

Building Research Capacity: Enabling Critical Thinking Through Information Literacy in Higher Education in Africa



by **Dr Mark Hepworth** (Department of Information Science,
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Dr Mark Hepworth (Loughborough University) and Siobhan Duvigneau (IDS)
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This report has been circulated to all respondents to provide the opportunity for comment. However, the authors take full responsibility for any errors or inaccuracies and, in particular, the analysis of the findings and the recommendations drawn.

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by **Dr Mark Hepworth** (Department of Information Science,
Loughborough University) and **Siobhan Duvigneau** (British
Library for Development Studies at the Institute of Development Studies)

The authors

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Siobhan Duvigneau is the Information Literacy Manager in the British Library for Development Studies (BLDS) at the Institute of Development Studies (IDS). She works with partners in Sub-Saharan Africa and Asia to strengthen the capacity of researchers and policymakers to use evidence in research or policymaking processes (see BLDS, below). Siobhan is particularly interested in exploring how to nurture critical thinking, independent and lifelong learning skills (i.e. information literacy) and has focused her research on developing the capacity of trainers to build long-term and sustainable information-seeking behaviours and skills. She is also interested in promoting the use of inquiry-based, learner-centred approaches to education. This area of interest has resulted in the development of a unique information literacy training programme that combines information literacy skills with pedagogical and training theory.

The British Library for Development Studies (BLDS) at the Institute of Development Studies hosts the largest collection in Europe of materials on social and economic development, with over one million items on a comprehensive range of development themes. Its collection includes a wide array of unique or rare materials, with over half originating in the global South. BLDS plays a distinctive role in the academic and research community in the UK and internationally through a range of services and programmes to support international research in the development sector. Through a DFID-supported Mobilising Knowledge for Development (MK4D) Programme, BLDS works to stimulate the demand for research knowledge by building the information capability of development researchers, policymakers, and practitioners in Southern contexts. To find out more about this programme, visit www.ids.ac.uk/knowledge-services/demand-for-evidence.

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Executive summary

Building research capacity: Enabling critical thinking through information literacy in higher education in Africa

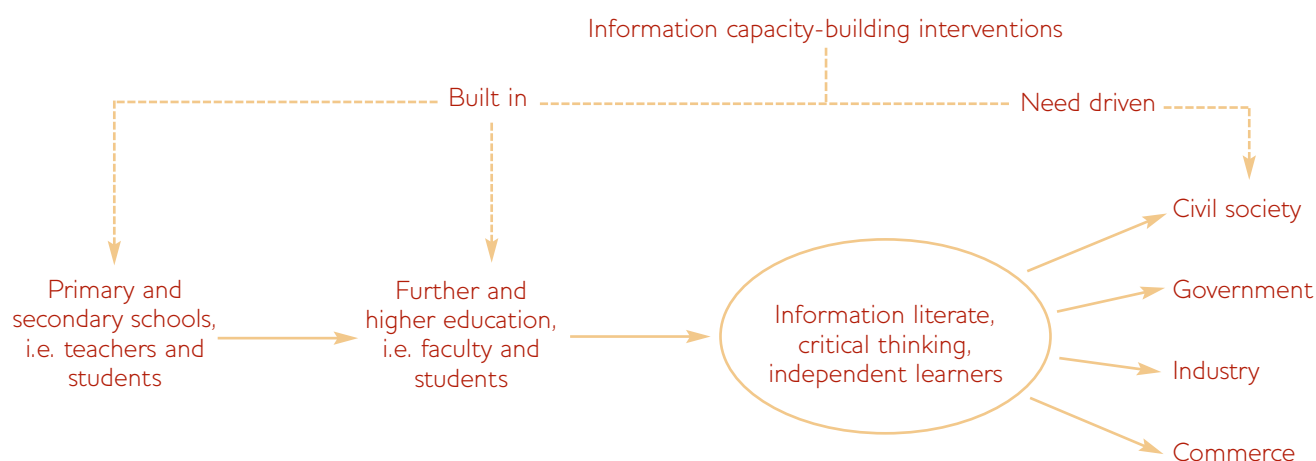
Information literacy, critical thinking and independent learning are now recognised as essential capabilities for people in society. As the 2006 Alexandria Proclamation on Information Literacy and Lifelong Learning states, information literacy is a means to ‘empower people in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals’ (Horton 2007). Information literacy is necessary for individuals to become independent, lifelong learners and be entrepreneurial, creative and innovative.

The attributes of critical thinking and independent learning bolster people’s employment potential and their capacity to contribute to society as active citizens. Higher education plays a fundamental role in nurturing these capabilities, leading to the production of research that contributes to the general body of knowledge, and developing individuals who will be key players in industry, policymaking and political leadership. This can be seen as part of a journey or continuum: at each stage in a person’s development appropriate interventions are needed to develop the necessary attitudes, behaviours and capabilities.

The research for this report focused on what needs to be done in higher education to help achieve these outcomes. It took place within the context of the BLDS (the library at the Institute of Development Studies, IDS) aim of building the capacity and strengthening the role and contribution of Southern researchers. Specifically, it sought to determine whether an institutional strategy could be developed that would plan, monitor and evaluate the building of information capabilities and research capacity among undergraduate and postgraduate students in higher education in three countries in Africa – Zambia, Malawi and Botswana.

The research was undertaken by BLDS in May 2012 as an exploratory exercise with the potential for leading to a larger, change-driven programme. It comprised interviews with staff at the University of Zambia and Mzuzu University in Malawi, and a workshop with staff at the University of Botswana. These institutions were chosen, first, because of their previous collaborative work in this area with IDS; and, second, because of the different resource contexts they represent. All three are keen to build up their information capabilities and to address any shortcomings identified through change at an institutional level.

Figure 1 Building information capacity in society



Key findings

Despite the different histories and resource contexts of the three institutions involved in the research, the issues raised by participants were remarkably similar, as were the solutions identified. The key findings are¹:

- 1 Many graduates currently lack information literacy, critical thinking and independent learning capabilities. The students were often described as passive and embracing a 'least effort' culture. To date, strategies to strengthen these skills have had limited success, despite examples of good practice being evident. Developing these attributes in learners should begin early, starting in primary school and continuing through secondary school education to facilitate the transition of students to the demands of university.
- 2 Students involved in innovative training such as problem- or inquiry-based research with a 'real world' setting, or encompassing a competitive element, demonstrate the motivation, enthusiasm and capacity for developing their information capabilities.
- 3 Inadequate and inappropriate resources present real challenges to building information capabilities. Specific challenges include high student and low staff numbers, funding issues, limited ICT and out-of-date and Northern-biased information resources, and a lack of study space.
- 4 Academic staff need training in the use of alternative, more engaging, interactive and participatory approaches to learning in order to build information literacy, critical thinking and independent learning, as well as methods to monitor and evaluate the impact of these. Furthermore, staff lack consciousness of their own information capabilities, making it difficult for them to convey what they do know.
- 5 Staff need support in integrating information literacy, critical thinking and independent learning throughout the higher education curriculum. A current lack of integration results partly from staff lacking the necessary pedagogic skills, as well as the characteristics of the teaching and learning environment indicated above.
- 6 The connection between research and teaching capabilities (pedagogic skill) was made in all three institutions, and both need support. The characteristics of a good researcher coincide with the attributes of the information literate, critical thinking independent learner. Developing both research capacity and pedagogic skills were considered fundamental for the student, as well as generating local intellectual capital, such as publications. The latter were considered a key ingredient for motivating and engaging the student learner.

Going forward

A number of practical approaches to overcome specific current challenges in developing information capabilities were identified by participants, including (1) the greater use of e-learning and peer assessment (to counter low staff–student ratios); (2) allowing students more time to do projects (to counter resource limitations); (3) using 'real world' problems in information training (to foster student enthusiasm and develop research capabilities); and (4) rewarding the demonstration of good information capabilities (to provide incentives).

The research also identified the creation of new partnerships as being important in building information capabilities – both to share lessons and resources, and to involve all relevant stakeholders. Such partnerships should be within institutions (e.g. between the library, academic development, research, enterprise/outreach and ICT services), as well as between the institution and external bodies (e.g. representatives of government, schools and employers). However, for lasting change, higher education institutions need to approve and allow for a system which supports staff as they develop research capabilities and capacity, including information literacy, critical thinking and independent learning skills; as well as pedagogic skills and the ability to monitor and evaluate them. Such a system would lead to

¹ It should be noted that the challenges uncovered by the study are also experienced to a lesser or greater extent in many other higher education institutions in Africa and elsewhere in the world, including the global North. Likewise, solutions identified in this study for positive change in African institutions may be applicable elsewhere.

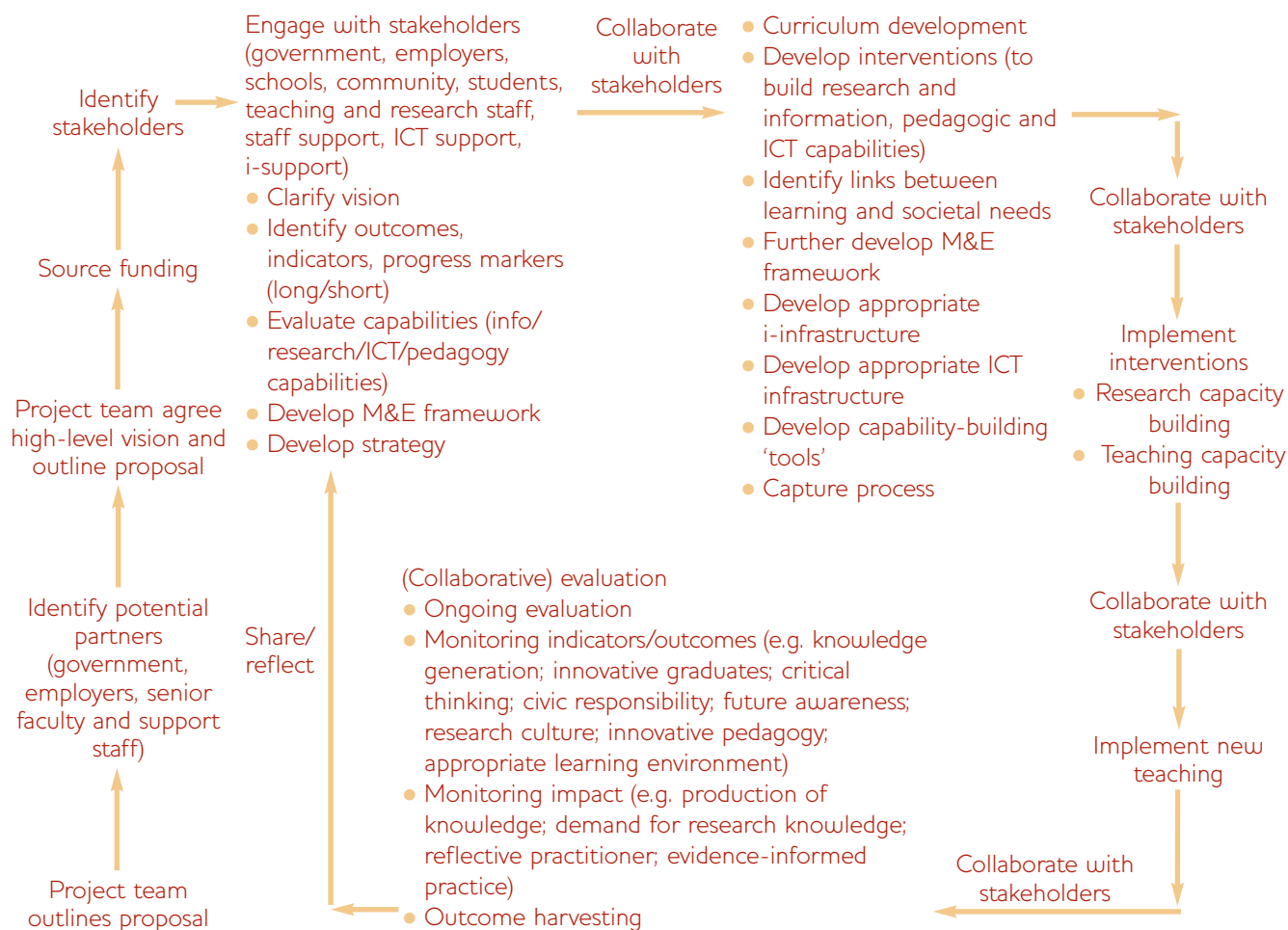


Figure 2 Developing information literate, critical thinking, independent learners in higher education: theory of change

staff (1) becoming better role models; (2) being better able to transfer their skills; (3) providing more research opportunities for students; and (4) producing better research. Overall, the result would be a symbiotic virtuous circle.

A group of experts within a higher education institution, variously skilled in pedagogy, research, information capabilities, change and project management, who had support from the highest level (including the education ministry and accreditation bodies) could provide such a learning support system for staff. Such an 'Information and Research Capabilities and Pedagogic Capacity Unit' could work with staff to both develop their skills and jointly define the attributes they want to build in students (defining outcomes, indicators and impact in the process). It could also find ways to overcome the various specific challenges revealed by this research, for example low staff–student ratios.

To fully develop a planning, monitoring and evaluation framework to build information literate, critical thinking independent learners – possibly involving the above recommendation – a study would need to take place over a minimum of three years. Further defining of outcomes, indicators and impact would need to be done in collaboration with a broader range of stakeholders than was possible during this preliminary research, to include students, academics, administrative and support services, employers, schools and the community, as well as consideration to how these may relate to different disciplines. This initiative would begin with implementation in one or more academic departments in the university leading to the development of a strategy and methodological framework which could be delivered throughout the institution and provide guidelines for others who want to make similar changes. An outline of this holistic approach is shown in Figure 2.

Introduction

Purpose of the research

This research was carried out as part of work by BLDS (the library at the Institute of Development Studies, IDS) to help build capacity and strengthen the role and contribution of Southern researchers. The focus of this preliminary study was to investigate current strategies in higher education that would foster future researchers and to identify the challenges and possible solutions. Previous research has highlighted a number of constraints faced by researchers in East and Southern Africa that, in particular, have an impact on e-resource access and use (Harle 2010). This study builds on that research and provides a further insight into how research capabilities could be encouraged among students and potential future researchers. It focuses on three areas fundamental to research capability: information literacy, critical thinking and independent learning. Also investigated were factors that would have an impact on the development of these capabilities, such as institutional norms and strategies; staff capabilities; and information and communication technology (ICT) infrastructure. These findings would increase our understanding of the current context and inform the development of a larger programme of work, i.e. determine the kind of initiatives that could be taken to help build these capabilities and whether a framework could be developed that would enable higher education institutions to plan, monitor and evaluate the development of information capabilities and research capacity among students in higher education in Africa.

The focus of this preliminary study was to investigate current strategies in higher education that would foster future researchers and to identify the challenges and possible solutions

Aim

The overall aim of this research was therefore to determine whether an institutional strategy could be developed that would plan, monitor and evaluate the building of information capabilities and research capacity among students, both undergraduate and postgraduate, in higher education in Africa. BLDS agreed to fund this preliminary scoping exercise with three institutions (University of Botswana, University of Zambia and Mzuzu University in Malawi) to understand objectives 1–5 listed below, and to define a larger programme of research and activities. If the three universities agreed to proceed following the initial study, the assumption was that additional funding would be sought to complete the larger research programme that would lead to defining and implementing a strategy to enable change. This would include a planning, monitoring and evaluation framework that could be applied by other institutions to help build information capabilities among students within higher education in Africa (and possibly elsewhere).

Objectives

The main objectives were to:

- 1 Identify current 'visions' for developing these capabilities within the institution, for example graduate attributes;
- 2 Establish 'outcomes' associated with the 'vision', for example levels of information literacy;
- 3 Determine how these 'outcomes' will be/have been achieved and how progress towards these visions will be/have been measured. Examples include teaching and training interventions, changes in culture, etc.;
- 4 Identify challenges, barriers and solutions;
- 5 Identify how these capabilities will have impact, for example usage of online resources, publications, employment, etc.

Subsidiary objectives were to:

- 6 Enable reflection on current practice;
- 7 Enable an institutional consensus in terms of the capabilities that need to be or are currently being developed;
- 8 Develop shared and agreed methods to help build information capabilities among students within the institution.

The outcome of objectives 7 and 8 was expected to be indicative and would only be fully determined through subsequent participative research with the higher education institution(s).

Key questions were posed and formed the basis of the data-gathering process:

- Does the university see a need to develop the capacity of students (at all levels) to undertake independent study and therefore their information literacy, critical thinking and research skills? If so, what formal activities are organised at present and at what level?
- Is it feasible to take a university-wide approach?
- Is it possible to develop (or create if one does not exist) for the university a vision, a mission, and progress markers and outcomes that would indicate whether the vision is being achieved? In other words, evidence that would show that the university, in terms of infrastructure, attitudes, roles, teaching and learning, etc. is fostering an information literate culture?
- In what way do current resources (technology, information resources and staff) either lend themselves or pose a challenge to achieving the vision?

Background

In both the North and South there is a perceived need to encourage and foster a future generation of people who can capitalise on existing knowledge and create new knowledge. A number of terms have been used to try to encapsulate these capabilities, including 'media and information literacy', 'critical thinking' and 'independent learning'.

In its 2007 publication *Understanding Information Literacy: A Primer*, UNESCO cites the 2006 Alexandria Proclamation on Information Literacy and Lifelong Learning:

'to empower people in all walks of life to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals' (Horton 2007).

Hepworth and Walton (2009: 10) consider information literacy as:

'A complex set of abilities which enable individuals to engage critically with and make sense of the world, its knowledge and participate effectively in learning and to make use of the information landscape as well as contributing to it.'

In the development context, where people focus on 'capacity development', similar learner attributes are eluded to, for example 'enhancing grounding/enabling knowledge and skills through systematic learning processes' (Taylor and Clarke 2008: 4). Here systematic learning processes refer to a conscious, strategic approach to learning.

In the educational context, authors have advocated inquiry- and problem-based learning as a way to foster and enable students to 'acquire experience in a range of intellectual and social capabilities, including critical thinking, reflection and self-criticism, teamwork, independence, autonomous thinking and information literacy' (Hutchings 2007: 6). These concepts – information literacy, critical thinking and independent learning – can

be seen as being interconnected and are linked to empowerment from the perspective of the individual, the organisation, the community, and society.

Over the last 20 years, information professionals have developed the concept of 'information literacy' and numerous strategies have been instigated in an attempt to develop this knowledge among learners in schools, further education and universities, as well as within organisations and the community. However, throughout the world this has proved a challenging task. One reason for this is that information literacy or critical thinking – or for that matter independent learning – are relatively abstract and are not at the forefront of people's minds. In addition, with regard to interventions there tends to have been a focus on those that concentrate on the individual's skills without sufficient attention being paid to the context within which capabilities are enabled, encouraged or applied.

A range of approaches have been taken to develop information literacy in higher education, including student orientation to information resources when they arrive; drop-in sessions to help students learn how to use electronic sources or evaluate information sources; and talks to discourage plagiarism and how to reference information. These information literacy interventions, or 'study skills' courses that focus on academic tasks, such as essay writing, may be voluntary or compulsory. Although useful, these interventions have had limited success, with providers finding it difficult to genuinely engage learners and ensure they apply this knowledge in their studies. Neither have they fundamentally changed learners in terms of them becoming self-directed, motivated, independent learners and critical thinkers who enjoy the process of becoming informed, and value the role of data, information and knowledge in their personal and professional lives. Greater success has been achieved where information literacy training/learning has been integrated into the subject domain and curriculum. However, this has tended to depend on enlightened individual lecturers and proactive librarians rather than a cohesive institutional strategy.

Greater success has been achieved where information literacy training/learning has been integrated into the subject domain and curriculum

To help determine whether a more cohesive institutional approach could be taken that incorporates a structured planning, monitoring and evaluation framework (to act as a guide for institutions), it was decided to draw on the knowledge of staff in three institutions: the University of Zambia, Mzuzu University (Malawi) and the University of Botswana. This selection was made partly because of existing collaborative relationships. These include:

- An information literacy strategy workshop, 'Information Literacy Workshop for Librarians, Researchers and Academicians in Institutions of Higher Education, Colleges and Research in Zambia', which was attended by 11 institutions from across Zambia. It was funded by the International Network for the Availability of Scientific Publications (INASP) and co-facilitated by Siobhan Duvigneau (Information Literacy Manager in the British Library for Development Studies (BLDS) at IDS), Babakisi Fidzani (Deputy Director, University of Botswana Library) and Dr Akakandelwa (Head, Veterinary Library and Information Literacy Co-ordinator, University of Zambia). This workshop also offered the University of Botswana and the Copperbelt University (Zambia) an opportunity to share approaches developed during the first year of a DeLPHE (Development Partnerships in Higher Education) project that had the objective of 'Developing an IL [information literacy] programme for lifelong learning in African universities'. It focused on raising awareness of information literacy concepts, standards and performance indicators, and explored the institutional context, culture and factors that enable and challenge the provision/support for information literacy programmes.
- In Zambia, BLDS in conjunction with INASP conducted a capacity-building initiative with Dr Akakandelwa, the University of Zambia's Information Literacy Co-ordinator, and Biopuso Mologanyi, the University of Botswana's Senior

Information Literacy Trainer. This included a training course in the pedagogy of trainers of policymakers and influencers.

- BLDS provided support to the University of Zambia through training in KOHA (the first free and open source software library automation package) and open source repositories.
- At the University of Botswana (in addition to the joint activities with the University of Zambia) BLDS facilitated the SCANUL–ECS (Standing Committee of African National and University Libraries – East, Central and Southern Africa) steering committee for the University of Botswana’s governance period for SCECSAL, and with Dr Mark Hepworth (Loughborough University) facilitated a pre-SCECSAL workshop involving practitioners from the region. BLDS (Siobhan Duvigneau) also worked with the University of Botswana (Babakisi Fidzani) on a paper that was presented at the Library Information Literacy Annual Conference (LILAC), entitled ‘Understanding the Institutional Enabling Environment in a Sub-Saharan African Context’.
- The University of Botswana staff have helped to support an information literacy discussion list hosted by BLDS called Chat Literacy².



Entrance to the University of Botswana’s library

- BLDS provided suggestions for the design of the information literacy week, run by the library, in September 2012 to help sensitise staff and students to the importance of information literacy.
- Mzuzu University has an ongoing institutional relationship and Memorandum of Understanding with Loughborough University. A number of Mzuzu staff have completed Masters programmes in Library and Information Management at Loughborough over the last 40 years.
- A workshop (14–17 February 2012) to help define the form and content of a monitoring and evaluation toolkit for information professionals wishing to design and implement information literacy interventions was instigated by BLDS in conjunction with Loughborough University and the Research Information Network (RIN). It involved participants from East, West and Southern Africa, and helped frame some of the thinking with regard to this research.

The three universities were therefore chosen partly because of this previous contact and their involvement with information literacy but also because they represent three very different contexts in terms of resources.

The University of Botswana (approximately 16,000 students) is reasonably well endowed in terms of physical resources, including ICT infrastructure and information resources. It has also made significant steps to integrate information literacy and build the capacity to foster information literacy, including developing an information literacy toolkit (see page 21) to facilitate the development of information literate students. However, further work is needed to prioritise the next steps and to institutionalise the strategy.

Although the University of Zambia (approximately 10,000 students) has an ICT infrastructure and a relatively large library, a lack of investment over a number of years has resulted in these being underdeveloped. Nevertheless, information literacy interventions had taken place. But an institutional approach was lacking.

Mzuzu University in Malawi (approximately 1,500 students) is relatively new, having opened in 1999. It has minimal ICT and information resources (although significant investment is planned based on funding from the African Development Bank). The university has taken steps to inculcate information literacy and critical thinking but faces significant challenges.

² For Chat Literacy see <http://community.eldis.org/.59e9ac6e/>

All the universities shared a desire to help develop the information literate, critical thinking independent learner and were willing to address these issues, and had started to do so.

Each institution, due to different experiences, context and history was in a position to provide an insight into how to foster the information literate, critical thinking independent learner. The vision and mission statements of all three universities reflected an ethos whereby they saw that a significant part of their role was to address the needs of their country and society. This reflected an underlying philosophy that implied empowerment through learning and developing information capabilities. This, it could be argued, helped them to perceive and understand the value of information literacy, critical thinking and independent learning and its role in the development context.



The University of Zambia's library

The work at the University of Botswana, based partly on a recently completed two-year project funded under the DelpHE initiative, would also be useful to the other institutions, largely because this knowledge had been developed in Africa and the Southern context. However, it was unclear to what extent this would be the case bearing in mind environmental and cultural differences. Furthermore, the University of Botswana still needed to clearly identify and find ways to address the challenges associated with the implementation of their toolkit and how to resolve them in practice.

These three institutions therefore provided a fertile ground for exploring the issues associated with fostering information literate, critical thinking independent learners.



Mzuzu University's library

The ideal outcome of this study would be to work with partners to seek funding and then implement a programme to enable the three universities to develop an institutional approach to developing information literate, critical thinking independent learners. This would include capacity building; the participative design of solutions involving a broad range of stakeholders; implementation of solutions; and evaluation and measurement of impact. It is likely that this would take place in part of the institution, such as within one or more academic departments and particular programmes. The final outcome would be an institutional planning, monitoring and evaluation framework that would enable the institutions to roll out the strategy throughout the institution and that other learning institutions, in various contexts, could benefit from and use.

Methodology

This aim of this exploratory piece of research was to:

- help identify the aspirations for graduates at the three universities and the current approaches to achieving these, as well as the challenges and possible future strategies;
- see whether outcomes could be defined and how progress towards these goals could be monitored and evaluated; and
- identify opportunities for future collaboration and partnerships between stakeholders in higher education and beyond, to further define outcomes and develop a planning, monitoring and evaluation framework for institutional information literacy, critical thinking and independent learning through participative, action research.

The issues raised and strategies that were suggested by participants were remarkably similar across the three institutions

To gain this understanding, emphasis was placed initially on finding out the thoughts and experiences of senior university staff who currently lead and shape the university's learning environment. Originally the intention was to conduct interviews (see Appendix 2) with senior staff in all three institutions – including academic, academic support, library and ICT staff – to help gather data. This approach had to be adapted to some extent in Botswana to suit the needs of the library and academic development staff because they had recently been involved in a DeIPHE project with the objective of 'Developing an IL [information literacy] programme for lifelong learning in African universities'. They therefore wanted to focus on the next steps. To help achieve this, a participatory workshop was designed lasting two and a half days (see Appendix 1).

The two approaches had slightly different consequences. One of these was a greater involvement from people such as the Vice Chancellor and Deputy Vice Chancellor, deans, lecturers, and library and ICT support staff at the University of Zambia and at Mzuzu University; whereas at the University of Botswana the workshop primarily involved senior librarians and senior academic support staff and a few lecturers. The interview format enabled the involvement of more senior staff outside the library, probably because they felt more comfortable with the privacy of the interview format, plus it was difficult to get senior academic staff together in one place at the same time. The interviews allowed specific issues to be explored in depth, such as particular teaching methods, with teaching staff.

The University of Botswana workshop touched on similar issues but focused more on how to move forward. This, to some extent, was from the perspective of the library and academic development staff who had worked together on the DeIPHE project and were keen advocates of information literacy. In the workshop emphasis was therefore given to developing short- and long-term strategies. The latter alluded to national as well as internal strategies. Due to the workshop format, it was also possible to gain a high degree of consensus between participants on how to go forward.

The issues raised and strategies that were suggested by participants were remarkably similar across the three institutions – despite the different stakeholder involvement, and the different contexts regarding resources and culture. At the University of Zambia, and especially at Mzuzu University, greater emphasis was placed on developing academic staff capabilities. Although at the University of Botswana the importance of developing academic staff research capabilities was mentioned, the connection between academic research capabilities and facilitating information literacy, critical

thinking and independent learning was made particularly explicit at the University of Zambia and Mzuzu University.

The interviews were structured using an adaptation of the Outcome Mapping monitoring and evaluation methodology (Earle *et al.* 2001). This is a participative approach that is applied by project partners, generally in the development context, to identifying a vision, a mission and progress markers, to agree strategy, and for monitoring and evaluation. The Most Significant Change approach (Davis and Hart 2005) was also influential.

As indicated in the Introduction, staff were also asked to reflect on:

- to what extent the university sees a need to develop the capacity of students (at all levels) to undertake independent study and therefore their information literacy, critical thinking and independent learning/research skills. What formal activities are organised at present and at what level, and what impact have they had?
- the feasibility of taking a university-wide approach;
- the possibility of the university developing a vision, a mission, progress markers and outcomes (with regard to information literacy, critical thinking and independent learning) that would indicate whether the vision is being achieved, i.e. what would show that the university, in terms of infrastructure, attitudes, roles, teaching and learning, etc. is fostering an information literate culture?
- the way current resources (technology, information resources and staff) either lend themselves or pose a challenge to achieving the vision.

The data gathered from the interviews... were rigorously analysed and key themes [were] identified

In addition, the opportunity for future collaboration and the potential for partnerships was explored.

The Outcome Mapping methodology and Most Significant Change approach also influenced the workshop structure and followed a similar format to that described above. Its format was delivered in a participative manner where people developed their ideas in groups then presented these to their colleagues, leading to discussion and a degree of consensus.

The workshop took place in Botswana (23–25 May 2012) and involved 18 staff. It was facilitated by Dr Mark Hepworth (Department of Information Science, Loughborough University) and Siobhan Duvigneau (British Library for Development Studies at IDS).

The interviews were conducted by Dr Mark Hepworth: 13 in Zambia during 7–11 May and 15 in Malawi during 14–17 May.

The data gathered from the interviews included notes taken during the interviews and voice recordings of the interviews which were later transcribed. These were rigorously analysed and key themes in the data identified. In Findings (page 18) representative quotes are used to illustrate the themes, i.e. they form the supporting data; they also indicate the significance that interviewees gave to the different topics and lend authenticity to the findings. Quotes are used to indicate the thoughts of the people interviewed. In general, the quotes selected were those that represented the thoughts of the participants across all three universities. In cases where these ideas seemed to be unique to the institution they are attributed to a place, i.e. a university. Otherwise, intentionally, they are not. Furthermore, it was important to retain anonymity where possible to ensure an honest 'voice'. This was necessary because some questions required critical reflection on current practices in the three institutions. These themes are also echoed in the data derived from the Botswana workshop. As in all rigorous qualitative data analysis, where the researcher consciously brackets their own assumptions, the use of quotations should be seen as supporting data and not anecdote. Data was further analysed applying the Theory of Change (Theory of Change Community 2012) and led to Figures 2 and 13.

Limitations

Although high-level visions, strategies, outcomes, challenges and barriers were identified, further work would need to be done to determine exactly how outcomes would be achieved and progress measured, and consideration given to how these would vary according to the discipline.

A further limitation of this preliminary study was the relatively small number of people involved. Other people and organisations could make a valuable contribution to defining an institutional strategy and identifying outcomes, indicators and desired impact. These would include:

- more lecturers involved in teaching and research (although in the University of Zambia and Mzuzu University all senior academic staff were involved in teaching)
- administrative staff and the full range of support services, including other members of the library and ICT services
- students (to get their views generally and, in particular, ensure the strategies envisaged will engage learners). Those who took part could also take on the role of ambassadors and facilitate the implementation of interventions
- potential employers, funders and policymakers in government, the third sector, research, industry, agriculture and commerce
- the community.

Inclusion of this wider selection of people would help to ensure that solutions would meet the various stakeholders' needs and also encourage their involvement in the process and future partnerships that fostered the development of learners.

The report is structured as follows:

- **Findings** (page 18) includes:
 - The need for information literate, critical thinking independent learners
 - Support for information literacy
 - Current information literacy initiatives
 - Challenges and solutions
- A **Discussion** (page 32) brings together the various findings.
- The **Conclusion** (page 38) addresses the research objectives.
- **Recommendations** (page 52) relate to further participative action research that would lead to the development of an institutional strategy and a planning, monitoring and evaluation framework which could be used by the university and other organisations.

Findings

The findings draw on comments made by interviewees at the University of Zambia and Mzuzu University in Malawi, and the output from the workshop at the University of Botswana. Again, it should be emphasised that quotes were chosen to reflect opinions across the universities and where possible are made anonymous. Where comments were specific to a university this is indicated. They are clustered under the following headings:

- The need for information literate, critical thinking independent learners
- Current indications of a lack of information literate, critical thinking independent learners
- Expected changes in learners

These three sections report on the graduate attributes that the three universities would like to see and the kind of impact that information literate, critical thinking independent learners could make. Outcomes that would enable the monitoring and evaluation of teaching and learning objectives are defined to some extent. However, as indicated above, the latter would be the focus of further research and require participation of the relevant stakeholders. Expected changes and their indicators are discussed.

- Current institutional support for information literacy at the three universities

This includes a brief overview of the people currently involved in developing interventions that could foster information literate, critical thinking independent learners.

- Current initiatives for fostering information literacy, critical thinking and independent learning

A brief overview of current initiatives is given. However, in this study more attention was paid to the future, and whether an institutional approach could be adopted and what form this would take. This is also addressed in detail in the Discussion (page 32).

- Challenges facing the three universities

Current challenges were identified by participants and solutions suggested.

The need for information literate, critical thinking independent learners

Across all three universities staff identified a number of graduate attributes that they would like to see relating to information literate, critical thinking independent learners, and felt that a significant proportion lacked these. These attributes have been interpreted and expressed below as outcomes and impact. These capabilities would be the expected consequence of encouraging information literate, critical thinking independent learners. However, further work would be necessary to fully define these.

Expected outcomes include:

- curiosity, questioning, problem solving, reading critically, identifying strengths, an awareness of weaknesses, and gaps in current knowledge
- having analytical and reasoning skills rather than a descriptive or 'cut-and-paste' approach

Across all three universities staff identified a number of graduate attributes that they would like to see... [and these] capabilities would be the expected consequence of encouraging information literate, critical thinking independent learners

- knowing how to study and use information resources effectively, including reference services
- managing data, information and knowledge efficiently and effectively, including the organisation and storage of information (skills that will be useful immediately in the higher education context and also the workplace)
- using information ethically
- communicating effectively
- managing themselves well, including good time management.

Expected impact:

- being independent lifelong learners
- creating entrepreneurial, creative and innovative graduates
- being appreciated by employers, i.e. receiving positive feedback from employers about graduates and their employability
- contributing to society (enabling competition and innovation, addressing and resolving problems in society)
- being research oriented, supporting industry, policymakers and politicians (especially in relation to postgraduates)
- publishing and contributing to the generation of knowledge (especially postgraduates).

The importance of these attributes for industry was emphasised:

‘with so much information in the world, if you really want to get ahead, obviously employers are looking for people who can quickly get the information and use it for the benefit of the company’

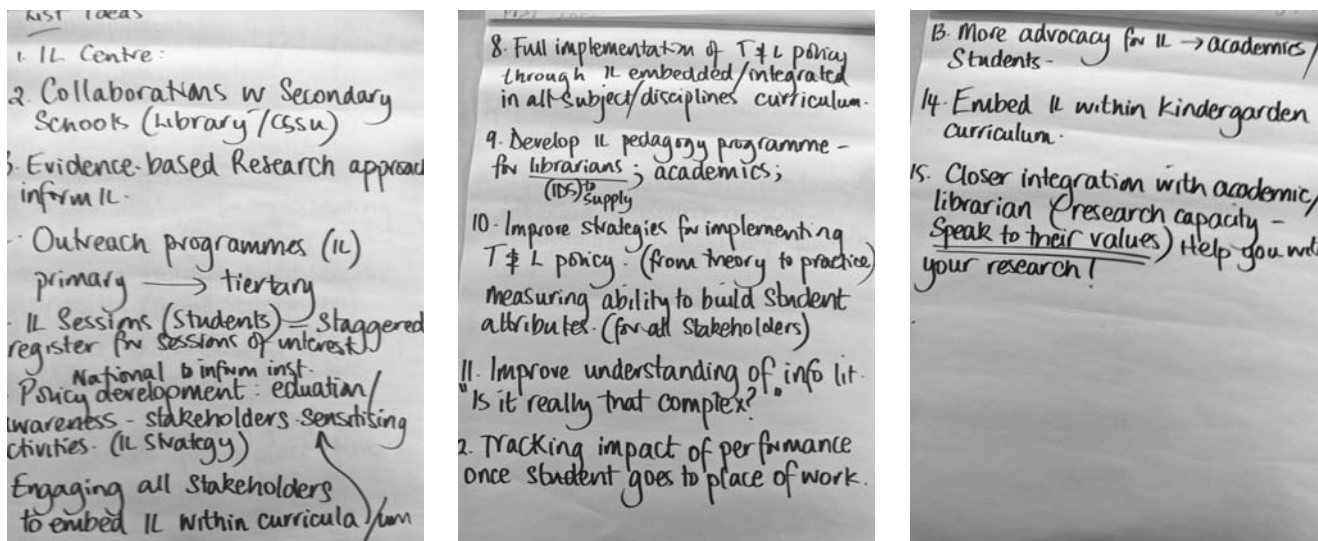
‘employers... are... looking for graduates with specific skills – critical thinking, problem solving and the like’.

The changing nature of society and the problems that need to be addressed emphasise the need to be able to *‘analyse issues’* and use *‘analytical and reasoning skills to develop their own solutions’*.

The following paraphrases a high-level institutional vision at the University of Botswana, relating to information literacy, presented by Mr Blackie Molelu (Acting Director, Centre for Academic Development) and further reinforced by Professor Silas Oluka (Deputy Director, Centre for Academic Development):

Information literacy is seen as a fundamental for making learning a worthwhile and lasting experience, which can develop information practices and critical thinkers who would contribute to the nation and society. In other words information literacy enables the development of talented, creative, confident graduates who can advance knowledge by harnessing, analysing and contextualising it to solve problems that impact on business, the professions, government and civil society.

To achieve this, a holistic approach is needed that addresses the curriculum, teaching, support and capability building, in collaboration with faculty, in all disciplines, and with key institutional stakeholders, i.e. it is neither an ‘add-on’ nor is it confined to academic literacy.



Current indications of a lack of information literate, critical thinking independent learners

Negative qualities of current students were highlighted, providing an indication of what the universities would like to change. Again, it should be recognised that these findings are in response to questions about the challenges; students with a positive profile also exist. However, when students first come to university they were likened to a 'blind person, who doesn't know the way to go... you have to show them that they have come here to learn how to use information... to think critically... not to take things for granted... to use information efficiently and effectively'.

Students were described as 'passive', 'surface learners' and as having a 'least effort' culture. There was an emphasis on 'banking' information and memorisation. As one interviewee in Zambia put it, 'memorisation enslaves' and that there is a danger of creating a generation 'full of facts but no understanding':

'They [students] think their lecturer is the reservoir of knowledge... [this] is the major problem; they do not see the value of pursuing knowledge for themselves'.

In both Malawi and Zambia academic staff stated that 'there are some students who just want to be fed'.

Furthermore, the students thought they knew how to find and use information, because they could 'use' the internet. In fact, students made poor use of ICT and were not information literate; they were seldom aware of freely available sources and made little critical analysis of what was found. Use of study guides was limited and voluntary drop-in sessions were 'not taken seriously' and had 'poor attendance'. In Zambia, interviewees thought there was a negative perception of the library – 'What can we get from the library? There's nothing' – which, in some cases, was reinforced by the views of teaching staff. This meant that the available resources were underused. A diagnostic test was suggested to help identify student ICT, information literacy, critical thinking and attitudes towards independent learning, to be taken either before or when they entered the university. This would identify to students the gaps in their knowledge, as well as enabling appropriate teaching and support.

This example from the University of Zambia indicates the current challenge:

'You can ask [students] to write a paper on the extent of drug abuse among street children because there are a lot of [them] around... Because of [a] lack of skills they would just go out there blindly... and start to look for information, any kind of information that comes their way, as long as it's on drug abuse. It ends there without [them] critically analysing what this question wants them to do and what sort of information they should look for and how relevant it is.'

Figure 3 Long-term goals for information literacy at the University of Botswana

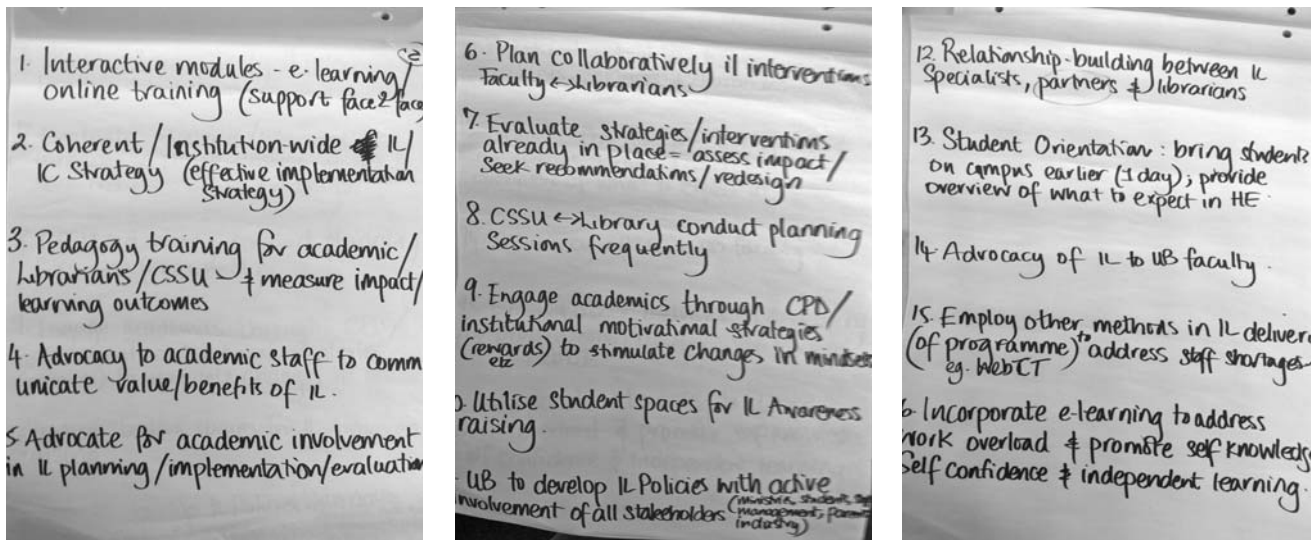


Figure 4 Short-term goals/changes relating to information literacy at the University of Botswana

However, there was a shared belief that students could be information literate, critical thinking independent learners. A Zambian academic cited evidence of independent learning where students questioned him based on their own independent reading and also included material that he had not provided. However, the impression given by the interviewee was that this was rare.

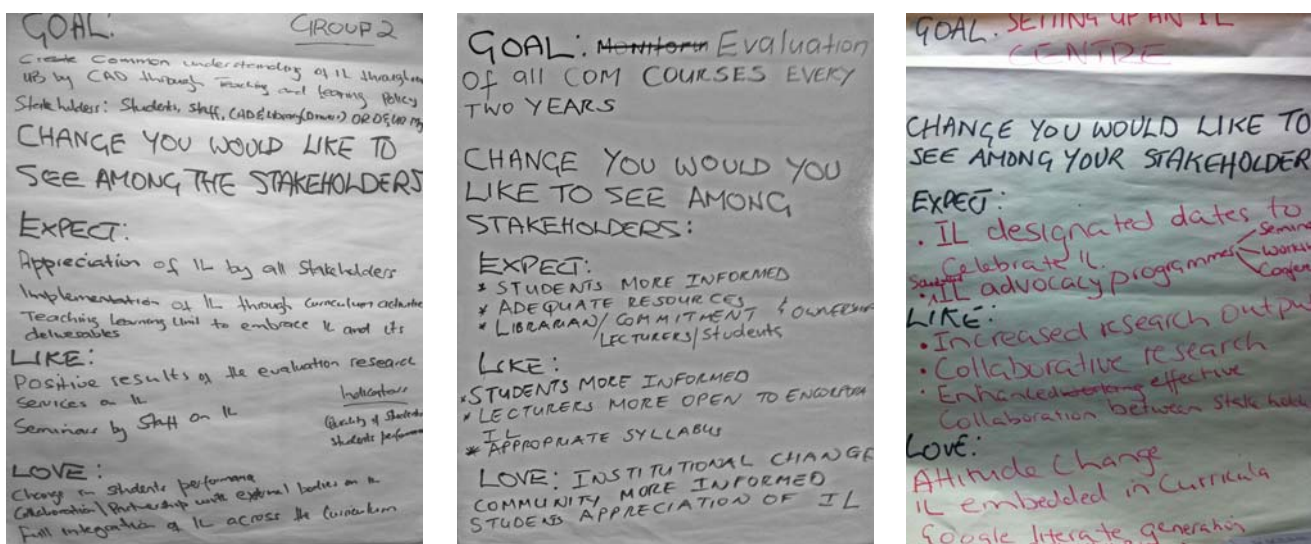
Expected changes in learners

The previous section identified graduate attributes that the three institutions wished to see and these are indicative of the changes that educators would like. Specific outcomes were identified during the workshop at the University of Botswana. It should be noted that a comprehensive list of outcomes, indicators and challenges was not expected but that the workshop would provide a methodology (i.e. the workshop structure, in particular the use of Outcome Mapping and Most Significant Change – theories of change) that could be used to think about planning, implementing and evaluating change, and that the process of defining outcomes, indicators and strategies for the University of Botswana would continue following the workshop.

Figure 5 Examples of changes staff would like to see made at the University of Botswana relating to information literacy

An initial ‘wish list’ served to identify some of the long-term goals relating to information literacy at the University of Botswana (see Figure 3).

Short-term goals were also identified (see Figure 4). To further explore these goals, more time would be needed to enable stakeholders to prioritise outcomes and the



associated indicators and ways to monitor and evaluate progress, as well as the long-term impact. This would be the focus of future work.

Individual groups in the workshop identified a number of specific outcomes. For example, the outcome ‘Students more informed’ was associated with indicators including ‘increased usage of databases evidenced by usage statistics’ and ‘assignment quality evidenced by good [variety, currency, relevance] references’. Another outcome, ‘Commitment and ownership [of information literacy] by librarians, lecturers and students’, was associated with the indicator ‘improved interaction between stakeholders [frequency of meeting, course-linked activities, etc.]’.

Challenges were also identified, as shown in Figure 6.

Current institutional support for information literacy at the three universities

In all the institutions, several bodies played a role in developing or advocating improvements in information literacy, critical thinking and independent learning. These included the library, which had undertaken this role for a number of years in all three universities; and Academic Development (at the University of Botswana) or Quality Assurance (at Mzuzu University), i.e. those who had a responsibility for staff professional development and teaching quality at the university. Specific departments also played a role, in particular Information Studies, Computer Science and Education (at Mzuzu University) and English Languages (at the University of Zambia).

At both the University of Zambia and Mzuzu University it was suggested that ‘experts’ were required to help develop staff capabilities and help design and implement innovative teaching that would foster information literacy, critical thinking and independent learning. At Mzuzu University a support unit was proposed: ‘You need some leadership in the university to ensure that lecturers are creative, critical thinkers’ and are ‘not haphazard... fire here... fire there’. An interviewee in Zambia suggested that ‘we need a base to oversee this’, a hybrid approach that was both centralised and decentralised, ‘so that there is adaptation’, i.e. a central unit with people who could provide training to help build staff capabilities in teaching. In addition, members of staff within each faculty would take on the role of helping other staff to create discipline- and subject-specific interventions.

A similar function was suggested at Mzuzu University regarding research capability, so that training which had been previously provided *ad hoc* (developing research proposals, research methodology, publishing, intellectual property, etc.) could be delivered on an ongoing basis.

ACTIVITY	INDICATORS (MEASURABLE)	CHALLENGES
1) Advocacy Programmes	<ul style="list-style-type: none"> Scheduled advocacy activities Reports on advocacy activities IL Peer Educators IL trainers-nationally & institutionally 	<ul style="list-style-type: none"> Inadequate staffing Lack of staff/student motivation Conflicting priorities/agenda
2) Enhanced Collaboration	<ul style="list-style-type: none"> IL Policy at national & institutional level IL embedded in Curricula More collaborative work on IL (research programme, curriculum, materials) 	<ul style="list-style-type: none"> Work overload Conflicting agendas/priorities Competition for resources
3) In-house Literature Generation	<ul style="list-style-type: none"> Reduced plagiarism Ability to use various research data bases or other information sources Small scale collaborations 	<ul style="list-style-type: none"> Keeping up with constant changes in technology

ACTIVITIES	INDICATORS (MEASURABLE)	CHALLENGES
1) Appreciation of IL by Students or staff holder	<ul style="list-style-type: none"> Presentation of academic work Consistency in citation styles Use of Current Information Sources Use of various information sources depicted in the references High thematic achievement in thematic IL areas 	<ul style="list-style-type: none"> Support by Academic Staff Institutional support Lack of standardised access to Institute across the Institute Teacher Student workload Inconsistent teaching & assessment of IL competence among academic staff
2) Implementation of IL through Curriculum activities	<ul style="list-style-type: none"> Clear articulation of content, teaching activities, planning and assessment, and the congruence between them. 	<ul style="list-style-type: none"> Addressing high cognitive abilities (analysis, thinking, critical thinking, problem application & evaluation)
3) Teaching Learning Unit for evidence IL and its deliverables	<ul style="list-style-type: none"> Running of IL workshops Follow up activities to monitor performance, engagement and up take. 	<ul style="list-style-type: none"> Staffing Skills
4) Seminars by Staff on IL	<ul style="list-style-type: none"> No of IL Seminars Attendance Reports on implementation 	<ul style="list-style-type: none"> Staff interest / student workload issues Facilities for skills Content development m.k.

ACTIVITY	INDICATOR (MEASURABLE)	CHALLENGE
* Students more informed	<ul style="list-style-type: none"> Increased usage of databases evidenced by statistics Quality Assignment evidenced by reference sources [Variety, Currency, relevance] 	<ul style="list-style-type: none"> Some statistics not readily available Librarians may not have access to assignment Lecturers may have to change marking criteria to assess IL skills [source logs]
* Librarian/Lecturer Students Commitment & Ownership	<ul style="list-style-type: none"> Improve interaction btw librarians & Lecturers Frequency of meetings Increased number of course linked activities 	<ul style="list-style-type: none"> Lack of buy-in on part of faculty Librarians work load due to multiple tasking Lack of human resources

Figure 6 Challenges relating to information literacy, as highlighted by staff at the University of Botswana workshop

Current initiatives for fostering information literacy, critical thinking and independent learning

Information literacy interventions had taken place in all three institutions.

University of Botswana

Within the context of programme design and delivery at the University of Botswana, information literacy is fully embraced as a major and interdisciplinary graduate attribute that prepares students for life, work and productive citizenship. Through the university's Learning and Teaching Policy it asserts that students should be independent learners and be equipped with lifelong learning skills, one of which is information literacy skills.

<p>Through the university's Learning and Teaching Policy it asserts that students should be independent learners and be equipped with lifelong learning skills</p>	<p>Historically, library orientation focused on familiarising the students with the available services and resources. However, this did not give students the skills to fully utilise them. The library recognised the limitations of library orientations and introduced bibliographic instruction in collaboration with the subject librarians and lecturers, and included how to use the Online Public Access Catalogue (OPAC) and online indexes.</p> <p>Recognising the changes brought by technology in higher education, general education courses were introduced. The library in partnership with the Department of Computer Science came up with two courses in 2002: Computing and Information Skills General Education Course (GEC) 121 and GEC 122. These two-semester courses were credit bearing.</p>
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However, the Computing and Information Skills course was only available to first-year students. Subject librarians were encouraged to liaise with their assigned faculties and ask for slots to teach information literacy skills to the upper classes. This led to the Centre for Academic Development (CAD) working with library professionals to establish a comprehensive plan for integrating information literacy in course structures. The outcome was the Communication and Study Skills Unit (CSSU) GEC courses, all of which have information literacy components. Currently, librarians co-teach CSSU courses to first-year students. During the previous academic year, each librarian was allocated slots to teach information literacy.

Apart from these formal classes, librarians are still engaged in delivering informal courses relating to information literacy to upper level students, as negotiated with individual departments.

As a result of the DelPHE project, the University of Botswana had also developed an information literacy 'toolkit' called *Developing an information literacy programme for lifelong learning: information literacy toolkits for African Universities* (DelPHE 2011). There are four component toolkits: (1) Framework and guidelines for implementing information literacy in higher education; (2) Information literacy curriculum; (3) Information literacy pedagogical framework; and (4) Advocacy for advancing information literacy. This resource was developed by staff in the University of Botswana library, CAD, librarians from the University of Abertay (Dundee, Scotland), and library staff and Dean of Mathematics and Applied Sciences at the Copperbelt University in Zambia.

This excellent resource breaks down what is required from an institutional perspective to facilitate the development of information literate students (toolkit 1); gives a detailed description of information literacy capabilities required, in particular the library and academic skills that students need to develop, including performance indicators that build on the Association of College & Research Libraries *Information Literacy Competency Standards for Higher Education* (ACRL 2004, toolkit 2); provides a framework that enables teachers to reflect on how these competencies, including related ICT competencies, should be incorporated in teaching and learning (toolkit 3);

and includes a theoretical and practical guide to aspects of advocacy within the university and how these could be used to communicate the importance of information literacy and the role of the library (toolkit 4).

These toolkits formed a good platform for the university to move forward and would also be useful to other universities embarking on a similar path. The purpose of the workshop held as part of this research was to think about the next steps, activities and outcomes that the library and Centre for Academic Development could take to realise some of its aspirations and apply some of the approaches outlined in the toolkits. However, the university still has to gain the support of other stakeholders and develop their ideas on how information literacy could be incorporated and evaluated throughout students' undergraduate and postgraduate experience. Although the University of Botswana has made great strides to integrate information literacy in core courses, as with other universities around the world, acceptance of these ideas and the changes required to some extent depend (especially at a postgraduate level) on the goodwill and cooperation of individual faculty staff.

It was also evident from the workshop that development of information literate, critical thinking independent learners would need to be a collaborative activity involving a range of stakeholders in the university, including senior management, faculty (lecturers/academic staff), academic development staff, as well as the librarians and information technology services. In addition, to support this, capacity building would need to take place among staff, in terms of developing research capability and pedagogic knowledge. This in turn would lead to teaching interventions that would motivate learners. Learning outcomes and progression that related to information literacy, critical thinking and independent learning, as well as ways to monitor and evaluate progression at all levels of the student experience, would also need to be defined.

University of Zambia

The library at the University of Zambia is actively involved in providing information literacy training to lecturers and students on demand. Programmes have been developed by faculty on an *ad hoc* basis. For example, a compulsory two-hour session each week in the Department of Engineering was instigated by faculty and have included the use of online databases and data management packages, taking in statistical analysis. The staff who delivered this training had been trained by the library.

The library at the University of Zambia is actively involved in providing information literacy training to lecturers and students

The School of Medicine has integrated information literacy in one of the undergraduate courses and librarians teach information and digital literacy to a group of students for several weeks.

Compulsory courses to develop academic literacy for students in Social Science and Humanities had been implemented in the past and included '*how to look for information, how to write essays, how to quote, provide references and create a bibliography*' (offered by the Department of Languages). However, due to a low staff–student ratio they were later abandoned.

A proposal to establish a Centre for Information Literacy has been put forward to the university by the library. Once approved, this Centre can offer integrated information literacy programmes to cascade across the university programmes.

Workshops have been run in 2012 to train library staff in pedagogical skills, as well as two workshops to raise awareness among lecturers and researchers on the importance of information literacy, particularly in relation to lifelong learning.

A study trip to the Netherlands for senior faculty staff to investigate methods to improve research skills in the university took place in 2012.

Mzuzu University, Malawi

The library at Mzuzu University is actively involved in providing information literacy training on an *ad hoc* basis. This has included training courses on:

- e-journal access, targeting students and academic staff
- the use of the e-learning platform, targeting students and academic staff
- training to use the Online Public Access Catalogue (OPAC), mainly for students and a few academic staff
- information resources available in the library for new students
- MS Office packages, email and online information searches
- ICT skills for junior library staff
- retrieval of books and other information resources held in the library for old and new students
- the organisation of research reports for final-year research undergraduate students.

Learning outcomes [at Mzuzu] that relate to information literacy, critical thinking and independent learning are being defined and, to some extent, levels conceptualised The Quality Assurance Unit has started to help ensure the curriculum is designed in a common way, and is increasingly student centred. Learning outcomes that relate to information literacy, critical thinking and independent learning are being defined and, to some extent, levels conceptualised. These would be particularly useful for subsequent research and implementation.

There was therefore a perceived need for information literacy capacity development and initiatives have been taken, similar to those taken elsewhere in the world. However, as with other universities, these changes do not represent a holistic, institutional strategy, and the following section identifies the challenges and possible solutions for this.

Challenges facing the three universities

The following outlines the challenges facing the three universities together with possible solutions. Three things should be borne in mind. Firstly, they are not unique to these universities. Higher education institutions around the world are experiencing similar challenges to a lesser or greater extent and provide the material for a constant source of papers for conferences, such as the Library and Information Literacy Annual Conference (LILAC)³ and journals such as the *Journal of Information Literacy*⁴. The fundamental importance of these issues has been recognised by international organisations (e.g. UNESCO) and are sufficiently prevalent to be recognised by academics and academic support staff in institutions worldwide, as well as by the 'consumers' of graduates, i.e. employers.

Secondly, these challenges are not confined to under-resourced or recently developed institutions. Cambridge University in the UK, renowned for its excellence, has also recently taken steps to address information literacy issues among its students (Secker and Coonan 2012).

Thirdly, the findings that stemmed from data gathering in the three institutions focus on the challenges. This does not mean that there are not examples of good practice. Indeed, in all three institutions there were examples of how teachers and librarians had found ways to inspire and enable students to be information literate, critical thinking independent learners. There were also examples where learners exhibited positive characteristics, such as the use of journals, and this was due either to the learner's background or individual motivation. Furthermore, there were members of staff who demonstrated excellence in research, including digital and information literacy, some of whom, partly through their knowledge of pedagogy, were also able to transfer these

³ See <http://lilacconference.com/WJP/>

⁴ Available at <http://ojs.lboro.ac.uk/ojs/index.php/JIL>

skills to their students. Nevertheless, as in other countries, the ability of staff members in research and digital and information literacy has often evolved over time, in a sense through ‘apprenticeship’ during their undergraduate, postgraduate and post-doctoral experience. As a result, these skills and associated attitudes may be implicit, relatively unconscious, and hence difficult for them to communicate. In addition, even where they are conscious, the individual may not have the pedagogic knowledge to transfer these skills to learners.

However, in general, the data generated from this study indicates that there are a number of challenges associated with developing information literate, critical thinking independent learners and these limit the impact of, for example, information literacy interventions.

Limited learner attributes

As indicated above, the current character and background of students posed challenges. There was no explicit explanation of why students lacked the attributes of information literacy, critical thinking and independent learning. Young people are quite capable of making complex decisions with regard to information in their personal lives; for example, in relation to gossip, what to trust, share, etc. A recent study in the UK showed that in their private lives young people made sophisticated decisions about information but in the academic environment they took on a more passive role (Smith and Hepworth 2012: 157–73). This was reflected in the three universities in Africa.

[T]he data generated from this study indicates that there are a number of challenges associated with developing information literate, critical thinking independent learners

A number of challenges or factors were thought to have a negative impact on developing information literate, critical thinking independent learners, and those prior to university included:

- schooling, which tends to be teacher centred rather than student centred and with little opportunity for project work and independent learning
- large classes (over 60 learners in one class at some schools), which reduces the opportunity for student-centred learning
- very limited information sources, such as books and ICT resources (in some schools there may be only one computer and this would be only used by staff)
- a lack of study space in school or at home
- a lack of reading culture (although there are exceptions, many homes would be without technology or books)
- a lack of public services, such as public libraries.

To some extent, this reflects the situation in the UK of first-generation university students (in their family) whose backgrounds did not foster a reading culture. The emphasis on results and school rankings in the UK over the last 20 years has also tended to foster pragmatic learners. However, in the UK and elsewhere in the North there is, of course, far greater access to information resources. Nevertheless, in both the North and South, learners need to be cultivated and motivated to use these resources. In general, entrants in the three universities were therefore relatively unprepared for independent learning due to their educational experience and limited resources, and this was a fundamental challenge.

Additional factors inhibiting change were identified within the three universities:

- limited research activities and publications by staff
- a lack of ICT and information resources
- a lack of study space (this applied to the Zambian and Malawi study experiences but not Botswana, which has extensive facilities)

- a lack of integration of information literacy, critical thinking and independent learning in the curriculum throughout the undergraduate and postgraduate programmes with appropriate delivery, assessment and progression (although initiatives had taken place).

This was considered one consequence of (a) a lack of pedagogic skills among staff, and (b) a lack of financial resources.

A common barrier making it difficult for staff to engage with research and to introduce innovative teaching was lack of time, primarily due to a poor staff–student ratio. This will be apparent in the discussion that follows.

Limited research activities and publications by staff

The connection between research capability and teaching capability was made in all three institutions, in particular at Mzuzu University and the University of Zambia. At Mzuzu, there has been a strong interest in pedagogy and hence an awareness of problem-based learning methods, so the connection between research and learning was made.

The main perceived barrier to building these capabilities were large student numbers and an inadequate number of lecturers On a pragmatic level, in Malawi *‘when people [lecturers] are more given to research... they also develop skills that they can impart to the student’*. Even more practically, *‘we involve students to work [on IT problems] within the university to do research’*. Introducing ‘real world’ (research) problems, such as how to manufacture ‘juice from fruits’, also helps students to realise the relevance of subject knowledge and associated theories and how they can be applied to solve problems. This in turn fostered student motivation showing that, through their learning, they can have an *‘impact on society’*, possibly leading to a role in the workplace.

At a skills-based level some participants felt that lecturers – even those with Masters and PhDs – lacked information literacy (*‘info savvy’*, *‘info smart’*, *‘i-capabilities’*), including knowledge of available information resources. In some cases, *‘even the lecturers themselves have a poor reading culture’*. Interviewees thought that all new members of staff should undertake information literacy training, as well as relevant ICT and data processing training, i.e. data gathering, analysis and storage.

In Malawi, a need was identified to develop research skills, including writing research proposals and bidding for funds; research methodology and data analysis; report and journal paper writing, and publishing, as well as understanding intellectual property issues. Some members of staff had recently had training in research from staff at Makerere University in Uganda and Bunda College of Agriculture in Malawi, which focused on *‘problem analysis; identifying a topic; problem tree analysis; identifying cause and effect, and... drawing up a proposal’*. Although these trainings lasted several days, it was felt that they needed to be regularly scheduled for staff. In addition, this kind of training also needs to be adapted to *‘look at specific areas and specific disciplines’* and make sure that research training was relevant.

A lack of research and publications written by academic staff was thought to lead to insecurity in terms of their academic prowess. This in turn makes it difficult for them to provide effective role models for their students. In addition, it means that there is little opportunity to involve students in research (which could provide a context for problem-based learning). The limited research and published works has led to few information resources that are relevant to the local context that could be used in teaching.

The main perceived barrier to building these capabilities were large student numbers and an inadequate number of lecturers. Hence, *‘attending to these students, teaching and marking... you do not have any time for research’*.

A lack of ICT and information resources and study space

In Zambia and Malawi, limited ICT and information resources, as well as dated resources, discouraged students and staff from accessing and using information independently and dissuaded staff from directing learners to information sources. This did not apply to Botswana where facilities are extensive.

Furthermore, in all three universities *'most of the collection is coming from the Western world... there is very little, just a fraction of our local content'*. The development of the local repository was regarded as important from this perspective and also helped *'to showcase what is possible in terms of producing [local] knowledge'*. In Zambia, an initiative was under way to digitalise local research in the form of Masters and PhD theses. The Malawi National Library, in conjunction with the BLDS Mobilising Knowledge for Development (MK4D) programme, are involved in a project to make local information resources more available. These initiatives are important in terms of supporting both teaching and research.

However, it was pointed out that the resources that are available are underused. The library at the University of Zambia *'did a survey [on usage of online databases] and... [the] statistics on usage... [are] quite low... They say it is because of the bandwidth; it is frustrating to sit and wait... [They also said that e-sources] are too complicated to use. They would rather go to Google of course.'* One interviewee said, *'They [students and some staff] do not see the benefit'* of library resources. Recently, access was suspended to e-sources because members of the Zambian consortium had not paid but *'No-one has complained [including staff]!'*. This supports Harle's (2010) findings. However, it should be recognised that (1) limited information literacy capabilities; (2) a lack of staff time for research; (3) a lack of access due to ICT capacity; and (4) the Northern origin of most electronic research sources all significantly deter usage.

[!] It is evident that fostering critical thinking and independent learning is possible even where resources are limited

In Malawi, although core texts had been sourced, they were limited in number. Limited information resources were also thought to reinforce students' dependency on the lecturer. However, even at the University of Botswana, where there was a wealth of library resources, similar attitudes among the students prevailed. Therefore, availability of information resources does not guarantee usage; this depends on whether students (and staff) have the capability and motivation to use them. This is borne out in the North and countries elsewhere in the world where a lack of information resources usage is evident, and one of the reasons why librarians promote information sources and have taken up the information literacy 'chalice'.

Furthermore, it is evident that fostering critical thinking and independent learning is possible even where resources are limited, by taking a creative approach to teaching and using the environment around the university as a source of problems to use in the learning context and for information and data collection (these are explored in more detail below).

Both at the University of Zambia and Mzuzu University the ICT infrastructure was perceived as a significant obstacle. In both institutions there was limited access to computers and the internet. However, at the University of Zambia 'hot spots' around the campus where students could access the internet had been introduced recently to improve the situation. Nevertheless, a lack of suitable study spaces was evident and the existing space in the library was being used to full capacity. At the University of Botswana space was available. At Mzuzu student internet access was limited to eight computers in the library; staff offices were often without computers and the majority used 'dongles' and their own laptops to access the internet. A previous satellite link had to be abandoned due to the high cost. However, funding is expected from the African Development Bank that will rectify this situation to some extent, creating a robust local area network and providing space and equipment to access the internet.

A lack of integration

A lack of integration of information literacy, critical thinking and independent learning in the curriculum throughout the undergraduate and postgraduate programmes was thought to be one consequence of a lack of pedagogic skills among staff. Pedagogic skills are required to help staff move away from a teacher-centred approach to learning towards more engaging methods and ones that encourage information literacy, critical thinking and independent learning.

Pedagogic skills are required to help staff move away from a teacher-centred approach to learning towards more engaging methods and ones that encourage information literacy, critical thinking and independent learning

Participants felt that lecturers in all three universities lacked the pedagogic skills to teach information literacy, critical thinking and independent learning and needed help to set course work that fostered the research process, i.e. from problem statement; to defining objectives; to the research questions; appropriate methodology; and analysis. Furthermore, they needed assistance to integrate and reward digital and information literacy and thinking skills, and appropriate attitudes and values, such as learning independently and ethically. Pedagogic training was seen as a necessity. It was even suggested that ‘to continue teaching [Zambia], you [academics] must have this certificate [in pedagogy]’; and that we need to ‘give the tools [to the teacher] of how to train or to create the learner and, on the other side, you give [the learner] the tools of how to learn’. At Mzuzu University a recent initiative had been instigated to ensure that all programmes placed greater emphasis on process and outcomes (changes in behaviour, attitudes, etc. such as critical thinking) rather than output and relating learning to future roles in society. In the past ‘they [staff] had not encouraged independent learning... we have focused much more on the teacher-centred learning than student-centred learning so that the student would not want to miss a lecture, but they can write an assignment without coming to the library’.

Interviewees at the University of Zambia also felt that the demographic profile of lecturers, where a large proportion of staff were young and recently graduated, meant that pressure was put on longer serving staff to teach and supervise students. Hence, it was proposed that more emphasis should be placed on developing new staff during induction and that the number of courses more experienced staff taught should be reduced. This would enable them to do more research and also to play a mentoring role; the ‘moulders’ should teach the ‘cobblers’.

The attitude of lecturers was also thought to be a factor. Some staff were felt to have a negative attitude towards students, which in turn had a negative impact on learner motivation. Staff tended to think that they had to ‘know everything’ and that this teacher-centred view and a lack of willingness to learn from students constrained independent learning. In addition, it was recognised that some lecturers (in all three institutions) may feel threatened by problem-based or inquiry-based learning, where students could have knowledge that they do not. This indicated a lack of awareness of alternative approaches to teaching and learning.

However, one of the biggest obstacles to encouraging information literacy, critical thinking, independent learning and the opportunity for reflection and improvement in teaching, as indicated above, was a lack of time. This was due to the low number of staff compared to the high number of students. This was seen as a major challenge for both Zambia and Malawi; at the University of Zambia, few schools had a 100 per cent staff headcount. There was a need for innovative approaches to resolve this issue. E-learning, including e-assessment and the availability of e-content, was seen as a way that could reduce marking and lecturing time, so that better use could be made of face-to-face time with students. The latter, it was felt, should be used to foster deeper learning through discourse and discussion. However, e-learning strategies depend on an appropriate ICT infrastructure which was currently lacking. Other pragmatic approaches were mentioned such as the use of ‘good’ students to facilitate learning interventions and the use of peers, for example to conduct peer assessment.

Therefore, at all the institutions academic staff were seen to need support in developing interventions that fostered information literate, critical thinking independent learners. This would include help in defining learning outcomes and methods to monitor and evaluate learning from needs analysis and the implementation of diagnostics, to defining learning indicators, including formative and summative assessments of learning outcomes, to evaluating impact. Furthermore, work would need to be done on how to integrate these into the curriculum and how to define what would be expected at different points in the learners' development, for example in critical thinking or the appropriate use of sources, throughout their higher education experience 'so that it is fed from the first year up to the time the students finish their studies'.

Nevertheless, some lecturers did find ways to address these issues to some extent. One method was cited by a participant at Mzuzu University to integrate and evaluate these capabilities among learners: a 'mini research [project] where they... look for information to answer the questions you give them... you can tell whether students really know how to look for information... to ask specific questions... whether they have found the right information relevant to the question'. Again, 'real world' problems helped students 'visualise what they are able to achieve with [that] knowledge'. One lecturer (also at Mzuzu) followed a classic learning cycle of giving content/theory; applying that to a problem; then asking students to apply that to another problem; so that they could 'discover an idea of how to improve things... I don't ask them to memorise'. But, he did want them to reflect on the changes that could be achieved: 'I'll give them an assignment that is research based... [including] generic questions which they need to go and find out on their own... I've discovered students have been really able to go deeper in terms of covering the topic... and make reference to where they have found out [information], to make citations'. He would also check to see whether those documents 'did exist'. Sometimes students would delegate aspects of the research to group members, thus simulating collaborative problem solving that might be experienced in the workplace.

[A]t all the institutions academic staff were seen to need support in developing interventions that fostered information literate, critical thinking independent learners

Short individual projects (lasting one week) were suggested, where students documented the process in addition to the delivery of subject content, i.e. the final report. These methods could be deployed alongside larger projects where it was expected that students would work in teams with identifiable, assessed, individual tasks. At Mzuzu University it was suggested that campus-based problems could be used to frame coursework, particularly with regard to ICT problems.

However, it was recognised that there were issues associated with problem-based learning which would need to be addressed. These included the challenge of ensuring that all students had developed a sufficient depth of knowledge and whether they all had a consistent level of knowledge across the cohort. Teaching would therefore need to balance project-based, individual and group exercises, with the delivery of subject content (often specified by accreditation bodies) via face-to-face lectures, reading, or other means of content delivery.

Interviewees suggested a number of ideas for improving pedagogy, including:

- Broadening the curricula where possible to encompass a wider range of skills and knowledge appropriate for the workplace ('horizon widening')
- Incorporate information and digital literacy into the curricula and into standard subject domain assignments
- Give students more choice of topics to investigate to gain motivation (from a range of emerging issues) for assignments that encourage independent learning
- Incorporate problem-based learning where students work on 'real world' problems that relate to the needs of the community, industry, professional roles, etc.
- Give students more time to do projects to enable maximum use of limited resources

- Involve students with research where they can develop data and information handling skills (and possibly support the research of academics)
- Evaluate and reward good independent learning (the breadth and quality of resources used), relevance to question, good research, clear conclusion, referencing)
- Develop effective student study practices, including group work policies (avoiding students who ‘free ride’ on others’ work); and the use of mentoring and peer-to-peer learning
- Students developing portfolios to reflect independent learning.

At Mzuzu, in fact, greater emphasis was already being placed on process and outcomes (changes in behaviour, attitudes, etc. such as critical thinking), in addition to output and related learning to future roles in society and broadening the curriculum. As stated before, these institutions explicitly orientate themselves to being useful to society and this is evident in their vision and mission statements. The use of problem-based examples of teaching, outlined in the discussion below, that draw on projects that deal with problems and potential solutions for the community therefore coincide with the ethos of the institutions (although this connection probably needs to be explicitly highlighted). In addition they motivate students, partly because they could see how their studies could lead to a future role in society dealing with ‘real world’ problems.

A lack of reliable financial resources

A lack of financial resources is a fundamental issue, i.e. a shortage of core government funding. Financial resources were needed to develop the ICT and information infrastructure, particularly in Zambia and Malawi. In Zambia, an interviewee stated that it was ten years since the library’s book budget had been funded and it depended on ‘donors’. Currently funding went to paying salaries rather than infrastructure. The fact that government funding was inadequate to develop the information and ICT infrastructure is a fundamental issue. As already stated, Mzuzu has been promised funding from the African Development Bank to develop their information and ICT infrastructure. However, ongoing funding would be needed to ensure that the information and ICT infrastructure was supported and upgraded over time and that there was sufficient staff capacity, as well as teaching and learning support for academics.

[L]inks with pre-school, primary schools and secondary schools, in terms of developing information literate, critical thinking independent learners, would be an important part of a holistic strategy

Beyond the university

At the University of Botswana the wider context was also considered. It was recommended that links with pre-school, primary schools and secondary schools, in terms of developing information literate, critical thinking independent learners, would be an important part of a holistic strategy, indicating that the ‘journey’ had to begin early in a learner’s career. Furthermore, involvement in the development of a national information policy was seen as fundamental.

‘Outreach’ projects in the community could also play a significant role in developing future independent learners. At Mzuzu, for example, there was an ongoing project that brought children who lived on the street into a model school library on campus. One activity involved the children ‘publishing’ their own stories. This was stated to have had a dramatic impact on their lives and led many to attend school for the first time.

Discussion

All stakeholders, including senior academic staff, support staff, and employers, desired information literate, critical thinking independent learners who are also creative and innovative.

Students were shown to have the capacity for these attributes if stimulated in the right way. Examples were cited by academics in Zambia and Malawi where this happened. These included public, competitive settings and situations where students were involved in problem- and inquiry-based research. They took the form of either small individual projects or larger, group-based projects. Engagement was particularly evident when students were involved in 'real world' projects or research. These interventions indicated the kind of teaching and learning that could take place.

It was also evident that currently, due to the teacher-centred approach to learning and the emphasis on transferring 'content', students were not generally motivated or incentivised to be independent learners or access a broad range of sources. Furthermore, it should be recognised that students, as in other countries, manage to achieve their grades and final qualification despite this and have little to encourage them to change their ways.

All stakeholders... desired information literate, critical thinking independent learners who are also creative and innovative

Academics/teachers tended to focus on delivering content and, in most cases, this is what they had experienced in their own education. Several lecturers stated that staff emulated what they had experienced themselves. They also had to teach large numbers of students and as a result a large proportion of their time was consumed by a combination of teaching and marking. This supports the findings of Harle (2010: 7) in East African institutions. Other constraints included a lack of information, ICT resources, and slow internet connections in Malawi and Zambia. This echoes the findings of other studies (Musoke and Kinengyere 2008; Gathoni *et al.* 2011; Willinsky *et al.* 2005). These factors pose challenges for implementing new ways of teaching and learning, such as problem-based learning or more interactive modes of teaching and learning.

It was also apparent that the majority of academics did not have a robust knowledge of pedagogy to help them implement new methods and would require significant support to do so from librarians and others who are familiar with pedagogic practice. Furthermore, although academics may be information literate, critical thinking independent learners, if they are not conscious of these attributes it is difficult for them to convey these skills. It was generally recognised that the academics would benefit from training to make them more conscious of these capabilities and to enable them to incorporate the development of these capabilities in their teaching. The research indicates that academics would benefit from training that would enhance their information literacy, digital literacy and critical thinking, and this could be delivered as part of the process of improving their ability to do research. Harle (2010: 24) notes a lack of awareness of the availability of electronic resources and the need for awareness raising and training in the use of sources. Although there is undoubtedly a need for training, the research indicates that the impact of a lack of local resources (the majority of available electronic sources originate in North America and Europe) and the pressures of low staff–student ratios, as well as a large amount of (teacher-centred) teaching and, particularly in Malawi and Zambia, a lack of access to computers and the internet, discourages use. Training in the use of electronic resources is unlikely to have an impact on the use of information resources unless these other issues are addressed.

The examples of where students were motivated to conduct independent research indicate the kind of interventions that would develop the learner in ways that all

stakeholders aspire to. For example, at the University of Zambia, when law students took part in a 'Moot Court' activity – a simulated court proceeding that involved researching and drafting briefs, and presenting and arguing their case – it was found that they rigorously and independently researched their case. This (unusual) behaviour was explained by the public and competitive nature of the activity, where (undergraduate) students did not want to lose face in front of their peers.

Another example was at Mzuzu University, where students competed for prizes offered by commercial organisations, such as telecommunications companies, that stimulated independent research. Industrial placements were also seen as a way to engage students in 'real world' problems and which could be used for a range of teaching purposes.

Mzuzu University also provided an example of how this could happen in practice at an undergraduate level (although there is no reason a similar approach could not be taken for postgraduates) with engineering students studying the generation of biogas. The lecturer was conducting a research project in the community to produce biogas for cooking purposes and provided a theoretical background to the topic and a small amount of reading (library resources were limited, as was ICT access). The students were then taken to the village where the research was being carried out and they could see the theory being applied and could critically reflect on it. They also gathered data to manage and analyse, in the process developing data management and analytical skills. In these circumstances they were therefore, in effect, learning to be information literate, critical thinkers and independent learners. Student motivation was fostered because they could see how the theory and their learning related to 'real world' problems and possibly could, in the long run, lead to employment opportunities.

However, problem- or inquiry-based approaches were also, in some cases, met with resistance because students considered them time consuming, particularly when they had a number of competing assignments and *'don't have time to study for the question'*.

**Librarians have been involved
in information literacy
instruction for many years...**

Also, the challenge of sharing limited resources between large numbers of learners is difficult. One suggested solution was to give the students more than the usual time for this kind of research assignment, and thoughtful scheduling of assignments could also ameliorate this situation to some extent. However, in practice this presents challenges due to the need to coordinate assignments with teaching, as well as with assignments in other courses.

**However, it is recognised that
there is a need to develop
their knowledge of pedagogy**

Such approaches were perceived as possibly having limitations in terms of ensuring that subject knowledge was learnt in sufficient depth and across the cohort. Another challenge was how to deliver a student-centred approach to learning when numbers are large and staff and resources are limited.

Librarians have been involved in information literacy instruction for many years, as evidenced by the Botswana toolkits and the wealth of publications concerning information literacy written by librarians and information professionals from around the world. However, it is recognised that there is a need to develop their knowledge of pedagogy. Educators are familiar with a host of methods and techniques that can be applied to develop critical thinking and independent learning but there is a lack of detailed knowledge of information literacy. These two domains need to be brought together and, with the support of the institution and academics, find practical ways for these capabilities to be integrated into the curriculum and evaluated. The institution needs to provide the infrastructure that is appropriate and to ensure teaching and assessment, and support, foster the motivation to become information literate, critical thinking independent learners.

Generally, academic staff aspire to be good researchers, and would like to undertake (funded) research and see the results disseminated and used. This is a necessary part of their role and fundamental to the success of the institution and how, for example, that

institution is ranked internationally. This in turn builds the knowledge base, particularly if it resides in a freely accessible institutional repository that could be used for teaching purposes.

Many of the attributes of a good researcher are those of the information literate, critical thinking independent learner. There is also, of course, a need for a good understanding of epistemology and associated research methodologies, as well as specific techniques to gather and process data. Many staff would benefit from support to further develop their research capabilities and capacity. Ideally, this training would be tailored to their areas of research (Harle 2010: 30). This research shows that the benefit of building research capacity goes beyond the usage of e-resources and would benefit teaching and could provide contexts for developing independent learners. In addition, staff would be in a better position to provide an example to students and transfer these skills.

The connection between academics' research capability – including their information and digital literacy and the possibility of involving students in research which would help them to develop the attributes of information literacy, critical thinking and independent learning as well as, possibly, contributing to the academic's research objectives – represents a powerful, symbiotic, virtuous circle (see Figure 7).

This model has several advantages:

- The academic would be motivated to develop research capabilities (including their own information literacy and critical thinking).
- In developing their information literacy and critical thinking lecturers would be enabled to be more conscious of these capabilities.
- This would be combined with developing a fundamental understanding of research and the capabilities (knowledge, skills and attitudes) associated with being a 'good' researcher – including the ethics of research, aspects of intellectual property (IP), epistemology, methodology, data gathering and analysis – that could then be conveyed to the student (or next generation researcher).
- It would build the capacity of students to conduct research and, possibly, enable the academic to do their research.

This relationship between the academic/faculty and the learner or the 'student research-teaching nexus' (Healey 2005: 67–78), echoes ideas associated with research-informed teaching; staff-led (students as 'audience') and student-led (students as participants) teaching and how this is related to information-led and discovery-led inquiry (Levy and Petrulis 2007). These ideas are represented in Figures 8 and 9.

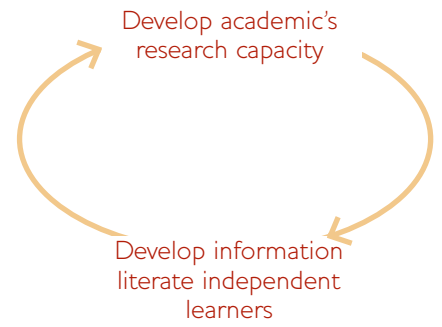
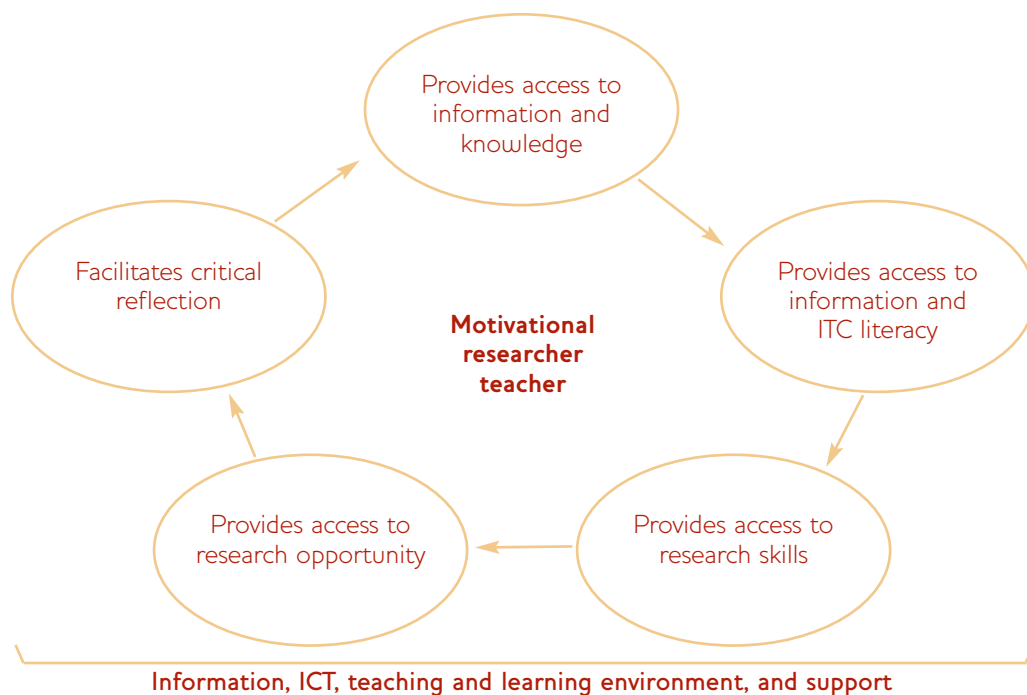


Figure 7 Motivating academics to motivate students: the virtuous circle

Figure 8 Student research-teaching nexus (Hepworth and Walton 2009, based on Healey 2005: 70)

	Students as participants		
Emphasis on research content	Research-tutored Curriculum emphasises learning focused on students writing and discussing papers or essays	Research-based Curriculum emphasises students undertaking inquiry-based learning	Emphasis on research processes and problems
	Research-led Curriculum is structured around teaching subject content	Research-oriented Curriculum emphasises teaching processes of knowledge construction in the subject	
	Students as audience		

Figure 10 The academic enables access to knowledge that develops the independent learner



The extent to which this approach is taken will depend on the learning context and may not be appropriate for all types of learning. Nevertheless, to move in this direction academic staff would need to develop appropriate teaching skills so that they are better able to create learning environments that foster independent learning and help learners to develop their research skills and related attitudes and values. This would enable academic staff to facilitate access to a range of capabilities as shown in Figure 10.

To develop this expertise among academics and genuinely facilitate these activities, the institution would need to sanction and reward these activities. It would also need to provide the necessary learning support, i.e. a group of experts who had the remit to deliver this on an ongoing basis. This is represented in Figure 11: the 'Information and Research Capabilities and Pedagogic Capacity Unit' would enable academics to gain this expertise and teach, monitor and evaluate these capabilities, as well as develop their own research capabilities. A unit of this kind would comprise individuals with a range of knowledge, including:

Figure 9 Conceptions and modes of student inquiry (Hepworth and Walton 2009, based on Levy and Petrulis 2007: 3)

	Student-led		
Exploring and acquiring existing disciplinary knowledge	<p>Information-active Students explore the knowledge base of the discipline by pursuing questions, problems, scenarios or lines of inquiry they have formulated. Independent information-seeking is emphasised</p>	<p>Discovery-active Students pursue their own questions, problems, scenarios or lines of inquiry, in interaction with the knowledge base of the discipline. Higher-order information literacy is emphasised</p>	Participating in building disciplinary knowledge
	<p>Information-responsive Students explore the knowledge base of the discipline in response to questions, problems, scenarios or lines of inquiry formulated by staff. Guided information-seeking is emphasised</p>	<p>Discovery-responsive Students pursue questions, problems, scenarios or lines of inquiry, as formulated by tutors, in interaction with the knowledge base of the discipline. Higher-order information literacy is emphasised</p>	
	Staff-led		

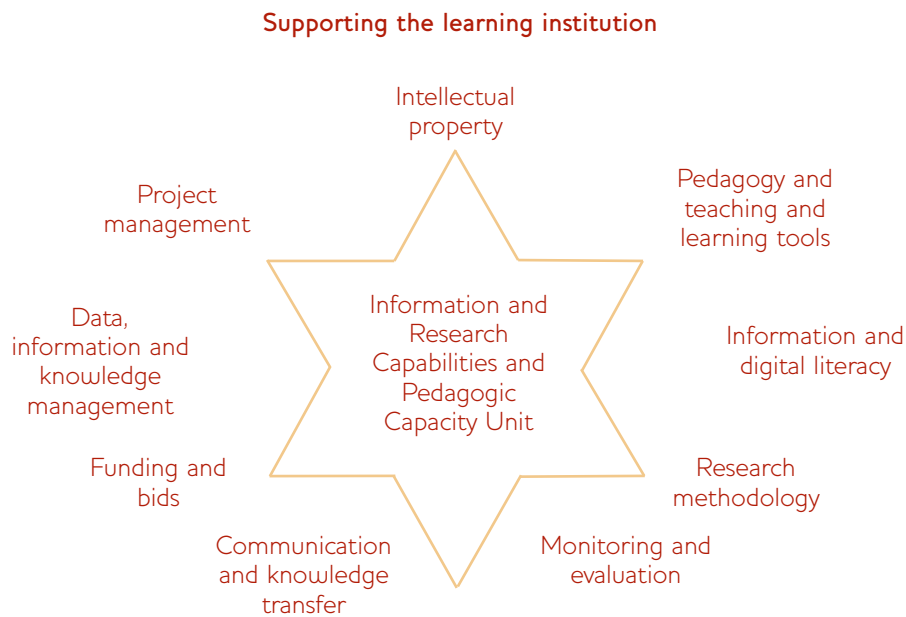


Figure 11 The Information and Research Capabilities and Pedagogic Capacity Unit

- Pedagogy and, in particular, monitoring and evaluation that relates to developing these capabilities, and developing teaching and learning interventions (including e-learning)
- Information literacy
- Critical thinking
- Research skills, including epistemology; methodology and data gathering and analysis, and issues associated with intellectual property; research funding
- Data and information management
- Communication, including publishing and knowledge management
- Project management
- Change management.

Developing an appropriate information and ICT environment would also be a necessary ingredient to help achieve these outcomes. This would require significant changes in both thinking and behaviour among the university staff and students, requiring careful management. Endorsement from the highest level in the institution, as well as external organisations such as the Ministry of Education and accrediting bodies would also be a requisite. To enable genuine change, all stakeholders would need to be involved as each has a fundamental role to play in making it work. Furthermore, a collaborative participative process of agreeing, for example, outcomes and indicators or desired impact, is likely to be the most effective strategy for implementing change since this would enable the various actors to work towards a negotiated, relevant, shared goal. This would be a learning process for all participants and lead to an institutional strategy. An institutional strategy that takes on board this challenge is reflected in Figure 12.

In Figure 12, the 'Information and Research Capabilities and Pedagogic Capacity Unit' staff would have developed the necessary knowledge to inculcate information literacy, critical thinking and independent learning and research, and be able to find ways of dealing with the challenges presented, for example low staff–student ratios. They would work with academics to develop their expertise and implement interventions that motivate learners to develop the desired attributes. These attributes (reflected in outcomes, indicators and impact) would be defined collaboratively with academics and other stakeholders. External stakeholders could also be used to help develop learning contexts (identifying 'real world' problems; facilitating access, where possible, to

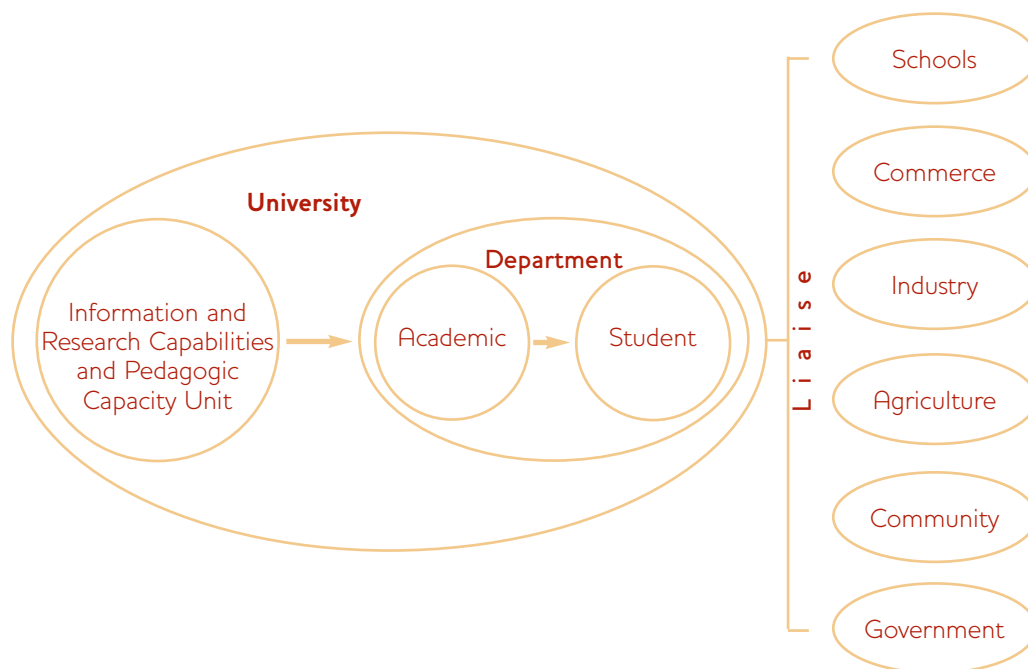


Figure 12 An institutional strategy involving all stakeholders

situations where problem-based learning could be applied and capabilities developed) and, also, they could be involved in assessment.

However, it is evident that a fundamental requirement for change is the necessary financial resources, from government to the education sector, to help address the issue of low staff–student ratios; develop ICT and information resources; create centres of human resources, specialised in pedagogy; and foster pedagogy, research, and digital and information literacy.

Conclusion

This conclusion relates to the remit of the BLDS-funded research and to a great extent refers to how this preliminary research could be taken forward with the three institutions to further develop and try out the ideas that stemmed from it. The recommendations relate to an institutional strategy that could be taken within the universities if sufficient funding was sourced. However, based on an understanding of development in information literacy over the last 15 years, it is believed that a similar strategy could be taken by other institutions and the findings, discussion, conclusion and recommendations are relevant to higher education in both the North and South.

This research had the following objectives:

- 1 To identify current 'visions' for developing information and research capabilities within the institution, for example graduate attributes.

The three universities had a clear idea about the graduate attributes they want to see develop, including those that enhance individuals' contribution to society. They are all aligned to the institutional vision and missions of the three universities.

- 2 Establish 'outcomes' associated with the 'vision', for example levels of information literacy.
- 3 Determine how these 'outcomes' will be/have been achieved and how progress towards these visions will be/have been measured. These will include teaching and training interventions, changes in culture, etc.

The visions indicated above imply specific outcomes and in the case of the University of Botswana, indicators were explored. Furthermore, the University of Botswana's information literacy toolkit (see page 21) identified additional learning outcomes that relate to information and digital literacy. However, additional work would be required by all the institutions to further define learning outcomes and the indicators to show that they had or were being attained. In particular, levels of progression would need to be defined and subject/domain-specific outcomes identified. Similar work needs to take place with regard to research capacity.

In addition, support staff and academics would need to be trained to support and deliver teaching and learning interventions. Expertise, either internal or external to the institution, would be required to build these capabilities. Knowledge may also need to be strengthened in areas such as open access and building institutional repositories, as well as change management.

- 4 Identify challenges, barriers and solutions.

Challenges and solutions relating to the environment, the students and the academics were identified. One key finding is the need to incorporate more problem-based student-centred learning. The 'virtuous circle' whereby academics' research capability, their teaching capability and the development of information literate, critical thinking independent learners was shown to be connected. It also indicates a way to engage the academics and the institution with the changes that need to take place. It was argued that taking this as a model would enable academics and the university to achieve their goals in terms of attracting research funds, generating knowledge and publishing, as well as helping to provide learning contexts that would motivate and develop information literate, critical thinking independent learners.

One key finding is the need to incorporate more problem-based student-centred learning

The 'virtuous circle' whereby academics' research capability, their teaching capability and the development of information literate, critical thinking independent learners was shown to be connected

However, one key challenge that needs to be addressed is how to introduce more innovative and engaging modes of teaching and learning and yet cope with the large numbers of students, often with limited resources.

- 5 Identify how these capabilities will have impact, for example usage of online resources, publications, employment, etc.

Again, the visions and outcomes envisaged by the participants indicated the impact of the institutional strategy described above, both in terms of developing information literate, critical thinking independent learners, as well as the research capacity of academics. However, further thought on defining outcomes, indicators and impact would be necessary and this would need to take place in collaboration with a broader range of stakeholders than was possible during this preliminary research.

A further objective, due to the participative nature of the research, was to:

- 6 Enable reflection on current practice.

The design of the interviews (see Appendix 2) and the workshop (see Appendix 1) enabled staff in the three universities to reflect on current practice and identify challenges and possible solutions.

- 7 Enable an institutional consensus in terms of the capabilities that need to be or are currently being developed.
- 8 Develop shared and agreed methods to help build information capabilities among students within the institution.

[A]ll three universities, particularly at the University of Botswana... recognised a need to get university-wide support for a cohesive institutional strategy rather than *ad hoc* interventions

With regard to objectives 7 and 8, a degree of consensus could be seen within and between the institutions in terms of what needed to be achieved. However, it was not possible for this preliminary research to gain institutional consensus on defining precisely the capabilities that need to be developed nor how these should be fostered: this would require further work with the universities. The process of reaching a consensus, possibly using the Outcome Mapping methodology or an adaptation, would be integral and fundamental to enabling change. Furthermore, it is likely that an institutionally supported, participative process involving all stakeholders in this activity is the most effective way to achieve change. Fundamental change is less likely to be achieved through either a bottom-up approach, which may be unsustainable and lack institutional support, or a top-down approach, which is unlikely to get the necessary support from staff.

Key questions were posed and formed the basis of the data-gathering process:

- Does the university see a need to develop the capacity of students (at all levels) to undertake independent study and therefore their information literacy, critical thinking and research skills? If so, what formal activities are organised at present and at what level?
- Is it feasible to take a university-wide approach?

There was a consensus across all three universities that there was a need to develop the capacity of students (at all levels) to undertake independent study and, therefore, their information literacy, critical thinking and research skills. A number of initiatives had already taken place in all three universities, particularly at the University of Botswana, and all recognised a need to get university-wide support for a cohesive institutional strategy rather than *ad hoc* interventions.

- Is it possible to develop (or create if one does not exist) for the university: a vision, a mission, progress markers and outcomes that would indicate whether the vision is being achieved? In other words, what would show us that the university, in terms of infrastructure, attitudes, roles, teaching and learning, etc. is fostering an information literate culture?

To a great extent these had been defined by the University of Botswana, although further thought and negotiation would be required to make them happen. In addition, the three universities did not explicitly recognise the need to develop the research and pedagogic skills of academic staff. In all three institutions, further work would be needed to develop a cohesive strategy and a monitoring and evaluation framework to enable the institutions to determine exactly what needs to be done and whether they have been successful.

- In what way do current resources (technology, information resources and staff) either lend themselves or pose a challenge to achieving the vision?

At the University of Zambia and Mzuzu University, the information and ICT infrastructure, as well as study space, were seen as inhibiting the development of information literate, critical thinking independent learners. Inconsistent electrical supply was also highlighted as an issue at Mzuzu. The value of creating an institutional repository that showcased local research and was also a source for teaching was apparent. However, it was shown, particularly at Mzuzu but also at the University of Zambia, that even with relatively little resources innovative teaching and learning methods could be deployed despite a lack of resources to develop these capabilities. However, these depended on the motivation and skills of individual academics.

Initiatives had taken place with some success and further initiatives were in the planning stage. However, with regard to the University of Botswana, there was a need to foster further support within the institution, make relevant connections outside the university, and plan in detail further interventions that could be applied throughout the institution and to the student experience. Mzuzu University and the University of Zambia had both had some experience of developing interventions to foster information literacy and critical thinking.

All three institutions had similar aspirations and, to some extent, had experienced similar challenges. Building the information and ICT infrastructure to support the students was particularly challenging at Mzuzu University and the University of Zambia due to a lack of resources, although Mzuzu has been promised funding for infrastructure developments from the African Development Bank, and the University of Zambia was planning to set up a unit that would support the development of information literacy.

A holistic, participative approach whereby stakeholders are engaged, solutions and strategies agreed, and then developed, seems to be the logical way to develop the strategy and framework

A holistic, participative approach whereby stakeholders are engaged, solutions and strategies agreed, and then developed, seems to be the logical way to develop the strategy and framework. Agreement would need to be reached within each institution in terms of how to implement this. For example, whether experts in areas including research, information literacy, critical thinking and pedagogy, etc. should be brought in (as suggested in the Discussion, see page 30), or internal. However, if the latter they would probably need training to build their capabilities before working with other stakeholders – such as academics, government and employers – to develop strategies, interventions and methods to evaluate the success of these. Developing an internal centre of excellence with a range of research, digital and information literacy and pedagogic skills is probably the most effective and sustainable solution. Sources of internal and external expertise would also need to be identified to build capacity. In addition, agreement at institutional level would be needed on whether one or more departments (e.g. a humanities department, a social science and/or a science) should be the focus of initial activities, leading to the development of a strategy and methodological framework which could be rolled out throughout the institution and provide guidelines for others who want to make similar changes.

Partnerships and roles

To undertake these changes new partnerships are likely to be formed across the institution, such as between the library, academic development, research, enterprise/outreach and ICT services, as well as external partnerships. For example, local partnerships would need to be formed with representatives of government (who

are both an employer and have a perspective on the human capacity needs of the country). The Ministry of Education would presumably need to be engaged with any fundamental changes in education. Government funders of education would need to be consulted. Key employers in industry, commerce and agriculture, both in the areas of research and application, including non-governmental organisations, would need to be consulted. These stakeholders (who are also potential future employers) could play a role in helping to define capability outcomes and also help create problem-based 'real world' learning contexts that would motivate students. Furthermore, these

To undertake these changes new partnerships are likely to be formed across the institution... [and] wider partnerships could include those within higher education

partnerships could have a research component that engaged academic researchers. Other local partnerships should, ideally, also include local schools because, as participants at the University of Botswana pointed out, that was where changes need to begin. Collaboration with schools would enable educators to focus on the learners' development in terms of information literacy, critical thinking, independent learning and research capability from an early age and facilitate the transition of students from secondary school to university. Even if schools did not participate directly in a future project, they would need to be made aware of the expectations placed on students in higher education in order to develop these attributes in their students.

Wider partnerships could include those within higher education, including the three universities that took part in this study. They would benefit from pooling expertise and experience, and possibly sharing resources. Furthermore, involving institutions that are embedded in different contexts and which experience different challenges, including less or more resources, would help to ensure that the lessons from this experience are relevant to a broad range of organisations. Similarly, if people in each institution worked with academics in different disciplines the collective knowledge would be more widely applicable across higher education institutions. For example, the University of Botswana is open to sharing its toolkits with other universities. Other higher education institutions in the region that have undertaken information literacy initiatives could also be part of a looser collaborative network.

Further afield, centres of excellence in Africa could also contribute to this initiative. Other organisations outside the continent – in addition to BLDS and Loughborough University – could provide expertise and training in the areas of research; information and digital literacy; information and data management; repository building; and pedagogy, including e-learning, monitoring and evaluation, project management, and participative approaches to change. There are a number of organisations, within and outside the continent, and initiatives identified in Harle's (2010) report, that provide training interventions relating to the competencies needed by lecturers and students.

Funding

To conduct a study whereby the ideas in this report are tested and an institutional strategy developed, implemented and evaluated would require significant funding. Potential funders who could fund a three-year project encompassing all the elements detailed above would need to be identified; or it may be more appropriate to approach funders in relation to specific aspects of the project. Suggestions by participants for funders, 'backers' or organisations that could provide relevant capacity development include UNESCO, the European Union, IDS, Norwegian Agency for Development Cooperation (Norad), International Development Research Centre (IDRC), International Network for the Availability of Scientific Publications (INASP), Swedish International Development Cooperation Agency (Sida), Canadian International Development Agency (CIDA), Department for International Development (DFID), the British Academy, the Bill & Melinda Gates Foundation, and the Leverhulme Trust. It transpires that UNESCO has been funded to conduct a similar scoping study in francophone West Africa and there may be an opportunity for collaboration. The private sector could also be a source of funding.

Recommendations for action

To develop the information literate, critical thinking independent learner would require significant resources and change to take place. In addition, to develop a robust planning, monitoring and evaluation framework (to build information literate, critical thinking independent learners) that the institution could roll out, and other institutions take on, would need to be done in stages over a minimum of three years. This timescale would allow for sensitising the organisation to the aims of the project, building capabilities, implementation, and the monitoring and evaluation of impact.

This initiative should be seen as a collaborative, participative, action research process where a number of research questions would be addressed (with others likely to evolve during the project). These would include, for example:

- What is the current level of expertise of staff in terms of pedagogy and research?
- What do employers value in terms of information literacy, critical thinking and independent learning?
- What is the current level of expertise of students in terms of research capacity and information literacy, critical thinking and independent learning?
- What are the most effective ways of working to foster information literacy, critical thinking and independent learning with large numbers of students, particularly in contexts where resources are limited?
- What is the most effective way to develop staff research capabilities?
- How can staff be motivated to make substantial changes in their teaching and develop new capabilities?
- What information and ICT infrastructure would support these changes?
- What role can problem-based or inquiry-based learning play in developing information literacy, critical thinking and independent learning?
- What are the different levels of information literacy and what is the path of progression from school, to undergraduate to graduate and postgraduate learning, and how can these be measured in terms of indicators, outcomes, output and impact?
- How can a problem-based, student-centred approach be applied with limited resources and limited pedagogic knowledge (in a relatively short time frame), especially for new staff?

[It] could be seen as one continuous, holistic process taking place within the institution. Alternatively – as with many capacity-building interventions – the problem could be broken down and distinct interventions that tackle issues separately take the form of short training courses

Research based on these (and other) questions could be seen as one continuous, holistic process taking place within the institution. Alternatively, as with many capacity-building interventions, the task could be broken down with distinct interventions that tackle issues separately taking the form of short training courses, such as in pedagogy, research, or information literacy. Both could be driven from either an internal capacity development unit, i.e. an 'Information and Research Capabilities and Pedagogic Capacity Unit' (see Discussion, page 30), or a regional centre outside the university that would facilitate the changes indicated and provide regional capacity-building support in, for example, pedagogy and research. A combination of external and internal initiatives could be another approach.

Encompassing a holistic institutional strategy

The following initiative assumes a holistic institutional strategy. This approach is proposed because the changes envisaged probably require fundamental changes in the

The proposed initiative: the next steps

- 1 Gain understanding of the initiative, and commitment to it, from senior staff in the higher education institution(s). This would include agreeing high-level outcomes, indicators, impact and overall strategy. Senior staff would also need to agree where these changes should take place – for example identify three academic departments: a science (e.g. engineering or medicine), a social science (e.g. geography) and a humanity (e.g. law).
- 2 Identify who would make up the ‘steering group’ and ‘project team’ – some of whom, in the longer term, may form the ‘Information and Research Capabilities and Pedagogic Capacity Unit’ – and the competencies they need to undertake the project and provide the necessary ongoing support. For example, this could include project management, pedagogy, research skills, information and digital literacy, and monitoring and evaluation methodology.
- 3 Form a project team to take responsibility for managing the initiative; this would be likely to include librarians, ICT support, research support, academic support, and administrative staff who are familiar with curriculum development. It would also need to include academics to represent and help coordinate activities in the three departments. The capabilities of the team would need to be evaluated to determine their training needs.
- 4 The project team would need to identify and negotiate participation with the wider group of stakeholders including, for example, government officials, industrialists, agriculturalists, business people, non-governmental organisations, schools and the community (such as parents and marginalised groups). In addition, other organisations which could participate in the project, such as capacity-building partners, would need to be identified and roles defined.
- 5 The capabilities of the project team would need to be developed and at this point the ‘Information and Research Capabilities and Pedagogic Capacity Unit’ would be formed (see page 33). This could involve a number of external capacity-building bodies.
- 6 Evaluate the capability development needs among academics that relate to (a) developing their research capabilities, and (b) developing information literacy, critical thinking and independent learning among students.
- 7 Evaluate the capability development needs among students that relate to developing (a) their own research capabilities, and (b) their information and digital literacy, critical thinking and independent learning.
- 8 The project team/Unit would help develop the research capabilities of academic staff, including their information and data management capabilities and their information and digital literacy.
- 9 The project team/Unit would collaborate with academic staff, students and other, external, stakeholders to determine and prioritise learning outcomes and methods to monitor and evaluate learning.
- 10 Evaluate the information and ICT infrastructure to determine what is necessary to enable research, information literacy, critical thinking and independent learning capacity in the institution.
- 11 The project team/Unit would collaborate with academic staff, students and other, external, stakeholders to design teaching and learning (probably problem-based) interventions.
- 12 It is likely that information, ICT infrastructure and teaching resources would need to be developed. This could include, for example, enabling access to research that relates to the local context and developing e-learning solutions. It may also include novel approaches to using students to help provide teaching support and mentoring.
- 13 Implement teaching and learning interventions to develop students’ information literacy, critical thinking and independent learning.
- 14 Conduct formative and summative evaluation of learning, as well as its overall impact, in conjunction with academic staff and other stakeholders.
- 15 Develop a planning, monitoring and evaluation framework based on this experience, and ‘package’ learning objects, so that they can be applied in other parts of the university, as well as by other institutions.
- 16 The Unit would continue these activities and facilitate rolling them out across the institution.

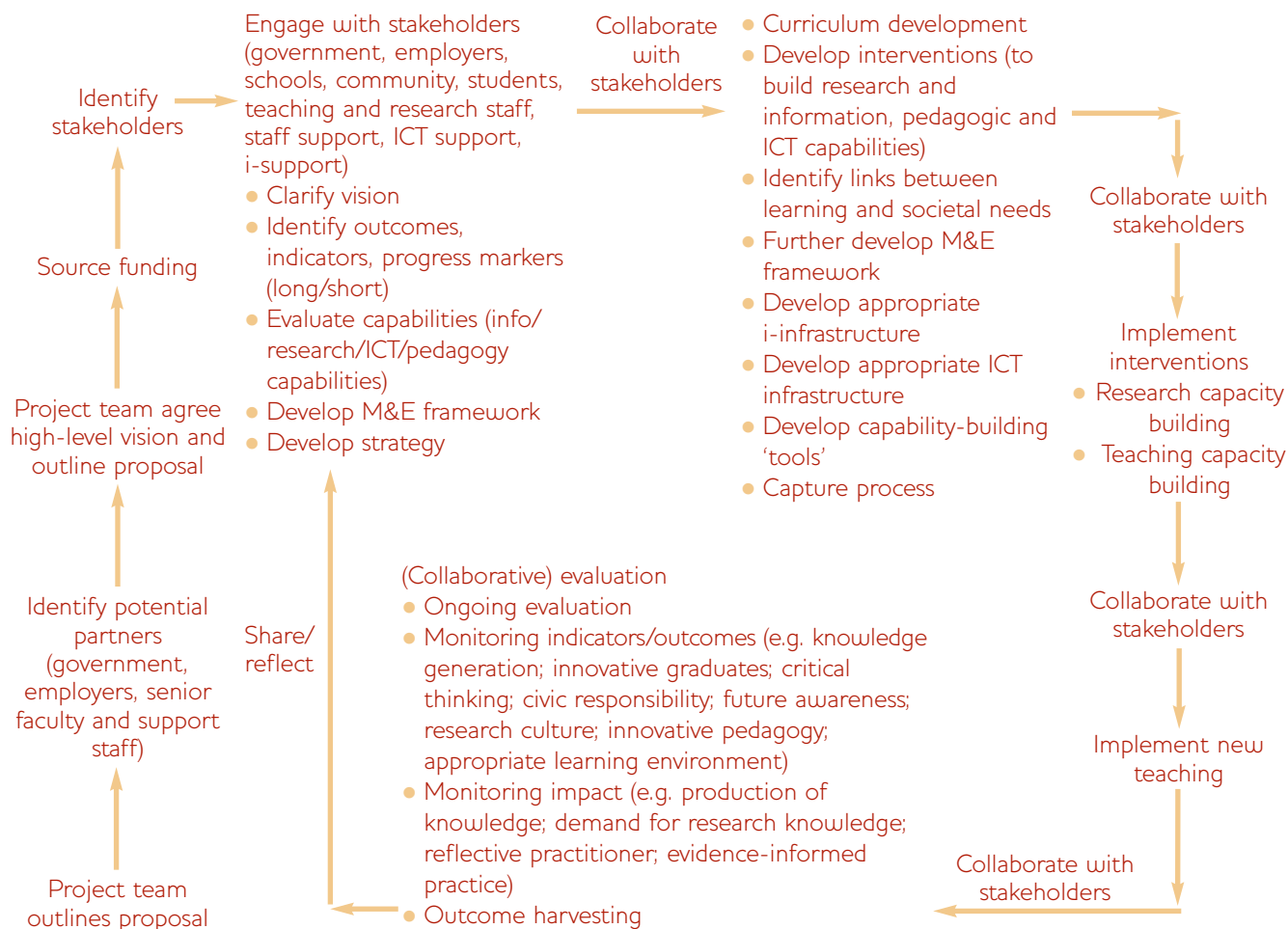


Figure 13 Developing information literate, critical thinking, independent learners in higher education: theory of change

culture of the institution that would benefit from an institutional strategy and backing. Furthermore, it is argued that the degree of change (taking on new knowledge and skills, as well as certain values) needs to happen in a participative way where outcomes are to a great extent identified by the participants and a consensual approach is taken, i.e. a ‘corporate journey’.

There would therefore need to be sufficient commitment from the institution at the highest level to sanction and help ensure involvement of the staff in what would be fundamental change. Academic, administrative and support staff would have to appreciate the need for, and commit to participating in, the changes that would need to take place, including their own capacity development. The capacity, capabilities and resources to instigate, undertake, support and sustain the changes would need to be put in place. For example librarians, who play a primary role in building information literacy, would also have to develop expertise in how these skills could be conveyed to students and teaching staff. In addition, they may be required to develop new skills, such as research, if they were to help build these capabilities. Research and teaching capabilities would need to be developed among academic staff and support would be necessary to incorporate research skills, information literacy, critical thinking and independent learning in their teaching.

This initiative would begin with implementation in one or more academic departments in the university – for example, a science (e.g. engineering or medicine), a social science (e.g. geography) and/or a humanity (e.g. law) – for which agreement at an institutional level would be needed. This initial focus would then lead to developing a strategy and methodological framework which could be delivered throughout the institution and provide guidelines for others who want to make similar changes. See page 41 for a step-by-step summary of this initiative.

Outcomes – for example, learning outcomes and indicators of progress – would need to be defined and appropriate methods put in place to evaluate progress in terms of short-, medium- and long-term goals. This would also apply to academics' research capabilities. However, this should be preceded by an evaluation of current capabilities among the relevant support staff, academics and students. The implementation of new teaching and learning methods would be monitored and evaluated over time to determine whether the expected outcomes and the impact envisaged were achieved.

Outcomes... would need to be defined and appropriate methods put in place to evaluate progress Reflection on this experience and dissemination of the 'learning journey' should be done throughout the project, possibly in the form of journals produced by the project team, capturing the views of participants and stakeholders. Social media would provide an important tool for enabling dissemination and access to this experience. Evaluation data should also be collected during and following implementation through student assessments, including pre-intervention and post-intervention diagnostic tests, assignments, etc. Other indicators would include, for example, the usage of electronic information sources, and the participation and feedback from external stakeholders. The research capability of staff could be evaluated based on indicators such as the number of bids, publications, citations, and conference presentations. However, a fundamental part of the project, as discussed above, would be to define and agree outcomes, indicators and potential impact, as well as ways to measure these, with participants.

Documenting and modelling this experience would therefore lead to an institutional planning, monitoring and evaluation framework. This could then be applied across the institution to develop information literate, critical thinking independent learners, as well as build the research and teaching capacities of academic staff. It will also embed the necessary expertise in the institution for this process to be sustained into the future. Figure 13 shows a summary of this 'journey'.

A broad range of higher education and research institutions in Africa, and beyond, would benefit from this proposed further research, particularly if the participating institutions have different levels of resources, as in this preliminary study.

Once an 'Information and Research Capabilities and Pedagogic Capacity Unit' has been set up it would provide support on an ongoing basis to the university. These units could also provide support and information and research capacity building for other educational institutions in the region, as well as for other organisations involved in research. These units would therefore become centres of support and excellence to build research capacity, and teach information and digital literacy and independent learning. This role would enable revenue to be generated and lead to the sustainability of these centres.

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Appendix 1 University of Botswana workshop

Time	Day 1: Overview of current IL initiatives and planning, monitoring and evaluation frameworks	Time	Day 2: Review of possible strategies for effective and sustainable IL implementation	Time	Day 3: Way forward and plan of action
8.30-8.45	Welcome by Director CAD	9.00-9.15	Welcome & brief recap of day 1 (individual significant learning point; identifying specific issues that cropped up on the previous day; feedback) Duvigneau	9.00-9.15	Reflection
8.45-9.00	Objectives, workshop format & introductions Fidzani	9.15-10.30	The focus is on UB's plans and expectations over the next three years (individual reflection). In terms of current UB plans, the purpose of the following activity is to focus attention on what you would expect/like/love to see over the next three years and how UB would monitor and evaluate these activities. Activity: delegates are asked to list key goals and activities they would expect/ like/love to see over the next three years. (Duvigneau & Hepworth facilitate)	9.15-9.30	Review of outcome mapping stages (thinking about the way ahead); discussion
9.00-9.20	An overview of international trends in terms of encouraging independent, information literate, critical thinkers Hepworth			9.30-10.15	Prioritising and planning next steps (short term & long term) Activity: Delegates prioritise activities.
9.20-9.40	IDS IL activities Duvigneau			10.15-10.30	BREAK
9.40-10.00	UB's vision & IL commitment Oluka			10.45-11.10	Reflection capturing other priorities
10.00-10.30	Q&A, discussion			11.15-11.30	What previous work could contribute
				11.30-11.45	Pledges
				12.00	Reflection on the two and a half days. Close
<i>BREAK</i>		<i>BREAK</i>		<i>LUNCH</i>	
10.45-12.30	Planning, monitoring and	10.45-12.00	Delegates choose three broad key		

	evaluation strategies (Outcome Mapping) Hepworth & Duvigneau Discussion		areas and sub topics and discuss activities, indicators and challenges. Activity: Delegates produced three charts in groups (activities, indicators, challenges) feedback & group discussion. (Hepworth facilitate)		
<i>LUNCH</i>		<i>LUNCH</i>			
2.00-3.00	Reflection on UB's experience over the last 20 years Current initiatives: CSSU's experience Librarian's experience	2.00-3.00	Discussion on what evidence or indicators will need to be gathered to see whether progress is being made.		
		3.30-3.45	Reflection on what will help or hinder this process (competing interests, capacities or capabilities). BREAK		
		3.45-4.00	Activity: Groups focus on the stakeholders they have identified and focus on the indicators will need to be gathered to see whether progress is being made and challenges. (Duvigneau & Hepworth facilitate) Reflection		

Appendix 2 Interview structure: introductory letter

The purpose of the visit and conversations with senior staff is to:

- a) Provide an opportunity to reflect and discuss UZ's future direction, in terms of fostering information literacy/independent learning/research capacity among undergraduates and post graduates i.e. across the institution.
- b) Develop a shared understanding of the questions and challenges that need investigation and how these could be investigated or resolved;
- c) Develop a shared understanding of possible partnerships and opportunities.

To help achieve this there are a number of questions I would like to discuss with staff at UZ. They fall into three main areas: reflection on what has been done; the future vision and how we could work together. Questions would include:

Reflection and orientation

What has been done?

What has been achieved?

What changes have been observed?

What were the challenges?

Future vision

What would you like to do now, from an institutional, departmental or individual (staff/learner) perspective in terms of fostering information literacy/independent learning/research capacity/culture?

What changes do you want to see (expect, like, love)? What will success look like?

Who has a vested interest in the outcomes?

What evidence will you need to collect to know whether you making progress or have achieved your goals?

Who would be involved in collecting this data?

What skills are needed to take this work forward?

Next steps

To help achieve this future vision i.e. to foster and develop information literacy/independent learning/research capacity/culture what questions need to be answered?

Is it desirable to develop a planning, monitoring and evaluation framework that would help to guide future activities?

Would other organisations benefit from this experience?

How would working in partnerships facilitate this process?

Who would be involved and how would they contribute?

How would they work together?

What resources would be required?

Do you know of funding opportunities?

As stated this is an opportunity for reflection, discussion and future thinking. It is also an opportunity for me to familiarise myself with the situation and to get an idea of whether we could contribute in any way, in terms of enabling you to achieve your goals, and whether there is work that we could do together in the future.

If people would like to get an insight into my interests and the kind of work I do, the links below go to my Loughborough website and also to a blog.

I hope this gives you the necessary information you need. I will be in touch in due course.

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