

Technology mediated tools as drivers of library - researcher collaboration: the case of Botswana International University of Science and Technology (BIUST) Institutional Repository (IR)

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Abstract:

Research in every higher learning institution is essential for the growth of the intellectual content and elevation of the academic reputation. Botswana International University of Science and Technology (BIUST) is committed to undertake, promote and facilitate research and scholarly investigations that would accelerate Botswana economic growth. This means that all scholarly content produced by BIUST researchers should be capable of selling the institutional research capability.

BIUST library has developed processes, tools and services to align the university's research landscape with the dictates of the emerging information led revolution. This library developed technology mediated tools and used multiple interfaces to reach to users in their different environments. Strategies were developed to promote access and usage of research management tools. A flagship project in the BIUST research agenda has been the piloting of an institutional repository (IR).

The newly introduced services affected and impacted library space; technologies; library users; and staff at the Directorates of Research and Information Technology. The library team also had to recreate itself so as to be able to drive the needed change. This paper presents a qualitative description of these trans-formative processes and services. The discussion briefly touches on processes involved in the introduction of both the technology mediated tools and the research data management so as to demonstrate the importance of library- researcher collaboration at all stages of conducting research. The larger part of the paper is on the IR as a main vehicle that the library intends to leverage to drive the university into the Open Access information highway.

The shared experiences; conclusions and recommendations are to contribute to the global discourse on libraries as change agents in the research landscape and also to dialogue with fellow librarians on strategic positioning of people, spaces and technologies for this fourth industrial revolution.

Keywords: Academic libraries, Technology mediated tools, Institutional repository, Research data management, Botswana International University of Science and Technology.

1. Introduction

In today's technology driven era, universities are striving to boost their academic productivity through development and implementation of digital technologies in research, teaching and learning. Digital research is rapidly growing and poses challenges to university to come up with new approaches of research data management. This has given university libraries opportunity to leverage on digital technologies and then develop new processes as well as introducing new services to its users. These services are but not limited to preservation and dissemination of research output, providing online access to library resources, supporting research and sharing knowledge. The services even include libraries having to embrace new concepts like the open science agenda. Libraries are now challenged with establishing institutional repositories so as to aid parent institution to attain visibility and promote wide accessibility of research outputs on the web. This paper briefly discusses the processes involved in the introduction of both the technology mediated tools and the research data management services towards this end, it specifically focuses on the institutional repository at BIUST library as a flagship project. A good part of the paper therefore describes the process of establishing the IR as a main vehicle that the library uses to leverage to drive the university into the open access information highway. Lessons learnt and challenges encountered will also be shared.

2. The Botswana International University of Science and Technology

The Botswana International University of Science and Technology is public university that was established in 2004 but became operational in 2012. It was established to transform Botswana's economy from being resource-based to knowledge based through quality intensive research in the areas of engineering, science and technology. The university has two faculties being faculty of sciences (FOS) and faculty of engineering and technology (FET) with a total number of one thousand eight hundred and eighty one (1881) students. It offers degree and post graduates programmes across science, engineering and technology subject fields. There is a centre for business management, entrepreneurship and general education that equips students with both entrepreneurship and academic skills so that upon graduation they are ready for the market and direct contribution into the national economy. This is in line with the national mandate of research and entrepreneurship in science and technology.

3. The role of BIUST Library Services towards the mandate

The university library provides resources and services those are aligned to the university's strategic goals and responsive to user information needs. It is made up of two sections being resource management and information support. Library services are but not limited to building a collection of flexible and relevant information resources in all formats; developing open access services through IR, reference services, interlibrary loans, application of technology mediated tools (online services), provision of computers and reading spaces.

3.1 The library case for change

The library staff performance reviews of the previous year (being 2017/2018) academic year had shown that there was low uptake of library services by the library clientele. As a result, to

counter attack the situation the library management had to develop transformative processes and services that will not only close the observed service gap but also contribute towards the university's strategic objectives. The library developed strategies anchored on the stated need of "providing multiple and flexible opportunities to acquire knowledge and access to information services that enhance individual and institutional performance". The goal broadly called for building strong and responsive institutional systems, policies and processes for efficient, effective and quality attainment of all goals and mandates. Therefore, the library developed innovative tools that address the needs of technology driven users. This provided an opportunity for the library to prove the role of libraries in providing accessible and relevant information to users in an easy, robust and convenient ways.

The internal assessments and process reviewed showed that the library still had some shortfalls towards attainment of the observed needs. The library repositioned itself through the development of processes, tools and services that were aligned to the evolving teaching and research landscape. This is in line with, Sanjeeva (2018) observation that libraries are forced to change from the traditional operations and service delivery. BIUST library affirmed and reacted to a need to reconfigure its services to meet the user needs expectations on the information led revolution.

Part of the map in driving change in meeting the demands of the new generation, the starting point for BIUST library was to conduct library staff skills audit exercise. The objective of the whole exercise was to identify each individual's strength, ability and skills gap so as to have an in-depth understanding of library staff competencies in regard to the role of the demands brought by technological revolution. This is in line with Cardwell (2009)'s observation in international practices who reported that the similar approach was undertaken by Deakin university library. The author reported that this was done in recognition and utilisation of existing staff competencies in service improvement. This clearly shows that academic libraries to successfully redesign their services there should utilise existing staff expertise as well as improve capacity and ability of the identified skills gap.

The outcome of the exercise informed the library to make service delivery changes through the following:

a. Strategic positioning of staff and assignment of new roles;-

A collaborative discussion of the library staff performance contract for 2018/2019 academic year with direct relevance to the skills gaps identified from the internal skills audit was held. The conclusion made emphasised on the need to improve effectiveness of library services to users. Therefore, some of the library team were given additional new roles. The decision was made based on their strength in terms of skills, competencies and abilities.

b. Capacitating of library staff;-

The library team identified projects for implementation for year 2018/2019 and shared with both library management and the university executive management for support. The library management developed capacity building program for staff. And this was done through the development and implementation of in- house professional training programmes. As a result the following programs were conducted; -

- Project management workshop facilitated by BIUST project management division
- Metadata training seminar facilitated by Librarian Acquisition & Cataloguing

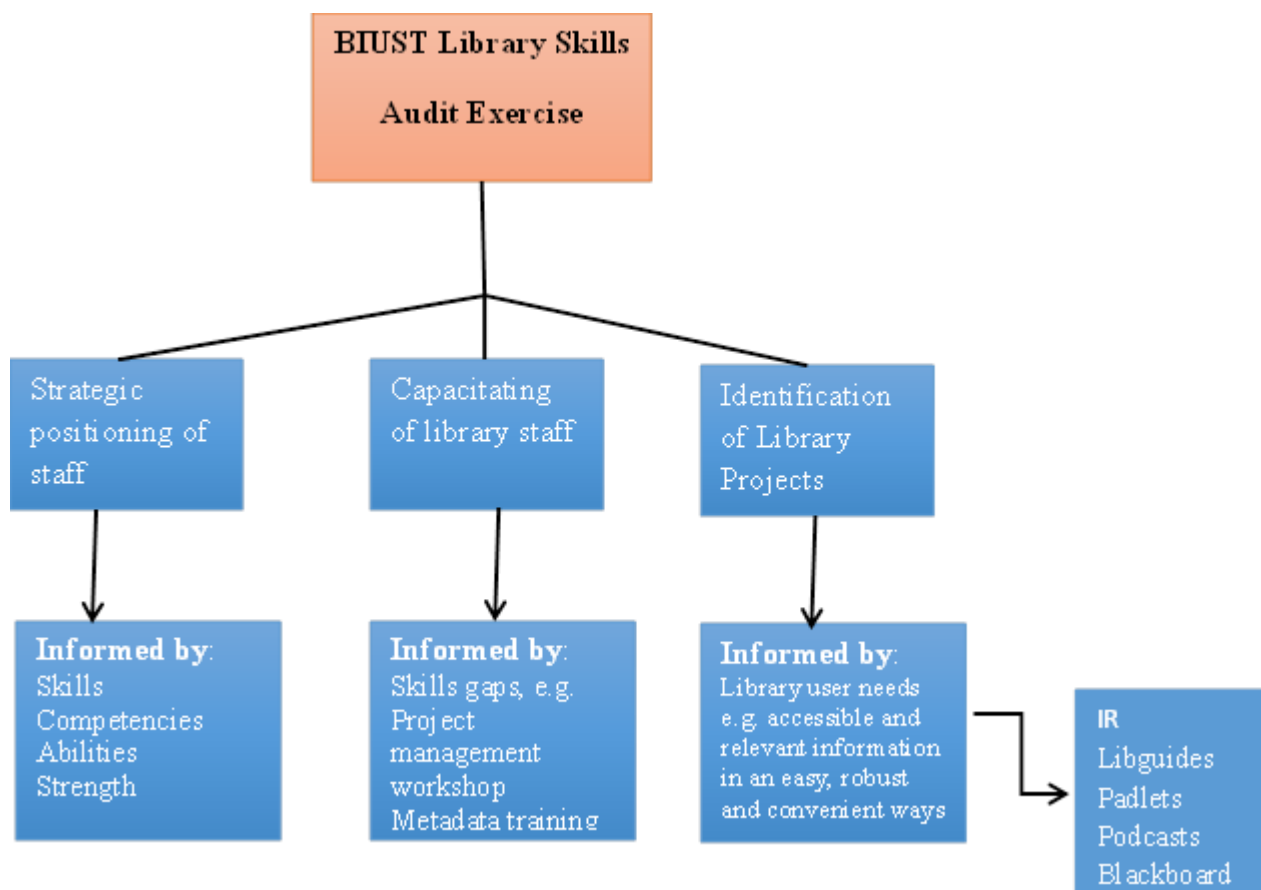
- Subject plus, padlets and podcast training workshop facilitated by Subject Librarian for faculty of sciences
- Open access and Institutional repository seminar facilitated by Subject Librarian for faculty of engineering and technology
- Black board short course for trainer of trainees targeting subject librarians facilitated by a representative from Black board
- Use of social media, organised by the Directorate of Communications and Public Affairs

Over and above, the library staff was also encouraged to participate in available webinars that are of their interest in order for them to apply best practices in their own area of work.

c. Identification of Projects Champions

Based on the skills audit library projects coordinators were appointed, and teams were formed to kick start the identified library projects. The project coordinators were given the responsibility to empower the team members through skills transfer.

Figure 1 summarises what has been discussed above.



The library aggressively engaged in strategies to reshape the library to effectively satisfy users' needs and support the university's teaching, learning and research in a more effective ways.

3.2 Developing relevant services

In making the library services more relevant, effective and efficient, the following factors were considered during the planning stage of the projects:

3.2.1 Library Users

It cannot be over stated that the fourth industrial revolution library users want to find and access information at their fingertips. The users are driven by technology; their lives revolve around new and emerging technologies. This poses a major challenge to the libraries as information provision centres. Academic libraries are especially challenged to align their service to meet patrons' needs through the use of technology mediated tools. Due to the user demand and the advent of new technology that has transformed the landscape of information and research data management fields, BIUST library developed and implemented technology mediated tools to reach its users in their preferred environment. The users were targeted in their cyber space. This was mainly motivated by the desire to provide user orientated services that would enhance visible improvement of library services. This initiative aided the library to provide valuable information needed by users, in a timely manner and in their preferred platforms.

3.2.2 Internal Collaborations

The deep rooted user needs that have been brought by the new digital information era dictate higher education institutions to depend largely on technology on learning, teaching and research. This era has reshaped the structure and provision of library services within these institutions. Academic libraries are discovering creative and innovative ways that help them to deliver effective services and contribute to institutional performance. Collaboration and partnerships are viewed as an essential driver in enabling quality services that are responsive to stakeholders' needs.

Academic libraries are forging strategic collaboration and partnerships with both internal and external stakeholders, to provide enhanced library services. During the inception of the introduction of technology mediated tools and research data management services, BIUST library strengthened the relationships with staff at the Directorates of Research and Information Technology as well as faculty members to leverage on their expertise and resources. The students were also engaged to ensure that the initiative is implemented effectively. This is in line with a view by Atkinson (2018) that academic libraries are working closely with other departments across the university particularly where there are "strong shared interests and activities such as the delivery of IT based services with computer centres".

3.2.2 Library Space

A major concern was placed on the utilisation of both the physical and the the virtual space. The intent was to design and employ of the emerging technology to fulfil the information needs of the fourth industrial revolution library users. The use of technology mediated tools as digital platforms that provide access to digital content via algorithms was adopted. This was introduced to make digital content available and accessible to the users in their different environments. Moreover, it increased the library's visibility and improved service delivery.

This initiative addressed the library objective of integrating digital library content with all university e-learning platforms available in order to help users to access new forms of information as well as retrieving more quality and relevant items at their own convenience. Khan and Bhatti (2017) emphasised on this note by highlighting that the role of academic

libraries has changed from “a storehouse of resources to a place of learning, research and innovation”.

Therefore, academic libraries must adopt this new culture through development of IT infrastructure, digital library development projects and digital collections to help users to find digital information. They further indicated that these libraries are becoming essential organ of “educational institutions by providing greater access to digital information and assisting researchers and faculty members in using technology to fulfil the educational and research needs of users”. The following technology mediated tools are used by BIUST library namely Library guides, podcasts, padlets, emails, facebook, blackboard, twitter, whatsapp and institutional repository (IR).

4. Establishing IR pilot project

As BIUST is striving to be a “world class university of research and innovation in science, engineering and technology and contribute on the advancement of a diversified knowledge based economy within Botswana”, the library developed and implemented a pilot IR project with intention to leverage and drive the university into open access information highway. IR is an online platform that permanently archive and disseminate research output more widely. These research outputs include research articles, conference works, research data, students’ theses and dissertations. Below are the stages that were undertaken during the implementation phase. These stages are broken into two stages namely the early phase and implementation phase.

4.1 Early phase of the project implementation

4.1.1 Project Management Skills

It is important to note that the team that spearheaded the project was selected based more on their expertise and passion. No expert was imported for the project. The team comprised of five library staff and one officer from Information Technology department. These inevitably had some skills gap needed for the project, hence an internal workshop on project management was initiated by the library management. It was facilitated by an expert from the sister department of project management. All library staff members participated in the workshop as this was identified as a skills gap during the library staff audit exercise. The expert shared the basic techniques of project management and encouraged participants that all the intended projects should be aligned with the university’s strategic goals and priorities.

The IR project team, especially the project leader found the IR pilot project very relevant as it drives the institution to embrace the open science agenda. It was seen as a project that would improve BIUST’s globally presence through showcasing intellectual output of BIUST community. As an outcome, the IR coordinator developed a Gantt chart to monitor the project progress, see figure 2 below.

Figure 2: IR Project Gantt chart

IR Concept Note to Internal Stakeholders	Green										
IR Proposal	Cyan										
Software Application & Specification Comparison, Selection	Yellow										
Software Installation & Customisation	Orange	Orange	Orange	Orange							
Definition of Workflows				Blue							
Dark Archive	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	
Presentation to Internal Stakeholders			Purple	Purple	Purple	Purple	Purple	Purple	Purple	Purple	
IR Guidelines			Red								
IR Procedures			Pink								
IR Pilot site					Green	Green	Green	Green	Green		
Training-Subject Librarians				Blue							
Populating/Uploading IR Content					Pink	Pink	Pink	Pink	Pink	Pink	
Promoting & Marketing IR						Purple	Purple	Purple	Purple	Purple	
IR Permanent Site										Brown	
IR Launch										Blue	
Evaluation											Light Green
	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar

4.1.2 Stakeholder engagement:

4.1.2.1 Management Briefing

In soliciting support, the Director of library services had to brief Deputy Vice Chancellor, Academic Affairs as the overall owner of projects related to academics. An overview of IR and its benefits was presented and this enlisted a positive response with a better understanding. It was however made clear that the project will use already existing resources in terms of personnel and infrastructure; and will incur no additional cost to the allocated library budget.

4.1.2.2 Departmental Briefing

For ownership of the pilot project by the library staff, the IR coordinator presented to all library staff on the concept of open access agenda, an overview of IR and its benefits to institution and researchers. She also introduced and made them aware about the pilot project, and assured the team continued update at all the implementation stages. It is very important to also highlight that this was also a relatively new concept to most team members. The project initiation was therefore characterised by a lot of information and education to library staff.

4.1.2.3 Development and dissemination of a concept paper to key internal stakeholders

Collectively, the IR coordinator, Director Library Services and both library managers responsible for information support and resource management crafted the concept paper and shared it with key internal stakeholders being the Deans from the two faculties, all Heads of department, Directors for; IT, Research and Developments, Student Affairs; Communications

and Public Affairs. The main reason was to sell the idea and to lobby for support. Continuous engagement was done through email.

The IR team also developed a proposal which was a customised business case that was submitted to other relevant authorities for project monitoring and implementation. As well as to gain support that would enable resource sharing during the implementation phase.

4.2 Project implementation phase

During the implementation of the pilot project, the following activities were undertaken:

Joint consultative meetings were held with the following stakeholders:

- Directorate of Information Technology; - the main objective was to bring them on board and ask for their support in terms of technical issues.
- Directorate of Research and Development together with Directorate of BIUST Institutional, Technology, Transfer and Incubation Park (BITRIP);- the main reason was to create awareness of IR and discuss strategies on how to accommodate the two projects of IR and research information management system (RIMS) namely PURE to avoid duplication. The conclusion made was that the library services will mine data from PURE and both platforms will continue to operate standalone.
- Faculty of Engineering and Technology and Faculty of Sciences: the meeting targeted Deans and Heads of department with the hope that they will cascade it to the staff. They were engaged in order to introduce the IR and lobby for their support, encourage their participation as well as creating awareness. This was done having considered that researchers play a crucial role in the successful implementation of the project hence this was a collaborative effort. The feedback the library got was positive as they welcomed the new development.

These consultative meetings were conducted parallel with setting up the platform; harvesting of research output as well as developing the policy. Currently, the IR is populated with conference works, research articles, post graduate students theses and dissertations.

5. Challenges Encountered

The team experienced the following challenges during the implementation phases:

- Project delay; - due the other engagement of the key stakeholders it was quite challenging to hold meetings as planned, then impacted negatively on project progress.
- Work overload; -the team was overstretched this also affected the project progress
- Delay by the telecommunication regulatory body to get the public internet protocol (IP) address for the IR pilot site to be accessible through the internet.

6. Lessons learnt

Below are the lessons learned during the implementation stages:

- Identifying staff with needed skills and competencies before the project implementation stage is very essential as it make the project to progress well.
- Stakeholder engagement is very crucial on the project sustainability especially when you bring everybody on board at the inception stage, it bears fruits as they own it and level of their engagement is very high.

- Advocacy or creating awareness should always targets all relevant stakeholders, for example even if we have done consultative meetings with faculties we could have included all researchers not Deans and Heads of department only because some researchers still report that they are not aware about IR pilot project.
- As much as we encourage our researchers to publish on open access journals we have realised that they have financial assistance challenges with regard to article processing charges, strategy is needed to be put in place to assist them.

7. Recommendations

As this year is planned to operationalise IR, BIUST library should consider the following recommendations:

- Consultative meetings with individual lecturers or researchers should be intensified so that no one lags behind.
- Training of researchers about their publications and copyright in order for them to have in-depth understanding of the implications of agreements they sign with publishers.
- Training of library staff on copyright issues so that they can best assist researchers on matters pertaining to author rights.
- The Research and Development directorate should relook at providing article processing charges financial assistance.

8. Conclusion

This paper shared the experiences of BIUST library on the transformative processes and services that were introduced to improve library services delivery as well as catering for the needs of technology savvy users. It also covered the implementation processes of IR pilot project. One of the fruitful outcomes derived from this IR pilot project implementation was collaboration and partnerships that were strengthened and formed with key internal stakeholders.

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