

Adding Action to the Information Audit

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Abstract: The Information Audit (IA) has long been seen as an important tool within the Information Management field, with its origins stemming from financial audits. It is used extensively in libraries as an improvement tool and, although many have tried to define it, such as Guy St. Clair (1997), Orna (1999) and Henczel (2001a), there is still no general consensus on a definition, or the steps taken to achieve it. Whatever form it may take, it is agreed that to undertake such a task requires a structured approach. The following study will propose a hybrid approach in which Henczel's seven-stage Information Audit model will be coupled with the Action Research (AR) methodology in order to assist a mid-sized architectural practice to manage their information throughout the architectural design process, and, in particular, as they attempt to design a new academic building for a prominent Australian university.

Keywords: information audit, information management, architectural design process, action research

1. Introduction

As organisations begin to create and accumulate information, they tend to lose sight of how to manage it, and what information they actually possess. We are currently seeing this information being created at an astonishing rate, and manifesting itself in many forms. Organisations such as architectural firms are not only dealing with traditional paper-based documents, but are now also dealing with an abundance of unstructured data such as emails, pictures from building sites, technical drawings, formal documents from governing organisations, handwritten notes taken during interviews with clients and even transcripts collected from focus group activities.

In order for an organisation to achieve high performance it is stated that, "effective information management is the key" (Roglaski 2006), but the sheer amount of unstructured data being created by these organisations present it with many challenges. Roglaski continues by stating that, "finding the right information is difficult, information is not well leveraged among partners and it is not coming together in ways that will yield useful new insights" (Roglaski 2006).

However, before an organisation can effectively and efficiently manage the information that they create, possess and disseminate, they must first complete an audit of their current information practices. An Information Audit (IA) can be seen as a tool that can be used to assist them with this process. Botha and Boon (2003) suggest that an Information Audit can be defined as:

The systematic examination of the information resources, information use, information flows and the management of these in an organisation. It involves the identification of users' information needs and how effectively (or not) these are being met.

The study will attempt to audit the information created by a mid-sized architectural practice as they cycle through the architectural design process in order to design a new academic building for a prominent Australian university. This will be done through the use of a hybrid methodological approach in which Sue Henczel's seven-stage Information Audit model will be combined with Kemmis and McTaggart's Action Research (AR) model.

2. Literature review

2.1 Information Audit (IA)

Over the last three decades there have been many attempts to define what an IA is, and what it should encompass. Yet to date, there is still no universal consensus. Early IA definitions (Reynolds 1980; Burk & Horton 1988) tended to focus on more formal information sources with a strong emphasis on document management, while recent approaches (Buchanan & Gibb 1998; Henczel 2001; Orna 1999) have moved away from this narrow approach to recognise and incorporate the importance of organisational approaches and the broad range of information resources.

In order to demonstrate the differences in approaches and definitions of Information Audits a brief examination of some of the definitions is provided:

LaRosa (1991)

... A systematic method of exploring and analysing where a library's various publics are going strategically, and determining the challenges and obstacles facing those publics. The audit, which raises questions about where and when these publics find and use information, gives the library a better understanding of the present and future needs of its constituents which in turn helps the library determine its most appropriate strategic direction.

St. Clair (1997)

A process that examines how well the organisation's information needs and deliverables connects with the organisational missions, needs and goals and objectives.

Buchanan and Gibb (1998)

Discovering, monitoring and evaluating an organisation's information resources in order to implement, maintain, or improve the organisation's management of information.

Orna (1999)

A systematic evaluation of information use, resources and flows, with verification by reference to both people and existing documents, in order to establish the extent to which they are contributing to an organisation's objectives.

Henczel (2001b)

Is a process that will effectively determine the current information environment by identifying what information is required to meet the needs of the organisation. It establishes what information is currently supplied, and allows matching of the two to identify gaps, inconsistencies and duplications. The process will also facilitate the mapping of information flows throughout the organisation and between the organisation and its external environment to enable the identification of bottlenecks and inefficiencies.

As we can see from the definitions listed above, a majority focus on the organisations and the management of their information. It is only LaRosa who makes reference to the end users of this information, and only a few make reference to the use of Information Technology (IT) in their primary definition of IA, which can now be seen as an essential part of every organisation and the way they manage their information.

2.2 Approaches to information audits

Buchanan and Gibb (2007) describe the IA as being, "central to the effective organisational management of information, however there is evidence from the field that IA is neither fully accepted nor commonly practiced" (Buchanan & Gibb 2007). However, when an IA is executed by an information practitioner it can be seen as a very costly exercise for an organisation due to the time and resources that must be allocated for such an undertaking.

Currently there is no standard or agreed methodological approach within the field, and it is generally left to the practitioner to sort through a myriad of academic and proprietary methods – some more comprehensive than others. Once an appropriate methodology has been selected, the practitioner is required to identify "the numerous tools and technique(s) required to support the methodological process" (Buchanan & Gibb 2007).

Many may also argue that a standard for IA is not required, as each organisation needs to be treated as a separate entity and requires a different approach. Buchanan and Gibb (2007) also suggest that there is a, "lack of an agreed methodological approach" which in turn makes the selection of the methodology somewhat challenging. To add to the complexity of methodology selection, there has also been limited empirical evidence regarding the usability of the existing approaches.

In support of Buchanan and Gibb's (2007) argument, Botha and Boon (2003) concluded that, "more research is required on the topic of information and more of the methodologies need to be tested in practice" (Botha & Boon 2003), which in turn will allow both practitioners and academics to develop more reliable IA methodologies that can be confidently used and re-used.

2.3 Information audit methodologies

As stated in section 2.2 there has been a myriad of methodologies created and adopted. The table below provides an outline of some of the major methodologies, in chronological order.

Table 1: Outline of some major information audit methodologies in chronological order

Year	Author	Brief description
1987	Worlock	<p>Worlock discusses a framework of headings for the auditing process after testing it out in various environments and suggests that the judgement of these headings rests with the person undertaking the audit. In total, there are five headings, each of which should not be seen as being mutually exclusive. The five headings are:</p> <ol style="list-style-type: none"> 1. Utility analysis. 2. Quality values. 3. Productivity factors. 4. Implementation criteria. 5. Strategic impact statements.
1988	Burk and Horton	<p>Burk and Horton were the first to develop InfoMap; it was seen as the first IA methodology developed for widespread use in the industry. Its focus was to evaluate the information resources using a four-stage process.</p> <ol style="list-style-type: none"> 1. Survey staff using questionnaires or surveys. 2. Measure the information resources against cost/value. 3. Analyse resources. 4. Synthesise the findings and map the strengths and weaknesses of the information resources against the objectives of the organisation.
1993	Booth and Haines	<p>Booth and Haines made use of the IA for organisational change and for the development of a new information policy for a regional health authority in the UK. Their strategy involved five components, which were:</p> <ol style="list-style-type: none"> 1. Identify and review the corporate objective. 2. Decide what information is needed to meet the corporate requirements. 3. Conduct an IA through the use of questionnaires and interviews to determine if the current required information exists within the organisation and if so, how it is currently being utilised. 4. Address the identified information gaps and problems where possible. 5. Develop a comprehensive information management policy for the organisation
1993	Ellis, Barker, Potter and Pridegeon	<p>Ellis, Barker, Potter and Pridegeon acknowledge that there are many different approaches to information auditing; however, they suggest that, to fulfil its function, an IA must encompass the following:</p> <ol style="list-style-type: none"> 1. Establish what the major goals of the organisation/operation are and what kind of organizational constraints act upon the operational information systems. 2. Determine the needs of the users. 3. Inventory the resources available. 4. Build up a coherent picture of how the system functions from the information gathered in the first three stages.
1994	Webb (cited in Botha and Boon 2003)	<p>Webb describes the IA according to three distinct stages:</p> <ol style="list-style-type: none"> 1. Initial audit (inventory). 2. Collecting the data. 3. Data analysis. <p>It can be seen as an operational advisory audit as it looks at how the IA can be used to audit the current system and how effectively and efficiently the resources are being used.</p>
1997	St. Clair	<p>St. Clair states that the information audit can be grouped into five main areas which are:</p> <ol style="list-style-type: none"> 1. Getting the ball rolling 2. Conducting interviews

Year	Author	Brief description
		<ol style="list-style-type: none"> 3. Organising and conducting interviews 4. Follow up 5. Typical pitfalls and mistakes.
1997 1998 2007 2008	Buchanan and Gibb	<p>Buchanan and Gibb studied a number of IA case studies and developed what they described as a “universal model” for conducting IAs. Their approach was to create an IA model that could be used in a number of different environments and for the purposes of developing an effective information strategy for organisations. The “universal model” proposed by Buchanan and Gibb consists of five phases, these being:</p> <ol style="list-style-type: none"> 1. Promote 2. Identify 3. Analyse 4. Account 5. Synthesise.
2001	Henczel	<p>Henczel's work in 2001 leveraged off the strengths of Orna and Buchanan and Gibb to produce a seven-stage auditing process. Henczel also suggests that the use of the IA should focus more on the strategic direction of the organisation and that it is the first step in the development of a knowledge audit or knowledge management strategy. Henczel's seven stages are:</p> <ol style="list-style-type: none"> 1. Planning 2. Data collection 3. Data analysis 4. Data evaluation 5. Communicating recommendations 6. Implementing recommendations 7. The information audit as a continuum.
1990 1999 2004	Orna	<p>Orna makes a metaphorical reference to the financial audit in her description of the IA as an, “authoritative examination of accounts with verification by reference to witnesses and documents” (Orna, 1990). Orna discusses the scope of the IA in terms of seven phases which are:</p> <ol style="list-style-type: none"> 1. Plan. 2. Investigate the information available in the organisation. 3. Identify the resources that are available for making information accessible. 4. Determine information used to further the purposes of the organisation. 5. Identify those that are responsible for managing and processing the information, respectively. 6. Identify and evaluate the information technology that is used to manage information resources. 7. Calculate the cost and determine the value of organisational information resources. <p>Since then, Orna (1999) has developed an alternative auditing process comprising ten steps:</p> <ol style="list-style-type: none"> 1. Conduct a preliminary review to confirm operational/strategic direction 2. Gain support/resources from management 3. Gain commitment from the other stakeholders (staff) 4. Plan, including the project, team, tools and techniques 5. Identify the IR, information flow and produce a cost/value assessment 6. Interpret findings based upon current versus desired state 7. Produce a report to present findings 8. Implement recommendations 9. Monitor effects of change 10. Repeat the IA.

From the analysis of Table 1, we can clearly see that there are many different approaches to conducting an IA, ranging from Webb's (1994) three-step process all the way up to Orna's (1999) ten-step process. It is also of interest to note that not all IAs focus on the same aspects and contain the same level of structure and detail.

3. Methodology

As stated in the introduction section, the study will attempt to audit the information created, processed and disseminated by a mid-sized architectural practice as they cycle through the architectural design process in order to design a new academic building for a prominent Australian university. Although there are many different methodologies that could have been selected as outlined in section 2.3, the researcher has opted for a hybrid approach in which two methodologies will be combined. This particular study will attempt to combine Henczel's (2001) seven-stage IA model with Kemmis and McTaggart's AR spiral to form a hybrid approach.

3.1 Justification

After careful consideration of the methodologies on offer, the researcher has decided to select Henczel's seven-stage IA model over the other competing methodologies as it:

1. Leverages off the strengths from previous work by Orna, Buchanan and Gibb to produce a seven-stage auditing process:

Previous work completed by Orna, Buchanan and Gibb have focused on developing effective information management strategies, as well as the comprehensive examination of the organisation - with particular reference to witness accounts and documents. Henczel's seven-stage IA model builds upon these strengths and also provides the practitioner a practical guide on how to structure and conduct one.

2. Focuses on a strategic direction for the organisation:

While earlier IA models incorporated strategic impact statements as apart of their approach (Worlock 1987), a majority of them have neglected to address the strategic direction for the organisation. Henczel's seven-stage IA model allows for the creation of a knowledge audit or knowledge management strategy, which, in-turn may assist the architectural practice in their decision making processes and allow the directors to form new information management policies based on the data collected within the IA.

3. Is similar to the AR cycle – Henczel's model advocates the IA as a continuum where there is an establishment of a cyclical process:

Both processes advocate that there should be an on-going process in which changes and adjustments need to be continually made. This is due to the fact that, organisations are required to be flexible in order to deal with the changes both internally, and the environments in which they operate within. Another reason why both were chosen was that they also took on a structured, methodical approach as opposed to earlier IA models such as Worlock (1987).

4. Has incorporated IT into its overall process:

Changes in technology and workflow processes have made earlier IA models not as comprehensive as they need to be now. The models that were developed in the early 80s and 90s did not focus in-depth on IT within organisations as its use was not wide spread. It can also be argued that the use of IT in the management of information has also not been seen as an effective as at this stage it full potential had not been realised.

5. Has considered management and operational aspects with the submission of a business case in the planning stage before proceeding:

For any project an organisation decides to adopt, the support of management is of upmost importance. Henczel's seven-stage IA model addresses this, and has considered the enlisting this support of management through the form of a business case before any work has been completed.

In addition to Henczel's seven-stage IA model, the researcher has also incorporated Kemmis and McTaggart's AR spiral. This will be utilised in place of stage six – implementing recommendations. The reason for this selection is that the researcher believes that, although Henczel's stage six fits well into the overall IA process, the use of the Kemmis and McTaggart's AR spiral will serve as a better

diagnostic and implementation tool as it can be seen as a more strategic and structured approach for implementing change. The use of an AR methodology should also, “assist in solving an organisational problem, or in some instances takes a step forward in deepening an organisation’s understanding of themselves” (Emerald, 2008).

3.2 Participants

The study will make use of a mid-sized architectural and urban design practice as a case study. It will attempt to audit the information created by a mid-sized architectural practice as they cycle through the architectural design process in order to design a new academic building for a prominent Australian university. The practice was established in 1996 and is based in the Central Business District (CBD) of Melbourne, Australia. It is currently being led by a team of five directors and also encompasses ninety professionals, who include: architects, technical staff, designers and construction staff.

The practice has been involved with, and completed numerous large-scale commissions for both private and government sectors, with some of their most recent projects including major commercial buildings, university education and training facilities, and government and defence projects.

3.3 Henczel’s seven-stage IA model

Similar to Orna’s (1990) IA model, Henczel’s IA model also consists of seven main stages. As demonstrated in Figure 1 each stage is clearly defined and each stage needs to be complete before the next one can commence. Listed below is a short description of what is involved in each stage.

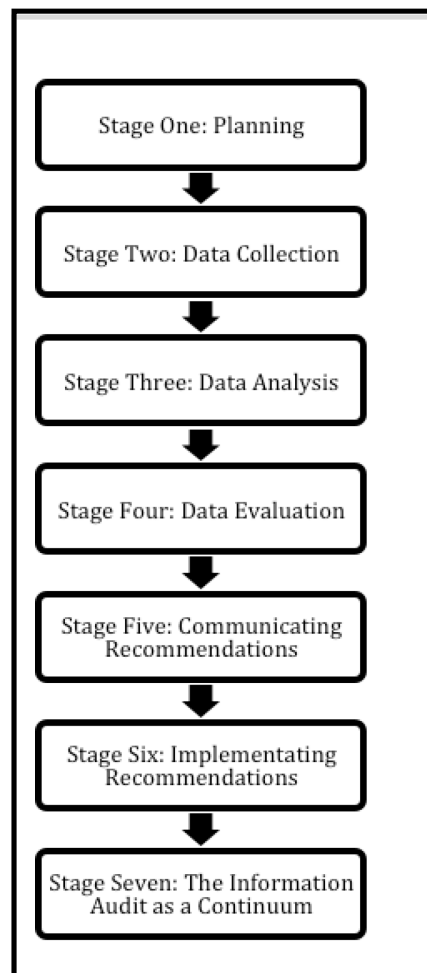


Figure 1: Henczel’s seven-stage information audit model

Stage one: Planning

Involves planning and the submission of a business case for approval by the organisation before proceeding on to the data collection.

Stage two: Data Collection

Involves the collection and development of an Information Resource (IR) database and its population through survey techniques such as questionnaires, personal interviews or focus groups.

Stage three: Data Analysis

Once the data has been collected, it must be organised in a way that allows it to be analysed. It is up to the person leading the IA to select the most appropriate method for the analysis of the data. Henczel suggests that, as specialist skills are required to accomplish this, it might be worthwhile to contract experts outside your organisation.

Stage four: Data Evaluation

At the data evaluation stage, the data begins to show the person conducting the audit a “snapshot” of the organisation’s information environment. This will facilitate the interpretation and formulation of the recommendations

Stage five: Communicating Recommendations

Henczel suggests that there are many ways of doing this, depending on the size of the organisation and the scope of the recommendations. However, the key people who need to be kept informed through this process may include:

- Anyone who has championed the audit
- Any sponsors
- People who directly participated
- Those who will be affected by the recommended changes. (Henczel 2001).

The communication of these recommendations may be delivered in many forms and could include: reports, website or intranet, verbal presentations, seminars and personal feedback to participants.

Stage six: Implementing Recommendations

This stage can be seen as the second-last stage in Henczel’s seven-stage IA model. It involves the development of a plan for when and how the recommendations outlined in the previous stage will be implemented. Henczel suggests that the organisation, together with the nature of the recommendations, will influence how the implementation occurs.

Stage seven: The Information Audit as a Continuum

Henczel suggests that when you reach the end of the audit, it is really only the beginning and that organisations need to be thinking about the IA as a continuous process to ensure that data gathered initially can be re-assessed and updated.

3.4 Kemmis and McTaggart’s Action Research spiral

McKay and Marshall (2001) describe how Action Research (AR) in its simplest form involves both action and participation within a particular field. Its focus is to problem-solve in order to improve the way processes are performed and services are delivered.

AR typically makes use of four main phases of continuous change, which are: Plan, Act, Observe and Reflect

For the purpose of this study, Kemmis and McTaggart’s AR Spiral was selected and will be embedded within the implementation recommendations stage (stage six) of Henczel’s seven-stage IA model. The spiral consists of the four phases of AR and is to be carried out collaboratively with the organisation that is being studied.

Figure 2 represents Kemmis and McTaggart's AR Spiral (1988). It includes the four main phases of continuous change (plan, act, observe and reflect). Provided below is a brief description of what happens within each phase.

Plan: Develop a plan of critically informed action to improve what is already happening within the organisation that is being studied.

Act: Based on the plan formulated, act upon the plan and implement it.

Observe: Observe the effects of the critically informed action in the context in which it occurs.

Reflect: Reflect on these effects as the basis for future planning, subsequent critically informed action and so on, through a cycle of succession cycles. (Kemmis & McTaggart, 1988)

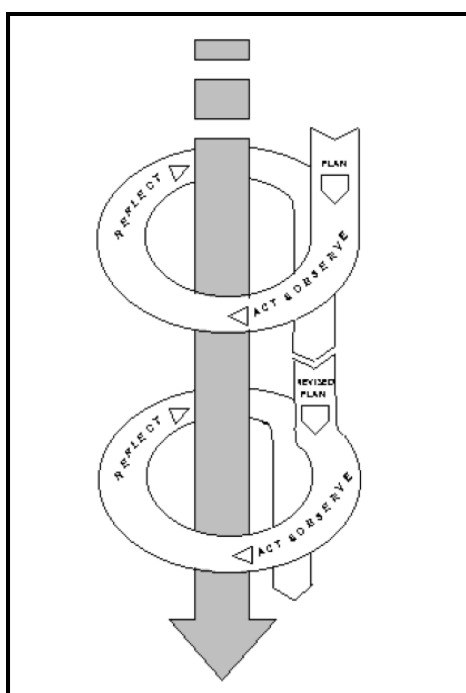


Figure 2: Kemmis and McTaggart's (1998) action research spiral

3.5 Combination of the two methods

As stated in section 3.1, the study will take on a hybrid approach where Henczel's seven-stage IA model and Kemmis and McTaggart's AR Spiral will be used in conjunction with one another. The study will cycle through each one of the seven stages of Henczel's IA model; however, there will be a modification made to the sixth stage (implementing recommendations) of the audit instead of making use of Henczel's sixth stage, where the outputs should include:

- An information policy
- Post-implementation strategy
- Revised business plan and information management process
- An updated information resources database.

With the addition of Kemmis and McTaggart's AR Spiral, the findings of the previous stages of Henczel's seven-stage IA model will inform the planning phase and, in the last component of reflection, will lead into the final stage, which is the information audit as a continuum. Figure 3 demonstrates how this will be accomplished.

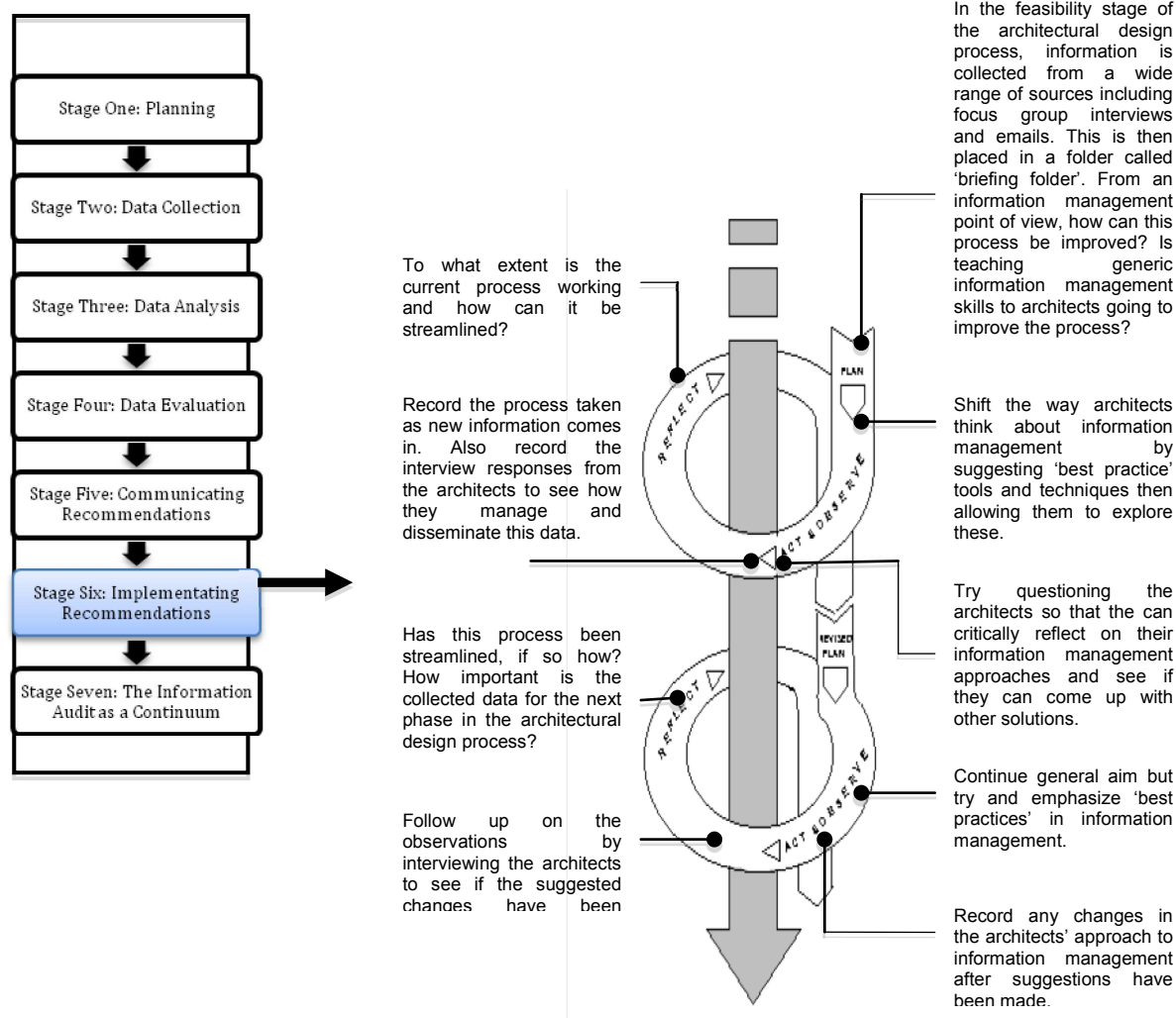


Figure 3: The incorporation of Kemmis and McTaggart's action research spiral within stage six of Henczel's seven-stage information audit model (Vo-Tran 2010).

In terms of the techniques that will be used within the combined methodologies, the researcher has decided to select two commonly used techniques, these being observations and interviews. The use of observations for this study will allow the researcher to understand, without interfering with the current practices within the organisation during their the planning phases. Observations can be used again to see if the changes that have been made during the implementation stages have been beneficial. In addition to the observations, interviews will be conducted to explore the attitudes and responses to the changes that have been made. This will also allow the researcher to gather qualitative information in the form of narratives. It is anticipated that the interviews will take place at the organisation and take on a planned but unstructured approach.

4. Preliminary findings

As the study is currently in progress, this section will outline the major findings of the first two stages to date. The findings will be broken down and reported in terms of Henczel's seven-stage IA model.

Stage one: planning

A formal letter was submitted to the directors of the architectural practice seeking their permission to participate in the study. Written permission was granted by the practice and the researcher then sought and received ethics clearance from their home university.

Adhering to Henczel's seven-stage IA model, the following tasks and activities were considered and implemented:

Table 2: Outline of the tasks and activities that were considered and implemented

Task	Activity
Developing clear objectives	An understanding of what the IA is trying to achieve for both the researcher and architectural practice Understanding the organisation and its core business Identification of the key stakeholders
Defining and scoping the resource allocation	Physical and information scope Human, financial, technical and physical resource allocation Insource, outsource options
Selection of a methodology	Data collection, analysis and evaluation The presentation of the findings and recommendations Action plan for implementing the recommendations
Development of a communication strategy	Before the audit During the audit After the audit

(Henczel 2001a)

From the tasks and activities listed in the table above, a business case was formulated and presented to the directors of the architectural practice; this has subsequently been approved and signed off.

Stage two: data collection

Upon completion of the business case, data needed to be collected. This was undertaken using a combination of techniques, such as onsite interviews and observations. From this, an Information Resources (IR) database was established and greater understanding of the architectural practice was achieved. Listed below are some of the findings that resulted from the interviews and observations.

- Projects are won through the tendering process, in which the architectural practice presents their ideas to prospective clients.
- Staff at the architectural practice work around project-based teams. They can be working on multiple projects at any given time depending on workload and expertise.
- Each project has one of the architectural practice's five directors in charge, and these directors may be spread across no more than three projects.
- All project teams are multidiscipline, and may include architects, draftsmen, consultants, engineers and designers.
- Projects may last anywhere between six months and four years, depending on the size and complexity.

In addition to the practices and processes listed above, the data collection also identified some challenges in information management the architectural practice is facing:

- Storage of documents and images. Documents and images are currently being duplicated in both physical and electronic formats. These may not be identical as it might take time to update the documents to reflect either format. In addition to this, electronic copies of documents are stored within folders according to the file type, e.g. all the PDF files in one location while all the word documents are in another.
- Recording decisions. The architects have stated that this is one of their biggest problems; any changes that have been made to a building go straight onto the drawing and there is no record to why this decision has been made. This causes problems later on when they have no idea why these changes have been made.
- Re-use of information. Although no two projects will be ever the same, there are some elements or aspects that could be reused. Instead, the architects and draughtsmen spend lengthy amounts of time trying to re-create almost identical drawings when they could be spending the time working on other elements of the building.

- Transfer of project details to new staff members. As the practices' staff members move from one project to another, it takes them time to read through the brief, and attempt to get up to speed as soon as possible. This is done through reading both the physical and electronic documents, which may not always contain the most recent changes. This in turn, means that they will have to spend more time with another staff member going through the finer details.

5. Directions for future research

As the research is currently in progress, it is anticipated that over the next six months the study will move from the data collection stage into the data analysis and evaluation stages. The data collected so far will now inform what needs to be done in terms of implementing the recommendations and structuring the action research component of the hybrid methodology. It is also anticipated that once the IA has been completed, it will add to the body of knowledge about which Botha and Boon (2003) concluded in a paper, "more research is required on the topic of information and more of the methodologies need to be tested in practice" (Botha & Boon 2003).

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