. This is contrary to the notion of upward accountability as Sung and Hepworth describe it, demonsrating instead a sense of accountability to a segment of the library community, in keeping with Pateman and Williment's (2013) conception. (Although this community accountability echoes Pateman and Williment's concept of community-led libraries, it was never envisaged that the Aboriginal community would lead library development.)

Accountability to management remained dominant throughout the Libraries ACT initiative; there was insufficient time to develop community accountability, e.g. through a reference group.

The Alice Springs example demonstrates that unevenness can be present within individual elements: Akaltye Antheme and accompanying service changes are extremely popular with Aboriginal patrons but are very little used by non-Aboriginal patrons. While the service changes and Akaltye Antheme are permanently sustained, formal community involvement in further development engagement has ceased.

In the Libraries ACT example, the same activity could address more than one element of the model, and one element could be present in more than one activity. For example, adopting the Protocols indicates flexibility and commitment; acknowledging mistakes indicates flexibility and genuineness.

Each example demonstrates the influence of authority in different ways. The supportive influence in the development of Alice Springs' services saw project outcomes shaped by the community. The creation of the Indigenous Services position and the allocation of management of Akaltye Antheme to the Special Collections position, supported by authority, ensured sustainability. By contrast the influence of authority was strong in all phases of the Libraries ACT example, driving the inception of the program, intervening to reshape it, and bringing it to an end in response to external pressures.

The role of cultural competence: Alice Springs Public Library

Using the cognitive, interpersonal and environmental domains outlined by Overall (2009) indicates that differing levels of cultural competence existed throughout the Alice Springs public library. The project worker exhibited cultural competence in collaborating with Traditional Owners and community organizations, rather than devising an internal solution to the question of better library services. Her knowledge of local cultures, a feature of the cognitive domain, and understanding of how they worked, a product of the interpersonal domain, enabled her to communicate the library's intent effectively with the community so that they saw an opportunity for themselves and the town. The library's willingness to amend practice and access to sensitive materials demonstrates environmental competence. This combination of competence, combined with the participation of the community, resulted in a library service which was popular with Aboriginal patrons and which garnered the library the Best of the Best award at the 2006 industry conference.

The difficulties in persuading some staff to adjust to changed Aboriginal use of the library, suggests uneven competence in the cognitive and interpersonal domains within the organization. It is possible to infer from Glenys Aird's (2008, personal communication) commentary that, instead of perceiving this change as a measure of success, some staff saw it as a nearly unacceptable disruption of established practice. This, and the demarcation between technical support for the conventional collections and the Indigenous Knowledge Collection, suggests that staff may not have recognized that library systems are a cultural product and so did not consider it necessary to modify

established practice in response to changed use by a minority cultural group. Understanding the role of culture in one's own life, including the work environment, and the need to modify the environment in response to other cultural groups, are essential features of cultural competence.

Montiel-Overall (2010) suggests that equipping individual staff to become culturally competent will drive the development of culturally competent organizations. However, relying on individuals in this way raises the problem of stress and isolation identified by Mestre (2010) and experienced by the Indigenous Services Officer and myself.

The role of cultural competence: Libraries ACT

Using the same domains to consider the Libraries ACT example suggests that cultural competence was beginning to develop. Speaking personally, the challenges of cross-cultural provision in Alice Springs led me to seek solutions, initially through professional reading then study of a solution identified during practice. The successful establishment of the Akaltye Antheme Collection in Alice Springs led me to ask the ACT Aboriginal and Torres Strait Islander community what they would like to see in a library, and to then start conversations with colleagues and management about how to meet those requirements, including modifying practice. Cognitive, interpersonal and environmental domain activity is evident.

Other staff sought guidance or advice about how to engage with Aboriginal and Torres Strait Islander people; staff from all levels of the organization indicated a willingness to learn about appropriate library provision and cultural expression. Both of these occur in the cognitive and interpersonal domains.

Changes to the environment had begun, in the provision of programming, in exhibitions which made Indigenous culture visible and in beginning to form a reference group. In many instances modifying the environment entailed me advocating for the community's preferred way of doing things. However, elements of the broader environmental context, e.g. notions of core library business which did not include community engagement, so that responses to funding cuts targeted this activity, prevented the environment changing permanently.

In each case, culture formed the basis of participants' involvement; a deficit model or a needs-based approach would have been out of kilter with their motivation. Nakata (2014) confirms the importance of recognizing this. For example, UsMobWriting were offering their cultural production as an asset for the purposes of building cross-cultural understanding,

rather than responding to a perceived community need for greater use of the library or for better literacy. Libraries ACT's operational culture led it to the aims of engagement within its usual operational framework of provision of recreational information and support for the acquisition of literacy.

Other features to consider

Further factors, unrelated to cultural competence and not identified by Sung and Hepworth (2013), may also have had an impact on the success of each example: the proportion of Aboriginal and Torres Strait Islanders in the population in each place; 'hierarchical equivalence', aims sufficiently in alignment to facilitate common activities and the development of a virtuous circle.

Proportion of a population. Aboriginal people are a significant and visible presence in Alice Springs and a disproportionately large library user group. This influenced the move to improve services. Aboriginal-controlled organizations are also a highly visible and active feature of the town's social and political environment. The strength of Aboriginal people's response to the Akaltye Antheme Collection and accompanying service changes, indicated the appropriateness of the initiative. This probably contributed to the initiative continuing.

In Canberra, Aboriginal and Torres Strait Islander people are a small minority. They supported efforts at Libraries ACT and commented favourably on changes but this appreciation was garnered anecdotally; as a small part of the general population and of library patrons, changes in use were harder to detect. This low profile may have made it easier for management to cease the engagement initiative

'Hierarchical equivalence'. By this, I mean where each organization sits in a bureaucratic hierarchy and their relative leverage within it and in the community. In Alice Springs, the public library and Aboriginal-controlled organizations were roughly equivalent as service providers, in size, standing and visibility. They were able to interact with agency and autonomy.

In Canberra, with greater distance between the operations of the library service and the activities of Aboriginal-controlled organizations, this familiarity and rough equivalence did not apply. Libraries ACT is primarily a service organization; ATSIEB and UNEC provide advocacy and advice to government. Taking a more formalized approach, such as drawing up a Memorandum of Understanding between ATSIEB and the library, may have created a more

equivalent relationship, albeit via a bureaucratic mechanism, and consequently a situation where engagements were not so easily halted.

Aims in alignment. Alignment of aims does not mean participants have the same aims. Rather, the differing aims of each organization aligned sufficiently to enable collaboration. For example, while the Alice Springs Aboriginal community embraced the opportunity to develop library services, seeing it as a means to showcase local culture and build cross-cultural understanding, the library was aiming to improve services for Aboriginal patrons. Part of Libraries ACT's overarching mission is support for the acquisition of literacy. UsMobWriting's involvement was predicated on the opportunity to promote their writing and cultural production and demonstrate the place of Aboriginal and Torres Strait Islander culture in the mainstream.

A virtuous circle. Although engagement did not become embedded in core business, a virtuous circle, where the outcomes of each phase of a cycle contribute to the development and success of the next, had begun to develop at Libraries ACT: the success of *In Living Memory* laid the groundwork for implementing the Protocols, and for staff beginning to plan programming which included Aboriginal and Torres Strait Islander presenters. Implementing the Protocols led the Deputy Chair of ATSIEB to suggest the formation of a Reference Group to provide advice and facilitate community involvement in library programming and service development. This experience suggests a virtuous circle could resemble:

- an organization and a group with aims in alignment leads to
- shared experience (of delivering a programme, developing a collection), which will generate
- ideas, mistakes, successes, learning and development, which will result in
- a partnership, which will generate
- benefits:
- the library position in its community will be strengthened
- the group will have a strengthened sense of belonging and their place in the mainstream. Optimally the partnership will drive the development of cultural competence and greater cross-cultural understanding. It will also generate:
- new ideas for shared activity.

Greater understanding and new ideas will feed back into shared experience and aligned aims and the virtuous circle would continue.

Conclusions

This article documents and discusses one community engagement initiative which has become static, and another which ceased before its potential could be realized. Mapping each example against the essential elements and underlying variables of community engagement reveals interesting contrasts. The two examples demonstrate the eight essential elements of Sung and Hepworth's model of engagement but also demonstrate that each element can be expressed differently.

Each example confirms the key role played by 'influence of authority' in determining the shape of the engagement and its sustainability, again through a different expression. In Alice Springs, the influence of authority was supportive; in Libraries ACT, it was much more directive. Despite differing input and outcomes, both affirm Sung and Hepworth's assessment of the 'influence of authority' and its impact on sustainability.

The Alice Springs example reveals that it is possible for an initiative to have uneven outcomes: the organization exhibits unevenness within essential elements and uneven staff cultural competence but still provides services that are of great relevance to a part of the community.

The Libraries ACT example is one where external environmental conditions effectively prevented both the continuation of community engagement and full development of cultural competence. This suggests that, for community engagement to be sustained and for full cultural competence to develop within an organization, the environment to be considered is much broader than that of the library's relationship with its user community.

The examples also have the following characteristics. Firstly, vigour is characteristic of community response, if the opportunity is in alignment with community aims. It suggests that communities are more willing to engage than libraries perhaps realize – and are perhaps more willing to be flexible than libraries are. Library inflexibility may indicate a lack of awareness of the cultural basis to a library's role, which suggests a lack of cultural competence in the cognitive domain.

Other factors that may be considered during community engagement include the proportional presence of the target group in the population, 'hierarchical equivalence', whether differing aims can facilitate

common activities, and the possibilities inherent in a virtuous circle. Each factor may suggest approaches which will enhance effectiveness.

It is worth remembering that that libraries stand to gain as much benefit from involvement with the community as the community will gain from them (Mestre 2010, Overall 2010).

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Author biography

Fiona Blackburn has worked in libraries and archives for 10 years, beginning in Alice Springs in central Australia. This is where her experience working with Aboriginal and Torres Strait Islander peoples in library services began; that position was central to the shape of her subsequent work. Experience in community development, gained prior to beginning in the information management sector, has been invaluable in her work in the sector. She has also worked in heritage and prison libraries. Currently she is a print archivist at the Australian Institute for Aboriginal and Torres Strait Islander Studies.

Abstracts

المُلخص:

الـهدف: تهدف هذه الدراسة إلى التعريف بأربعة مكتبات في أربعة بلدان أفريقية واقعة في جنوب الصحراء ودورها في نشر العلم المفتوح، كما تسعى هذه الدراسة أيضًا إلى استكشاف المُمارسات السائدة في مجال العلم المفتوح، والتأكد من مدى مُشاركة المكتبيين الأكاديميين في أنشطة العلم المفتوح، وتحديد استراتيجيات التسويق في منصات العلم المفتوح ومعرفة التحديات التي تُعيق نجاح مبدأ العلم المفتوح في الدول المذكورة.

المنهجية: استرشدت هذه الدراسة بمدرسة الفكر الكيفي حيث رسم الباحث صورة تفصيلية شاملة وقام بتحليل التقارير التفصيلية وسلوكيات الدراسة في ظل ظروف الدراسة الطبيعية، ووظفت الدراسة العديد من دراسات الحالة؛ لتقييم كيفية ترويج المكتبات الأكاديمية في غانا، ونيجيريا، وتنزانيا، وأوغندا للعلم المفتوح، وتم الاطلاع على الكتب، والمقالات المنشورة في المجلات؛ للتأكد من مدى تبني مبدأ العلم المفتوح.

النتائج: إن عدد المجلات الدراسية المُتخصصة المُتاحة للوصول الحر في الأكاديميات الأفريقية قليل في غانا، ونيجيريا، وتنزانيا، وأوغندا، واستُخدمت المستودعات المؤسسية المفتوحة على نطاق ضيق؛ لحفظ المحتوى الرقمي، مثل: رسائل الماجستير والدكتوراه والمواد المتاحة عن الإدارة والتراث وأعمال المؤتمرات والمقالات قبل وبعد نشرها وإتاحتها للجمهور في بعض المؤسسات الأكاديمية في أفريقيا.

على الصعيد العملي: وبغض النظر عن المزايا المتنوعة، لم يكن طريق الدول النامية إلى العلم المفتوح سلسًا مُمهدًا بسبب السياسات، وتوضح الخبرات أن المستودعات ستعمل فقط وفق قدراتها عند الحاجة لذلك، ولكن في العديد من الأحيان تبدأ مُبادرات العلم المفتوح قبل وضع السياسات المطلوبة.

الجانب الجديد/القيمة: تتناول هذه الدراسة بعض الموضوعات المُرتبطة بمبدأ العلم المفتوح في البلدان الأفريقية الواقعة في جنوب الصحراء وتضعها في وثيقة متسقة واحدة يُمكن أن يرجع إليها صُناع السياسات في أي مؤسسة ترغب في عمل منصة للعلم المفتوح.

قتطفات

Reproductive health information needs and maternal literacy in the developing world

ما نحتاجه من معلومات عن الصحة الإنجابية ومحو أمية الأمهات في الدول النامية:

Margaret Sullivan Zimmerman

العدد رقم 3،43 من مجلة الإفلا المُتخصصة:

المُلخص:

يُحلل هذا المقال علاقة التعليم ومحو الأمية بالصحة الإنجابية في الدول النامية، ويستكشف مُتطلبات النساء في هذه المناطق من المعلومات المُتعلقة بالصحة الإنجابية، إن أكثر من800 امرأة تموت كل يوم لأسباب مُتعلقة بالحمل، 99% منهم في الدول النامية، كان 16،000 طفل تحت سن الخامسة يموتون يوميًا عام 2015، ويستعرض المقال في البداية بشكل مُمنهج وبتوسع الكتب التي تُناقش العلاقة بين إلمام الأمهات بالقراءة وصحة الأم والطفل ويُحلل محتوى هذه الكتب؛ بهدف معرفة احتياجات أمهات الدول النامية من المعلومات المُتعلقة بالصحة الإنجابية، يلي ذلك مُناقشة بعض الوسائل التي نجحت في رأب هذه الفجوة وتلبية احتياجات الأسر من المعلومات التي تلزمهم لتنظيم الأسرة، والوقاية من الإيدز/فيروس نقص المناعة المُكتسبة، والأمراض المنقولة عبر الاتصال الجنسي، والعنف ضد المرأة، الثقافة الجنسية، والمعلومات عن الحمل، ورعاية التوليد في الحالات الطارئة.

Role of Academic Libraries in Propagating Open Science in Sub-Saharan Africa Countries

دور المكتبات الأكاديمية في نشر العلم المفتوح في البلدان الأفريقية الواقعة في جنوب الصحراء:

Peter Onauphoo Siyao, Fidelia M. Whong, Ebenezer Martin-Yeboah Yeboah, Annet Namamonde Namamonde

العدد رقم 3،43 من مجلة الإفلا المُتخصصة:

Perspectives on university library automation and national development in Uganda

التشغيل الآلي للمكتبة الجامعية وخُطة التنمية الوطنية في أوغندا:

Robert Stalone Buwule, Shana Rachel Ponelis

العدد رقم 43،3 من مجلة الإفلا المُتخصصة:

المُلخص:

تضم المكتبات الأكاديمية في الجامعات كم هائل من الأبحاث المُمكن استخدامها في أغراض تنموية؛ لدعم التدريس، والتعلّم، والبحث، والابتكار، وتوعية المُجتمع، ويتضمن التشغيل الآلي للمكتبات تبني نظم مكتبية مُتكاملة تُمكّن من الوصول إلى مصادر معرفة عالمية ومحلية؛ لمواجهة التحديات المحلية، والإقليمية، والتي تواجه التنمية المحلية، وباتباع أساليب مُتسلسلة ومُختلطة تم عمل دراسة حالة على جامعة أوغندا العامة، جامعة كيامبوجو، وبحثت الدراسة مفاهيم المكتبيين، والعاملين في مجال المعلومات، وغيرهم من المُستفيدين من الجامعة فيما يتعلق بالتشغيل الآلي للمكتبة والإسهام في تنفيذ الخُطة الوطنية، وأكدت نتائج الدراسة أن النُظم المكتبية المُتكاملة طورت تشغيل المكتبة وتلعب دورًا هامًا في دعم الخُطة الوطنية، كما تُلقي هذه الدراسة الضوء على التحديات المُستمرة التي تواجه استخدام النظم المكتبية المُتكاملة في الدول النامية، مثل: أوغندا، والتي إن بحثناها يُمكن أن تُطور الخدمات المعلوماتية المُقدمة من أجل تغيير وضع الأمة الاجتماعي والاقتصادي.

Effect of knowledge management on service innovation in academic libraries

أثر إدارة المعرفة على ابتكار خدمات في المكتبات الأكاديمية:

Anwarul Islam, Naresh K Agarwal, Mitsuru Ikeda

العدد رقم 43،3 من مجلة الإفلا المُتخصصة:

المُلخص:

ثُعد الإدارة الفعالة للمعارف الموجودة في مؤسسة عاملاً أساسيًا في الابتكار، وقد بدأت المكتبات الأكاديمية اكتشاف أهمية إدارة المعارف في هذا الصدد، ومع ذلك فهناك بعض الدراسات الكمية حول إدارة المعارف وابتكار الخدمات في المكتبات، توصل Islam، وAgarwal، وIkeda إلى إطار عمل لإدارة المعارف؛ من أجل ابتكار خدمات في المكتبات الأكاديمية، تبحث هذه الدراسة من خلال 107 مكتبي من 39 دولة أثر إدارة المعارف (ومراحلها) على ابتكار خدمات جديدة، وتوصلت الدراسة إلى أن لخلق المعارف والوصول إليها واستخدامها أثر بالغ الأهمية على ابتكار خدمات جديدة في المكتبات الأكاديمية على عكس مُشاركة المعارف ونقلها الذي ليس له أثر يُذكر على ابتكار خدمات، كما وضحت الدراسة أيضًا العلاقة بين

مراحل إدارة المعارف، وتؤكد نتائج الدراسة أن من شأن إدارة المعارف مُساعدة المكتبات الأكاديمية في عملية ابتكار خدمات جديدة من خلال مراحل دورة إدارة المعرفة.

Approaches to impact evaluation in academic libraries: A review of a new ISO standard

التأثير على التقييم في المكتبات الأكاديمية: مُراجعة لمعيار جديد من معايير الأيزو:

Karin De Jager

العدد رقم 43،3 من مجلة الإفلا المُتخصصة:

المُلخص:

يُراجع هذا المقال ويُلخص معيار الأيزو 16439 "المعلومات والتوثيق: أساليب وإجراءات تقييم أثر المكتبات"، والذي يجمع الأفكار الحديثة؛ لإجابة السؤال الصعب في البحث عن دليل على أن المكتبات الأكاديمية تُحدث فرقًا ملموسًا في حياة مُستخدميها، سيُهم هذا المقال المكتبيين والعاملين في المكتبات والذين يناضلون مع الحاجة المُلحة لإظهار قيمة خدماتهم.

Community engagement, cultural competence and two Australian public libraries and Indigenous communities

المُشاركة المُجتمعية، والكفاءة الثقافية واثنتين من مكتبات أستراليا العامة ومُجتمعات الشعوب الأصلية:

Fiona Blackburn

العدد رقم 43،3 من مجلة الإفلا المُتخصصة:

المُلخص:

يُحلل الكاتب مثالين للمُشاركة المُجتمعية في المكتبات العامة الأسترالية باستخدام نموذج (Sungand Hepworth) (2013) للمُشاركة المُجتمعية في المكتبات العامة وتعريف الكفاءة الثقافية في المكتبة وعلوم المعلومات، باستخدام المجالات التي تُظهر وتنمي هذه الكفاءة.

ويتوسع الكاتب في المثال الثاني في توضيح الآثار الحميدة للمُشاركة المُجتمعية، ويُناقش "كفاءة التدرج الوظيفي"، والتواجد النسبي لكل جماعة من الشعب وطبيعة أهداف كل منها كونها عوامل تؤثر على المُشاركة المُجتمعية، تُعد هذه الثقافة عاملاً تعول عليه المُجتمعات للمُشاركة والتداخل مع المكتبات والمُجتمع الأوسع وستتجاوب المُجتمعات مع الاتجاه إلى المُشاركة إذا مكنها الوصول إلى تطلعاتها، ونجد ذلك واضحًا في المثالين المُقدمين.

摘要

Reproductive health information needs and maternal literacy in the developing world

发展中国家的生殖健康信息需求与女性读写能力

玛格丽特·沙利文·齐默尔曼

国际图联期刊，43-3, 227-241

摘要：

本文分析了发展中国家读写能力与教育之间的关系，二者与生殖健康息息相关并互相交织，同时，文章探寻了该地区女性对生殖健康相关信息的需求。每天全球超过800名女性死于怀孕并发症，其中99%来自发展中国家。2015年，每天有16000名五岁以下的儿童死亡。本文首先系统回顾了大量探讨女性读写能力和母婴健康之间关系的文学经典。以解密发展中国家女性对生殖健康相关信息的需要为目标，文章对这些经典作品进行了内容分析。接着，本文对减轻这些信息差距的成功干预措施进行了讨论。其中一些干预措施满足了计划生育、艾滋病、性病传染、针对妇女的暴力行为、性行为、怀孕教育和产科急救等相关信息的需求。

Role of Academic Libraries in Propagating Open Science in Sub-Saharan Africa Countries

撒哈拉以南非洲国家的高校图书馆在宣传开放科学中的作用

彼得·欧瑶福·斯瑶，菲迪利亚·M·汪，埃比尼泽·马丁耶博阿·耶博阿，阿内·纳马蒙得·纳马蒙得

国际图联期刊，43-3, 242-255

摘要：

目的：本研究旨在审查四个撒哈拉以南国家(SSA)的图书馆及其在宣传开放科学中的作用。研究同时尝试探寻现有的开放科学实践，了解高校图书馆在开放科学活动中的参与水平，识别开放科学平台在市场化中的策略，同时列举阻碍这些国家开放科学成功发展的挑战。

方法论：本研究以定性学派的思想为指导，研究者建立一个复杂的、整体的图景，分析语言用词，汇报信息提供者的详细观点，在自然场景下开展研究。研究运用了多种案例研究的方法，以评估加纳、尼日利亚、坦桑尼亚和乌干达的高校图书馆是如何在各自国家推广开放科学的。研究明确检视了包括书籍、期刊文章和网络资源在内的实证文献，以确认开放科学的采纳程度。

发现：在加纳、尼日利亚、坦桑尼亚和乌干达的大多数院校，很少有学术期刊有公开获取的信息渠道。尽管尚未被广泛采用，开放信息渠道"机构知识库(IRs)已经在非洲的一些学术机构被用于保存和公开数字资源，例如博士硕士学位论文、行政及遗产资料、会议论文及期刊文章的预印版和印刷版。

实践应用：尽管多有裨益，但由于政策问题，发展中国家走向开放科学之路并不平坦。经验显示，一个知识库，只有推广它的政令下达，它的功能才能充分发挥。然而，很多情况下，相关政策的实施早已滞后于开放科学的倡议了。

创造力/价值：本研究将撒哈拉以南非洲国家一些有关开放科学的问题形成了一个统一连贯的文本，任何想要建立开放科学平台的机构决策者都可以进行参考。

Perspectives on university library automation and national development in Uganda

关于乌干达大学图书馆自动化与国家发展的观点

罗伯特·史泰龙·布乌勒，莎娜·蕾切尔·波内利斯

国际图联期刊，43-3, 256-265

摘要：

大学的学术图书馆保存了大量可以用于发展研究的资料，以支持教学、研究、创新、社区拓展和建立伙伴关系。图书馆自动化包括采用图书馆集成系统(ILS)，有效采用该系统能获取广泛的全球和本土知识，以应对本土的、区域性的乃至全国性的发展挑战。对乌干达公立大学——坎博沟大学的案例研究，本文采用了混合序列的研究方法，通过调查图书馆员、信息工作者及其他大学利益相关者的思想观念，来探寻图书馆自动化及其对国家发展的贡献。研究结论证实，图书馆集

成系统(ILS)改进了图书馆的运作，在支持国家发展中发挥了重要作用。本文同样强调了在乌干达这样的发展中国家采用图书馆集成系统(ILS)所面临的持续挑战，如果这一问题得到解决，将为一国的社会经济转型进一步改善信息传输服务。

Effect of knowledge management on service innovation in academic libraries

高校图书馆知识管理在服务创新中的作用

安瓦尔·伊斯兰，纳雷什·K·阿加瓦尔，池田满弓

国际图联期刊，43-3, 266-281

摘要：

对组织内所有知识的有效管理是衡量创新的一个关键标准。由此，高校图书馆正开始意识到知识管理(KM)的重要性。然而，以图书馆为对象研究知识管理(KM)与服务创新的定量分析很少。伊斯兰、阿加瓦尔和池田以知识管理的框架来研究高校图书馆中的服务创新。通过对来自39个国家的107名图书馆员进行调查，本文探索了知识管理(和知识管理周期阶段)对服务创新的影响。本文发现，在高校图书馆里，知识捕捉/创造和知识应用/使用都深刻地影响着服务创新。创新中的知识分享和传递作用被发现是无足轻重的。本文也展现了不同知识管理阶段之间的关系。这些发现支撑起了本文的基本框架，它们应该通过利用知识管理循环的周期，来帮助高校图书馆进行服务创新。

Approaches to impact evaluation in academic libraries: A review of a new ISO standard

高校图书馆影响力评估的方法：一种全新国际标准的综述

凯琳·德·雅格

国际图联期刊，43-3, 282-287

摘要：

本文是对16439国际标准的回顾和总结，《信息与文档——评估图书馆影响力的方法与步骤》一文集合了近来应对现实难题的观念和方法，这些观念方法都在试图寻找证明高校图书馆对其用户有实质性影响的证据。图书馆员和图书馆管理者正在努力展示其服务的价值，这种需要变得越来越紧迫，他们会从本文中找到兴趣所在。

Community engagement, cultural competence and two Australian public libraries and Indigenous communities

社区参与与文化竞争，两座澳大利亚公立图书馆与本土社区

菲奥娜·布莱克本

国际图联期刊，43-3, 288-301

摘要：

本文对两个澳大利亚公立图书馆开展社区参与的案例进行了研究，根据作者的经验，运用了桑甘德·赫普沃斯(2013)的公立图书馆社区参与模型、欧文沃(2009)对图书馆里文化竞争的定义和信息科学框架。这两个案例用以检验赫普沃斯发现的社区参与的特征；案例各自也都被认为是为了文化竞争，这种文化竞争以欧文沃设想作为活动空间，竞争力在此产生或发展。

从第二个案例中可以推理出一个社区参与的良性循环。组织内部的"层级对等"、人群中团体以一定比例参与活动、每个团体的目标属性，显示是可持续社区参与的重要因素。这种文化是团体参与图书馆及更广泛社区活动的资本，如果有可能满足团体的诉求，团体就会回应参与活动的方式，这在两个案例中都显而易见。

Sommaires

Reproductive health information needs and maternal literacy in the developing world

[Les besoins en informations concernant la santé reproductive et l'instruction maternelle dans les pays en développement]

Margaret Sullivan Zimmerman

IFLA Journal, 43-3, 227-241

Résumé:

Cet article propose une analyse de la relation entre instruction et éducation d'une part et santé reproductive de l'autre dans les pays en développement. Il explore les besoins des femmes de ces régions du monde en matière d'informations sur la santé reproductive. Chaque jour, plus de 800 femmes meurent de causes ayant un rapport avec la grossesse, 99% d'entre elles vivant dans des pays en développement. En 2015, 16 000 enfants de moins de cinq ans sont morts chaque jour. Cet article examine d'abord de façon systématique les principaux ouvrages consacrés à la relation entre l'instruction maternelle et la santé de la mère et de l'enfant. Il effectue une analyse du contenu dans le but de déterminer quels sont les besoins des femmes des pays en développement en matière d'informations concernant la santé reproductive. Ensuite, il aborde les interventions qui ont contribué à réduire les écarts. Certaines de ces interventions ont permis de répondre aux besoins en informations concernant le planning familial, le virus HIV/SIDA, les infections sexuellement transmissibles, les violences contre les femmes, la sexualité, l'éducation au sujet de la grossesse et les soins obstétriques d'urgence.

Role of Academic Libraries in Propagating Open Science in Sub-Saharan Africa Countries

[Le rôle des bibliothèques universitaires dans la propagation du libre accès à l'information scientifique dans les pays d'Afrique subsaharienne]

Peter Onauphoo Siyao, Fidelia M. Whong, Ebenezer Martin-Yeboah Yeboah, Annet Namamonde Namamonde

IFLA Journal, 43-3, 242-255

Résumé:

Objectif – L'étude s'intéresse aux bibliothèques universitaires dans quatre pays d'Afrique subsaharienne et à leur rôle dans la propagation du libre accès à l'information scientifique. Elle s'intéresse également aux pratiques actuelles de libre accès, détermine le niveau de participation des bibliothèques universitaires aux activités dans ce cadre, identifie les stratégies utilisées pour faire connaître les plateformes de libre accès à l'information scientifique et répertorie les obstacles qui entravent le succès de ce libre accès dans les pays en question.

Méthodologie – L'étude est basée sur une méthode de réflexion qualitative, dans laquelle le chercheur élabore une image holistique complexe, analyse des termes, rapporte les opinions détaillées d'informateurs et mène ses travaux dans un cadre naturel. Elle utilise la systématique d'une recherche basée sur des études de cas multiples pour déterminer comment les bibliothèques universitaires au Ghana, au Nigeria, en Tanzanie et en Ouganda font la promotion du libre accès à l'information scientifique dans ces pays respectifs. Des documents empiriques tels que livres, articles de revues et sites web sont étudiés avec soin pour évaluer le niveau d'adoption de ce libre accès.

Conclusions – Il existe peu de revues savantes auxquelles la plupart des universités africaines au Ghana, au Nigeria, en Tanzanie et en Ouganda peuvent accéder librement. Une fois de plus, quoique n'étant pas massivement adoptés, des dépôts institutionnels en libre accès sont utilisés pour conserver et publier les contenus numériques dans certains instituts universitaires en Afrique, par exemple thèses et mémoires, documents administratifs et patrimoniaux, rapports de conférences ainsi que prépublications et postpublications d'articles de revues.

Implications pratiques – En dépit des divers avantages, le chemin que doivent suivre les pays en développement pour avoir libre accès à l'information scientifique est plein d'embûches, en raison des problèmes politiques. Les expériences suggèrent notamment qu'un dépôt peut uniquement fonctionner à pleine capacité quand il existe un mandat d'exploitation pour l'alimenter. Cependant, dans de nombreux cas, des initiatives de libre accès à l'information scientifique sont mises en œuvre bien avant que des politiques appropriées n'aient été formulées.

Originalité/valeur – Cette étude aborde certaines questions importantes au sujet du libre accès à l'information scientifique dans les pays d'Afrique subsaharienne dans un document unique et cohérent, qui devrait pouvoir servir de référence aux décideurs politiques de toute institution souhaitant mettre en place une plateforme de libre accès à l'information scientifique.

Perspectives on university library automation and national development in Uganda

[Perspectives sur l'automatisation des bibliothèques universitaires et le développement national en Ouganda]

Robert Stalone Buwule, Shana Rachel Ponelis

Résumé:

Les bibliothèques universitaires conservent des volumes importants de recherches qui peuvent être utilisés à des fins de développement pour soutenir l'enseignement, l'apprentissage, la recherche, l'innovation, la sensibilisation des communautés et les partenariats. L'automatisation des bibliothèques comprend l'adoption de systèmes bibliothécaires intégrés (SBI). Le fait d'adopter un SBI permet un accès global aux sources mondiales et locales de connaissances pour répondre aux défis locaux, régionaux et nationaux en matière de développement. En utilisant des méthodes séquentielles mixtes dans une étude de cas portant sur une université publique ougandaise, l'université Kyambogo, cet article examine les perceptions qu'ont les bibliothécaires, les professionnels de l'information et les autres parties prenantes universitaires de l'automatisation des bibliothèques et de sa contribution au développement national. Les résultats confirment que les SBI améliorent le fonctionnement des bibliothèques et jouent un rôle important dans le soutien du développement national. Cet article s'intéresse aussi aux défis permanents que représente l'adoption des SBI dans les pays en développement tels que l'Ouganda, qui, s'ils sont pris en compte, pourraient contribuer à améliorer encore les services d'information mis à disposition afin de permettre une transformation socioéconomique de la nation.

Effect of knowledge management on service innovation in academic libraries

[L'effet de la gestion des connaissances sur l'innovation en matière de services dans les bibliothèques universitaires]

Anwarul Islam, Naresh K Agarwal, Mitsuru Ikeda

Résumé:

Une gestion efficace de toutes les connaissances détenues au sein d'une organisation est un critère essentiel d'innovation. Les bibliothèques universitaires commencent à réaliser l'importance de la gestion des connaissances (GC) à cet égard. Cependant, il existe peu d'études quantitatives portant sur la GC et l'innovation en matière de services dans le contexte des bibliothèques. Les auteurs Islam, Agarwal et Ikeda ont conçu un dispositif de gestion des connaissances favorisant l'innovation en matière de services dans les bibliothèques universitaires (GCISB). Par le biais d'une enquête auprès de 107 bibliothécaires de 39 pays, cette étude a examiné l'effet de la GC (et de ses différentes phases) sur l'innovation en matière de services. L'enquête a permis de constater que la collecte/création et l'application/l'utilisation des connaissances ont toutes un impact significatif sur cette innovation au sein des bibliothèques universitaires. L'effet du partage et du transfert des connaissances sur l'innovation s'est révélé négligeable. L'étude a aussi démontré la relation entre les phases de GC. Les conclusions confirment la validité du dispositif GCISB. Il devrait aider les bibliothèques universitaires dans le processus d'innovation en matière de services en mettant à profit les phases du cycle de GC.

Approaches to impact evaluation in academic libraries: A review of a new ISO standard

[Stratégies d'évaluation de l'impact des bibliothèques universitaires: examen d'une nouvelle norme ISO]

Karin De Jager

Résumé:

Cet article examine et résume la norme ISO 16439, *« Information et documentation – Méthodes et procédures pour évaluer l'impact des bibliothèques »,* qui rassemble des réflexions et stratégies récentes concernant la difficulté de rechercher et trouver des preuves qu'une bibliothèque universitaire fait véritablement une différence tangible pour ses usagers. Cet article intéressera tout aussi bien les bibliothécaires que les gestionnaires de bibliothèques qui luttent avec le besoin croissant et impératif de démontrer la valeur de leurs services.

Community engagement, cultural competence and two Australian public libraries and Indigenous communities

[Mobilisation communautaire, compétence culturelle et deux bibliothèques publiques australiennes et des communautés indigènes]

Fiona Blackburn

Résumé:

Deux exemples de mobilisation communautaire dans des bibliothèques publiques australiennes, tirés de l'expérience de l'auteure, sont analysés à l'aide du modèle de mobilisation communautaire de Sung et Hepworth (2013) pour les bibliothèques publiques et la définition faite par Overall (2009) de la compétence culturelle dans le cadre de la bibliothéconomie et des sciences de l'information. La présence d'éléments caractéristiques de mobilisation communautaire selon Sung et Hepworth est examinée; chaque exemple est aussi étudié sur le plan de la compétence culturelle, en utilisant les domaines dont Overall dit qu'il s'agit des sites où cette compétence se trouve ou est développée.

Un cercle vertueux de mobilisation communautaire est déduit par extrapolation du second exemple. Il est suggéré que « l'équivalence hiérarchique » entre organisations, une présence proportionnelle des groupes dans une population et la nature des objectifs de chaque groupe, sont des facteurs supplémentaires pour favoriser une mobilisation communautaire durable. Le fait que la culture est un atout dans lequel les communautés puisent pour collaborer avec les bibliothèques et avec la communauté plus large, et le fait que les communautés réagissent aux initiatives de mobilisation si la possibilité de répondre aux aspirations communautaires leur est offerte, sont une évidence dans chacun des exemples.

Zusammenfassungen

Reproductive health information needs and maternal literacy in the developing world

(Informationsbedarf zur Fortpflanzungsgesundheit und Bildungsstand von Müttern in Entwicklungsländern)

Margaret Sullivan Zimmerman

Zusammenfassung:

Dieser Artikel liefert eine Analyse des Zusammenhangs von Alphabetisierung und Bildung in Entwicklungsländern mit der Fortpflanzungsgesundheit und untersucht, welchen Informationsbedarf Frauen in dieser Region in Fragen der Fortpflanzungsgesundheit haben. Jeden Tag sterben mehr als 800 Frauen aus Gründen, die mit der Schwangerschaft zusammenhängen, 99 Prozent davon in Entwicklungsländern. 2015 starben jeden Tag 16.000 Kinder unter 5 Jahren. Dieser Artikel enthält eine systematische Übersicht der umfassenden Literatur, die sich mit dem Zusammenhang zwischen Bildungsstand der Mütter und der Gesundheit von Mutter und Kind befasst. Um den Informationsbedarf von Frauen in Entwicklungsländern in Bezug auf Fragen der Fortpflanzungsgesundheit zu erfahren, wurde eine Inhaltsanalyse durchgeführt. Anschließend werden Interventionen diskutiert, die das Informationsniveau erfolgreich verbessern konnten. Einige dieser Interventionen deckten den Informationsbedarf in Fragen der Familienplanung, HIV/AIDS, sexuell übertragbarer Infektionen, Gewalt gegen Frauen, Sexualität, Schwangerschaftsaufklärung und Notfall-Geburtshilfe.

Role of Academic Libraries in Propagating Open Science in Sub-Saharan Africa Countries

(Die Rolle von Universitätsbibliotheken bei der Verbreitung von Open Science in Subsahara-Afrika)

Peter Onauphoo Siyao, Fidelia M. Whong, Ebenezer Martin-Yeboah Yeboah, Annet Namamonde Namamonde

Zusammenfassung:

Ziel - Diese Studie befasst sich mit der Untersuchung von Bibliotheken in vier Ländern von Subsahara-Afrika (SSA) und ihrer Rolle bei der Verbreitung von Open Science. Ein weiteres Ziel der Studie ist die Untersuchung vorhandener Open-Science-Praktiken, die Ermittlung des Partizipationsgrads von Universitätsbibliotheken bei Open-Science-Aktivitäten, Feststellung der für das Marketing von Open-Science-Plattformen verwendeten Strategie herausfinden und Benennung der Herausforderungen, die den Erfolg von Open Science in den besagten Ländern behindern.

Methodologie - Grundlegend für die Studie war der qualitative Denkansatz, bei dem der Wissenschaftler ein komplexes, holistisches Bild erstellt, eine Wortanalyse durchführt und detaillierte Ansichten von Informanten berichtet, wobei die Studie in einem natürlichen Umfeld durchgeführt wird. Um zu verstehen, wie Universitätsbibliotheken in Ghana, Nigeria, Tansania und Uganda Open Science in ihrem Land fördern, verwendete die Studie einen Ansatz nach der Fallstudienmethode mit mehreren Fallstudien. Dabei wurden empirische Dokumente, wie Bücher, Zeitschriftenartikel und Websites

geprüft, um den Grad der Rezeption von Open Science festzustellen.

Ergebnisse - In den meisten Universitäten Ghanas, Nigerias, Tansanias und Ugandas gibt es einige wenige wissenschaftliche Zeitschriften mit Open Acces. Wenn auch nicht in großem Umfang, so wurden auch hier Institutionelle Repositorien (IR) verwendet, um den digitalen Inhalt in einigen akademischen Einrichtungen in Afrika zu erhalten und zu veröffentlichen, beispielsweise Examensarbeiten und Dissertationen, administratives Material und Kulturerbe, Tagungsberichte und Preprints und Postprints von Zeitschriftenartikeln.

Praktische Implikationen - Trotz der zahlreichen Vorteile ist der Weg von Entwicklungsländern zu Open Science aufgrund fehlender Richtlinien bislang noch sehr holprig. Erfahrungsgemäß funktioniert ein Repositorium beispielsweise nur dann optimal, wenn ein Mandat vorliegt, Publikationen dort einzupflegen. In vielen Fällen wurden Open-Science-Initiativen implementiert, lange bevor die entsprechenden Verfahrensregeln definiert wurden.

Originalität/Wert - Diese Studie führt wichtige Fragen zu Open Science in SSA-Ländern in einem einzigen kohärenten Dokument zusammen, das Entscheidungsträgern von Institutionen, die die Einrichtung einer Open-Science-Plattform anvisieren, als Hilfsmittel dienen könnte.

Perspectives on university library automation and national development in Uganda

(Perspektiven zur Automatisierung von Universitätsbibliotheken und zur nationalen Entwicklung in Uganda)

Robert Stalone Buwule, Shana Rachel Ponelis

IFLA-Journal, 43-3, 256-265

Zusammenfassung:

In Universitätsbibliotheken lagern Unmengen von Forschungsergebnissen, die zu Entwicklungszwecken bei der Unterstützung von Lehre, Lernen, Forschung, Innovation, Weiterentwicklung von Gemeinden und für Partnerschaften genutzt werden können. Voraussetzung für die Bibliotheksautomatisierung ist der Aufbau eines integrierten Bibliothekssystems (Integrated Library System, ILS). Der effektive Einsatz eines ILS bietet einen breiten Zugang zu weltweiten und lokalen Wissensquellen, um lokale, regionale und nationale Entwicklungsherausforderungen zu

meistern. Durch die Anwendung mehrerer Methoden in einer Fallstudie einer ugandischen staatlichen Universität, der Kyambogo University, hat diese Studie die Sichtweisen von Bibliothekaren, Informationsspezialisten und anderen an der Bibliotheksautomatisierung und ihrem Beitrag zur nationalen Entwicklung Beteiligten an der Universität untersucht. Die Ergebnisse bestätigen, dass das ILS den Bibliotheksbetrieb verbessert und eine wichtige Rolle bei der Unterstützung der Entwicklung des Landes spielt. Die Studie betont auch die nach wie vor bestehenden Herausforderungen bei der Einführung eines ILS in Entwicklungsländern wie Uganda, welches jedoch, wenn es einmal eingeführt wurde, die Informationsbereitstellung zur Herbeiführung des sozial-ökonomischen Wandels des Landes wesentlich verbessern kann.

Effect of knowledge management on service innovation in academic libraries

(Die Auswirkung des Wissensmanagements auf die Innovation von Dienstleistungen in Universitätsbibliotheken)

Anwarul Islam, Naresh K Agarwal, Mitsuru Ikeda

IFLA-Journal, 43-3, 266-281

Zusammenfassung:

Das effektive Wissensmanagement in einer Organisation ist der Schlüssel für Innovation. Universitätsbibliotheken beginnen allmählich die Bedeutung des Wissensmanagements in diesem Zusammenhang zu verstehen. Es gibt bisher nur wenige quantitative Studien, die Wissensmanagement und Innovation von Dienstleistungen im Zusammenhang mit Bibliotheken untersuchen. Islam, Agarwal und Ikeda haben einen Rahmen für Wissensmanagement zur Innovation von Dienstleistungen in Universitätsbibliotheken (KMSIL) geschaffen. Durch die Befragung von 107 Bibliotekaren in 39 Ländern untersucht die Studie die Auswirkungen des Wissensmanagements (und dessen Zyklusphasen) auf die Innovation von Dienstleistungen. Die Erfassung und Schaffung von Wissen und die Anwendung und Nutzung von Wissen haben, so fand die Studie heraus, einen signifikanten Effekt auf die Innovation von Dienstleistungen in Universitätsbibliotheken. Der Austausch und die Weiterleitung von Wissen hatten hingegen keinen signifikanten Effekt. Die Studie zeigte auch den Zusammenhang zwischen den Phasen des Wissensmanagements auf. Diese Ergebnisse unterstützen den KMSIL-Rahmen. Sie können Universitätsbibliotheken den Prozess der Innovation von

Dienstleistungen erleichtern, indem die Phasen des Wissensmanagement-Zyklus genutzt werden.

Approaches to impact evaluation in academic libraries: A review of a new ISO standard

(Ansätze zu einer Wirkungsuntersuchung in Universitätsbibliotheken: Review eines neuen ISO-Standards)

Karin De Jager

IFLA-Journal, 43-3, 282-287

Zusammenfassung:

Dieser Artikel ist ein Review und eine Zusammenfassung des ISO-Standards16439, *„Information und Dokumentation - Methoden und Verfahren zur Bestimmung der Wirkung von Bibliotheken",* in dem neue Auffassungen und Ansätze zu der schwierigen Frage nach der Suche und dem Finden von Belegen dafür zusammengestellt wurden, dass eine Universitätsbibliothek tatsächlich einen spürbaren Unterschied für ihre Nutzer darstellt. Bibliothekare und Bibliotheksmanagement, die sich mit dem stets stärker werdenden Imperativ herumschlagen, den Wert ihrer Arbeit zu beweisen, werden sich sicher für diesen Artikel interessieren.

Community engagement, cultural competence and two Australian public libraries and Indigenous communities

(Engagement von Gemeinschaften, kulturelle Kompetenz, zwei öffentliche Bibliotheken in Australien und zwei Gemeinden der Aborigines)

Fiona Blackburn

IFLA-Journal, 43-3, 288-301

Zusammenfassung:

Dieser Beitrag enthält eine Analyse von zwei Beispielen (aus eigener Erfahrung der Autorin) für das Engagement von Gemeinschaften in australischen öffentlichen Bibliotheken, und zwar anhand des Modells von Sungand Hepworth (2013) über das Engagement von Gemeinschaften für öffentliche Bibliotheken und der Definition einer kulturellen Kompetenz in einer Bibliothek und einem Rahmen für Informationswissenschaften von Overall (2009). Die Beispiele wurden anhand der von Sung und Hepworth identifizierten Charakteristika für Gemeinschaftsengagement untersucht, und für beide Beispiele wurde auch die kulturelle Kompetenz anhand der Domänen untersucht, die Overall als die Orte postuliert, an denen die Kompetenz sichtbar oder entwickelt wird.

Aus dem zweiten Beispiel wird eine deutliche Aufwärtsdynamik des gemeinschaftlichen Engagements hochgerechnet. Die „hierarchische Äquivalenz" zwischen Organisationen, die proportionale Präsenz einer Bevölkerungsgruppe und die Art der Ziele jeder Gruppe sind, so meint die Studie, ein weiterer Faktor für ein nachhaltiges Engagement einer Gemeinschaft. Dass die Kultur ein Schatz ist, aus dem Gemeinschaften schöpfen können, um sich für Bibliotheken und die größere Gemeinschaft einzusetzen, und dass Gemeinschaften auf dieses Engagement ansprechen, wenn sie dadurch die Möglichkeit erhalten, die Ziele der Gemeinschaft zu verwirklichen, wird in beiden Beispielen deutlich.

Рефераты статеи

Reproductive health information needs and maternal literacy in the developing world

(Потребность в информации о репродуктивном здоровье и грамотность матерей в развивающихся странах)

Маргарет Салливан Циммерманн

IFLA Journal, 43-3, 227-241

Аннотация:

В статье проводится анализ взаимоотношений грамотности и уровня образования в странах развивающегося мира в контексте их переплетения с репродуктивным здоровьем, а также исследуется потребность женщин из данного региона в информации, касающейся репродуктивного здоровья. Ежедневно более 800 женщин умирают вследствие причин, связанных с беременностью, и 99 процентов таких случаев происходит в развивающихся странах. В 2015 г. ежедневно умирали 16 000 детей в возрасте до пяти лет. В начале статьи приводится систематизированный обзор широкого перечня общепризнанных трудов, раскрывающих зависимость между уровнем грамотности матери и материнской и детской смертностью. Выполнен анализ содержания, целью которого является расшифровка потребностей женщин развивающегося мира в информации, относящейся к репродуктивному здоровью. Затем обсуждаются случаи вмешательства, в которых вышеназванные пробелы

были с успехом сокращены. В некоторых из таких случаев имело место удовлетворение запросов относительно информации, касающейся планирования семьи, ВИЧ/СПИД, инфекций, передаваемых половым путем, насилия по отношению к женщинам, сексуальности, знаний о беременности, а также экстренной акушерской помощи.

Role of Academic Libraries in Propagating Open Science in Sub-Saharan Africa Countries

(Роль библиотек учебных заведений в продвижении идей открытой науки в странах Тропической Африки)

Питер Онаупху Сияо, Фиделя М. Вонг, Эбенезер Мартин-Иебоа Иебоа, Аннет Намамонде Намамонде

Аннотация:

Цель: Задача данной работы заключается в изучении библиотек четырех стран Тропической Африки и их роли в распространении открытой науки. Здесь также осуществляется попытка изучения существующих методов открытой науки, определения уровня участия библиотек учебных заведений в мероприятиях, связанных с открытой наукой, установления стратегий, используемых для продвижения платформ открытой науки, а также перечисления проблем, препятствующих успешному развитию открытой науки в заданных странах.

Методология: Исследование проводилось в соответствии с учением о качественном подходе, когда исследователь формирует комплексную, всестороннюю картину, анализирует слова, представляет отчет о развернутых точках зрения опрашиваемых лиц и проводит исследование в естественной обстановке. В рамках настоящей работы использовался метод исследования множества примеров с целью определить, каким образом библиотеки учебных заведений в Гане, Нигерии, Танзании и Уганде способствуют продвижению идей открытой науки в своих странах. Был выполнен четкий обзор фактических ресурсов, таких как книги, журнальные статьи и интернет-сайты с целью определения уровня внедрения открытой науки.

Результаты: Для большинства учебных заведений Африки в Гане, Нигерии, Танзании и Уганде в открытом доступе имеется несколько научных журналов. Опять же, хоть это еще не принято в массовом порядке, открытые хранилища информации учреждений использовались в некоторых учебных заведениях Африки для хранения и публикации в электронном виде материалов, таких как тезисы и диссертации, административные материалы и информация, относящаяся к культурному наследию, материалы конференций, а также предварительные и окончательные варианты журнальных статей.

Практическое значение: Несмотря на различные положительные аспекты, путь развивающихся стран к открытой науке не был гладким в связи с вопросами политического плана. Опыт подсказывает, что, например, хранилище информации будет функционировать в полном объеме только в случае издания распоряжения, направленного на его популяризацию. При этом во многих случаях идеи, связанные с открытой наукой, реализуются задолго до формирования соответствующих установок.

Новизна/значение: В рамках настоящего исследования были подняты и собраны в единый связный документ некоторые актуальные вопросы, касающиеся открытой науки в странах Тропической Африки, и этот документ может быть использован руководителями любого учреждения при создании открытой научной платформы.

Perspectives on university library automation and national development in Uganda

(Перспективы автоматизации библиотеки университета и национальное развитие в Уганде)

Роберт Сталоун Бувул, Шана Рейчел Понелис

Аннотация:

Библиотеки университетов хранят большие объемы результатов исследований, которые могут быть использованы для поддержки и развития процессов преподавания, обучения, научных исследований, инноваций, работы с местным населением, направленной на просвещение и партнерство. Автоматизация библиотек включает в себя внедрение автоматизированных библиотечных информационных систем (АБИС). Эффективное внедрение АБИС представляет широкий доступ к глобальным и локальным источникам знаний, помогающих решать серьезные задачи, связанные с развитием в локальном, региональном и государственном масштабах. В рамках данной работы проводилось исследование на конкретном примере государственного университета в Уганде, Университета Кьямбого, при этом использовался

принцип последовательных смешанных методов, изучалось отношение библиотекарей, работников в сфере информации и иных ключевых лиц в рамках университета к автоматизации библиотеки и ее роли в государственном развитии. Полученные результаты подтвердили, что система АБИС оказывает положительное влияние на деятельность библиотеки, а также играет важную роль в содействии государственному развитию. В настоящей работе также отмечается, что внедрение АБИС в развивающихся странах, таких как Уганда, требует решения многочисленных задач, что, при должном отношении, может содействовать дальнейшему улучшению процесса представления информационных услуг в рамках социально-экономических преобразований в государстве.

Effect of knowledge management on service innovation in academic libraries

(Влияние управления знаниями на совершенствование услуг в библиотеках учебных заведений)

Анварул Ислам, Нареш К. Агарвал, Мицуру Икэда

IFLA Journal, 43-3, 266-281

Аннотация:

Эффективное управление всей информацией в рамках организации является ключевым критерием для инновации. Библиотеки учебных заведений начинают осознавать важность управления знаниями (УЗ) в данной связи. Однако существует немного количественных исследований в области УЗ и совершенствования услуг применительно к библиотекам. Ислам, Агарвал и Икэда вывели общие принципы УЗ для совершенствования услуг в библиотеках учебных заведений. На основании опроса 107 библиотекарей из 39 стран в рамках данной работы рассматривается влияние УЗ (и фаз цикла УЗ) на совершенствование услуг. В ходе исследования было выявлено, что как сбор/формирование знаний, так и применение/использование знаний оказывают ощутимое влияние на совершенствование услуг в библиотеках учебных заведений. Также было выявлено, что эффект от обмена знаниями и передачи знаний был для совершенствования несущественным. Еще данная работа демонстрирует взаимосвязь между этапами УЗ. Результаты исследования подтверждают структуру принципов управления знаниями для совершенствования услуг в библиотеках учебных заведений. Они должны помочь библиотекам учебных заведений

в процессе совершенствования услуг путем реализации этапов цикла УЗ.

Approaches to impact evaluation in academic libraries: A review of a new ISO standard

(Подходы к оценке влияния библиотек учебных заведений: Обзор нового стандарта ISO)

Карин Де Ягер

IFLA Journal, 43-3, 282-287

Аннотация:

Данная статья представляет собой обзор и краткое изложение стандарта ISO 16439 *"Информация и документация - методы и процедуры оценки влияния библиотек"*, в котором собраны воедино последние рассуждения и подходы к сложному вопросу поиска и нахождения свидетельств того, что библиотека учебного заведения в самом деле имеет существенное значение для своих пользователей. Как библиотекарям, так и руководящим работникам библиотек, которые сражаются со всевозрастающей необходимостью демонстрировать значимость своих услуг, эта статья будет интересна.

Community engagement, cultural competence and two Australian public libraries and Indigenous communities

(Взаимодействие с сообществами, культурная компетенция, две австралийские общественные библиотеки и коренное население)

Фиона Блэкберн

IFLA Journal, 43-3, 288-301

Аннотация:

Два примера взаимодействия с сообществами в австралийских общественных библиотеках, отобранные автором на основании собственного опыта, подвергаются анализу согласно модели взаимодействия сообществ с общественными библиотеками (2013) Санга и Хепворта и определения культурной компетенции в рамках библиотеки и науки об информации, автором которого является Оверол (2009). Примеры изучались на предмет соответствия характеристикам взаимодействия с сообществами, определенным Сангом и Хепвортом, также каждый пример рассматривался с точки зрения культурной компетенции с использованием

предметных сфер, которые, согласно утверждению Оверол, являются площадкой для реализации или развития данной компетенции.

Второй пример стал основанием для вывода о механизме самоусиления взаимодействия с сообществами. Сделано предположение, что "иерархическая равнозначность" организаций между собой, пропорциональное распределение участников группы среди населения и природа целей каждой группы являются дополнительными факторами стабильного взаимодействия с сообществами. В обоих примерах является очевидным, что культура является ресурсом, к которому обращаются сообщества при взаимодействии с библиотеками и широкой общественностью, и что сообщества будут отзываться на методы установления взаимодействия, если последние предлагают возможность удовлетворения чаяний сообществ.

Resúmenes

Reproductive health information needs and maternal literacy in the developing world

(Necesidades de información de salud reproductiva y alfabetización maternal en los países en vías de desarrollo)

Margaret Sullivan Zimmerman

Resumen:

Este artículo proporciona un análisis de la relación entre alfabetismo y educación en los países en vías de desarrollo en su interrelación con la salud reproductiva y explora las necesidades de información relacionadas con ésta de las mujeres de estas regiones. Cada día mueren 800 mujeres por causas relacionadas con el embarazo y el 99 por ciento de ellas proviene de países en vías de desarrollo. En 2015, murieron cada día 16.000 niños menores de cinco años. Este artículo primero presenta una revisión sistematizada del amplio canon de literatura que explora la relación entre el alfabetismo maternal y la salud de la madre y el hijo. Se realiza un análisis del contenido con el fin de descifrar las necesidades de información relacionada con la salud reproductiva de las mujeres de los países en vías de desarrollo. A continuación, se tratan las intervenciones que han demostrado ser exitosas a la hora de cubrir estos vacíos. Algunas de estas intervenciones han satisfecho las necesidades de información relativas a la planificación familiar, HIV/SIDA, infecciones de transmisión sexual, violencia de género, sexualidad, educación sobre el embarazo y atención obstétrica de emergencia.

Role of Academic Libraries in Propagating Open Science in Sub-Saharan Africa Countries

(Papel de las bibliotecas académigas en la difusión de la ciencia abierta en los países subsaharianos)

Peter Onauphoo Siyao, Fidelia M. Whong, Ebenezer Martin-Yeboah Yeboah, Annet Namamonde Namamonde

Resumen:

Objetivo – La finalidad del estudio es examinar bibliotecas en cuatro países del África subsahariana y su papel en la difusión de la ciencia abierta. El estudio intenta también explorar las prácticas existentes de ciencia abierta, determinar el nivel de participación de las bibliotecas académicas en las actividades de ciencia abierta, identificar las estrategias utilizadas en el marketing de las plataformas de ciencia abierta y enumerar los desafíos que dificultan el éxito de la ciencia abierta en los países seleccionados.

Metodología – El estudio se rigió por la Escuela de pensamiento cualitativo con la que el investigador crea una imagen holística compleja, analiza los términos e informa detalladamente sobre las opiniones de los informantes y realiza el estudio en un entorno natural. Para la realización del estudio se utilizó el método de diseño de la investigación de múltiples casos con el fin de evaluar cómo se promueve la ciencia abierta en las bibliotecas académicas de Ghana, Nigeria, Tanzania y Uganda. Se revisaron documentos empíricos, como libros, artículos periodísticos y sitios web, para determinar el nivel de adopción de la ciencia abierta.

Conclusiones – La mayoría de las academias africanas de Ghana, Nigeria, Tanzania y Uganda disponen de pocas publicaciones académicas de libre acceso. De nuevo, aunque sin adoptarse de manera masiva, los fondos institucionales de libre acceso se han utilizado para conservar y publicar los contenidos digitales de algunas instituciones académicas de África como tales, así como disertaciones, materiales administrativos y patrimoniales, actas de conferencias, además de versiones originales y finales de artículos periodísticos.

Implicaciones prácticas – A pesar de sus distintos beneficios, el camino de los países en desarrollo hacia la ciencia abierta no ha sido sencillo debido a cuestiones normativas. La experiencia sugiere que un repositorio, por ejemplo, solo funciona a plena capacidad cuando se establece un mandato para llenarlo. Sin embargo, en muchos casos, las iniciativas de ciencia abierta se implementan mucho antes de que se formulen las normativas pertinentes.

Originalidad/valor- Este estudio recopila algunos de los problemas relacionados con la ciencia abierta en los países del África subsahariana en un documento unificado y coherente que pueden consultar los responsables normativos de cualquier institución que desee establecer una plataforma de ciencia abierta.

Perspectives on university library automation and national development in Uganda

(Perspectivas para la automatización de bibliotecas universitarias y desarrollo nacional en Uganda)

Robert Stalone Buwule, Shana Rachel Ponelis

IFLA Journal, 43-3, 256-265

Resumen:

Las bibliotecas académicas de las universidades almacenan grandes volúmenes de investigación que pueden utilizarse para apoyar la enseñanza, el aprendizaje la investigación, la innovación, la divulgación en las comunidades y las asociaciones. La automatización de las bibliotecas supone la adopción de sistemas integrados de bibliotecas (ILS). La adopción efectiva de un ILS permite el acceso generalizado a fuentes de conocimiento globales y locales para solucionar los problemas de desarrollo locales, regionales y nacionales. Mediante el uso de un método secuencial combinado en el caso práctico de una Universidad pública de Uganda, la Universidad de Kyambogo, este estudio investigó las percepciones de los bibliotecarios, los trabajadores de la información y otras partes implicadas de la universidad con respecto a la automatización de las bibliotecas y su consiguiente contribución al desarrollo nacional. Las conclusiones confirmaron que el ILS mejoraba las operaciones de la biblioteca y juega un papel importante a la hora de apoyar el desarrollo nacional. Este estudio resalta también los constantes retos que supone la adopción de un ILS en países en vías de desarrollo, como Uganda, los cuales, en caso de superarse, podrían mejorar aún más la prestación de servicios de

información para la transformación socioeconómica de la nación.

Effect of knowledge management on service innovation in academic libraries

(Efectos de la gestión del conocimiento en la innovación del servicio de las bibliotecas académicas)

Anwarul Islam, Naresh K Agarwal, Mitsuru Ikeda

IFLA Journal, 43-3, 266-281

Resumen:

La gestión eficaz de todo el conocimiento de una organización es un criterio clave para la innovación. En este sentido, las bibliotecas académicas están comenzando a darse cuenta de la importancia de la gestión del conocimiento (KM). Sin embargo, hay algunos estudios cuantitativos centrados en la gestión del conocimiento y la innovación del servicio en el contexto de las bibliotecas. Islam, Agarwal e Ikeda establecieron un marco de KM para la innovación en el servicio de las bibliotecas académicas (KMSIL). A través de una encuesta realizada entre 107 bibliotecarios de 39 países, este estudio investiga el efecto de la KM (y de las fases del ciclo de la KM) en la innovación del servicio. El estudio concluye que la captura/creación de conocimiento y la aplicación/ difusión del conocimiento afectan notablemente a la innovación en las bibliotecas académicas. El estudio demostró también la relación entre las fases de la gestión del conocimiento. Las conclusiones apoyan el marco KMSIL. Deben ayudar a los bibliotecarios académicos en el proceso de innovación del servicio utilizando las fases del ciclo de KM.

Approaches to impact evaluation in academic libraries: A review of a new ISO standard

(Métodos para la evaluación del impacto en las bibliotecas académicas: Una revisión de la nueva norma ISO)

Karin De Jager

IFLA Journal, 43-3, 282-287

Resumen:

Este artículo es un análisis y un resumen de la Norma ISO 16439, *"Información y documentación - métodos y procedimientos para evaluar el impacto de las bibliotecas"* que reúne el pensamiento y los métodos

más modernos para la difícil tarea de buscar y encontrar evidencias de que, en efecto, la diferencia que suponen las bibliotecas académicas es realmente tangible para sus usuarios. Este artículo será interesante tanto los bibliotecarios como los administradores de las bibliotecas que luchan con la cada vez más imperativa necesidad de demostrar el valor de sus servicios.

Community engagement, cultural competence and two Australian public libraries and Indigenous communities

(Involucración comunitaria, competencia cultural y dos bibliotecas públicas australianas y las comunidades indígenas)

Fiona Blackburn

IFLA Journal, 43-3, 288-301

Resumen:

Dos ejemplos de involucración comunitaria en las bibliotecas públicas australianas, extraídos de la experiencia del autor, se analizan utilizando el modelo de involucración comunitaria de Sung y Hepworth (2013) para bibliotecas públicas y la definición de Overall (2009) de competencia cultural en el marco de la biblioteca y la ciencia de la información. En los ejemplos se examinan las características de involucración comunitaria identificadas por Sung y Hepworth; para cada una de ellas se tiene también en consideración la competencia cultural, utilizando los dominios que Overall sugiere como los lugares donde esta competencia se produce o se desarrolla.

Del segundo ejemplo se extrapola un círculo virtuoso de involucración comunitaria. La "equivalencia jerárquica" entre organizaciones, la presencia proporcional de un grupo en una población y la naturaleza de los objetivos de cada grupo se consideran como factores adicionales para la involucración comunitaria sostenible. En ambos ejemplos queda de manifiesto que esa cultura es un activo sobre el que las comunidades se apoyan para involucrarse con las bibliotecas y con la comunidad en su sentido más amplio, y que las comunidades responderán a los métodos de involucración si ofrecen la posibilidad de satisfacer las aspiraciones de las mismas.