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Research on E-book usage in academic libraries: 'tame' solution or a 'wicked problem'?

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Research on E-book usage in academic libraries:
'tame' solution or a 'wicked problem'?

Abstract

A systematic review of literature on research about the usage of e-books in academic libraries published in the United States and the United Kingdom¹ between 2004 and 2014 is examined. Through the use of Soft Systems Methodology, commonalities were identified amongst the articles, together with factors such as questions asked, user response and the research methods that were used. Several areas of deficiency were identified in the conduct of the research and, in order to contextualise the issues, Horst Rittel and Melvin Webber's (1973) characteristics of a 'wicked problem' and a 'tame problem' were used as a framework. It was concluded that e-book usage does have several of the characteristics of a wicked problem, and uncertainty about the exact nature of the problem will remain until further research has been conducted into the various aspects concerning e-book usage, such as reading and comprehension.

¹ Unoriginal text: 8 words
open.uct.ac.za/handle/11427/12997

Keywords: e-books, soft systems methodology, research studies, wicked problem, tame problem, e-book usage.

Introduction

Significant proportions of acquisition budgets are being spent by academic libraries in many countries on electronic books (e-books) or the implementation of e-books in their libraries. Research has shown that there are effects of screen-based reading on the human brain and that the ergonomic aspects of the various

reading devices affect the way people read and understand. It seems that library managers, and people in general, have tended to ignore the research done and have gone with what they believe their users demand, which appears to be continuously available and easy access to academic resources. It is of strategic significance to know whether the money spent by academic libraries and the effort put into such an endeavour is effective, how it is being used and what users think of e-books are significant factors for collection building and management.

Levine-Clark (2006: 286) notes that the assessment of user satisfaction with e-books has been somewhat neglected and that research about e-books has concentrated on the assessment of technologies such as vendor provision. However, how users perceive e-books and the reasons underlying e-book use or non-use is an important factor for both libraries and e-book publishers and should not be neglected.

Upon critically reading the literature dealing with user satisfaction with regards to e-book usage, it becomes apparent that many researchers tend to ignore various issues that have an effect on how the data collected is interpreted. For example, a low response rate, the types of questions asked and the method of research. Even the location of the research is important: there are several examples of potentially erroneous inferences about e-book usage based upon studies conducted in another country or milieu. Confusion over the definition of an e-book as well as what the word 'usage' implies, is another major issue: can one really trust data from a questionnaire completed by users who have indicated at the outset that they do not know, or are unsure of, what an e-book is? These issues may be considered as the

making of a 'wicked problem'.

2.0 What makes a 'wicked problem'?

The term 'wicked problem' can be described as referring to that class of social system problems which are ill-formulated, where information may be confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly ² confusing' (Churchman, 1967: B-141). The term was introduced in 1967 by Horst Rittel and developed with Melvin Webber in a paper published in 1973 entitled 'Dilemmas in a general theory of planning' (Rittel & Webber, 1973). In this paper, the authors spoke about how the sense of 'wickedness' refers to the difficulty of determining a solution or solutions, rather than any assertion of intrinsic evil. Rittel and Webber stated that a wicked problem should have ten characteristics. The characteristics are:

1. There is no definite formulation for a wicked problem
2. Wicked problems have no stopping rules
3. Solutions to wicked problems are not true or false, but better or worse
4. There is no immediate and no ultimate test of a solution to a wicked problem
5. Every solution to a wicked problem is a ³ 'one-shot operation'; because there is no opportunity to learn by trial-and-error, every attempt counts significantly
6. Wicked problems do not have an enumerable (or ⁴ exhaustively describable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan ⁵
7. Every wicked problem is essentially unique
8. Every wicked problem can be considered to be ⁶ symptom of another [wicked problem]

9. The causes of a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution ⁷

10. [With wicked problems,] the planner has no right to be wrong

(Rittel & Webber, 1973: 161-167; Ritchey, 2013: 4-5).

Ritchey (2013: 3) notes that the criteria for a 'wicked problem' can be limited to four or five characteristics as some of the characteristics overlap or are closely related.

If the problem did not have these characteristics, it would then be classified as a 'tame problem'. A problem is considered 'tame' if it has the following characteristics:

1. A well-defined and stable problem statement
2. A definite stopping point - we know when a solution has been reached
3. The solution can be objectively evaluated as right or wrong
4. Belongs to a similar class of problems which are solved in a similar way
5. Have solutions that can be easily tried and abandoned
6. Comes with a limited set of alternative solutions ⁸

(Conklin, 2005: 9-10; Ritchey, 2013: 2)

Examples of wicked problems offered by Conklin (2005:8) and Ritchey (2013:2) include the questions whether to build the highway through the city or around it and how should crime and violence be dealt with in schools. These examples meet the ten characteristics of a 'wicked problem' and they also have a human or social element to them that will affect any decision made. Other issues where wicked problems are commonly found are healthcare,

poverty and terrorism, to name just a few (Batie, 2008: 1176).

Soft Systems Methodology, pioneered by Peter Checkland in 1981, is often used when approaching problems that are thought to be wicked. Soft Systems Methodology can be defined as an organized, flexible process for dealing with situations which someone sees as problematical, situations which call for action to be taken to improve them, to make them more acceptable, less full of tensions and unanswered questions' (Checkland & Poulter, 2006: 4). Soft Systems Methodology is a good method to use when tackling 'wicked problems' because it specifically deals with situations that have a strong social element to them.

3.0 The research problem

Vendors supply circulation statistics that show e-books are being used, but they do not provide information about the reasons behind use, how e-books are being perceived and user satisfaction with the format. Consequently, there has been an interest in investigating e-book usage and user satisfaction: as a result, many studies have been conducted. The results must be interpreted with care: research that has been conducted in the United States, for example, cannot unhesitatingly be compared with the results of research that was conducted in the United Kingdom, even if it was conducted in the same year. Each country and, even, its individual states or provinces, is unique and cannot easily be compared with another, because the demographics of the population (such as age, education, culture and economic background) differ. Despite this, the published literature indicates that attempts at comparison are made.

² Unoriginal text: 22 words
www.strategyoneconsulting.ca/

The aim of the study was to discover whether the issue of e-book usage in academic libraries constitutes a 'wicked problem' or a 'tame problem'. The implication of the latter finding would be that the characteristics, nature, effects and use of e-books can be comprehensively and completely described and understood; the implication of the former is that no reliable and stable conditions of sufficient generality can yet be ascertained.

Journal articles describing research on e-book usage that was conducted in the United States and the United Kingdom, spanning a ten-year period, were collected and analysed. While each article had the issue of e-book usage in common, the aims of the articles differed, resulting in a representation of a variety of research methods, target populations, questions and results. The research was analysed, looking for various factors and commonalities, such as:

Location

User response

Demographics (age and gender)

Method of research used for data collection

What part of the institution was surveyed (faculty or whole university)

Questions asked

Results and recommendations

Another important issue is that of the vendor-funded research. While research conducted by e-book platforms such as Springer and ebrary provides interesting results pertaining to user satisfaction, the question of whether they can be considered independent and reliable arises. Preference was given to research that was not vendor-funded.

4.0 Limitations and exclusions

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The extent of the research is limited in that the findings are based largely on journal articles published over the course of the past ten years and that only articles written in the English language have been consulted. Additionally, a major limitation is the sole reliance on the literature, a substantial proportion of which is only available on the internet, to conduct the research. The thought processes of the researchers are unknown and, without personal discussion, remain unknowable: so, conclusions can only be drawn from what is provided in the literature.

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⁵ Unoriginal text: 23 words
en.wikipedia.org/wiki/Wicked_problem

Some of the research material encountered was excluded from the final selection, even though it fitted the date and location parameters, mainly because the focus of the material was not exclusively on e-book usage or because of the mode of distribution.

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5.0 Defining the term 'problem'

The word 'problem' frequently features in research; however very few scholars spend time trying to define what a 'problem' is and instead just assume the reader shares their understanding of what constitutes a problem.

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The term 'problem' can be defined as a 'discrepancy between the current state of affairs and a desired state' (Balint et al., 2011: 12). In other words, a problem is an acknowledgment that there is a gap of sorts between the present condition and the desired goal (Huitt, 1992).

The construction of a typology of problems - that is, differentiating between different types of problems and approaches to their solutions - is not a new

development. Social and community roles are built on the hope of rectifying problems. It is human nature to strive to be better and to improve something that has already been built and changed. However, with this drive for improvement, failure is often met along the way and instead of change, restructuring and relabeling takes place, thus creating a never-ending cycle of change (Grint, 2008).

6.0 Wicked and tame problems

The term 'wicked problem' may be attributed to Rittel and Webber (1973); however, they are not the only individuals to identify that there are some problems that prove difficult in nature to solve. Wicked problems have also been referred to as 'ill-structured problems' by Mitroff and Mason (1980: 339) and as 'social messes' by Ackoff (1974: 21), who coined the term 'social messes' because he believed that there was no suitable word to describe a 'system of problems'.

The reason behind the use of the term 'social messes' instead of 'wicked problems' is that the use of the word 'problem' creates confusion: use of the term 'problem' implies that there is solution, which is not the case with wicked problems (Ritchey, 2011: 1; Conklin, Basadur and VanPatter, 2007: 4).

6.1 Tame problems

Rittel and Webber introduce the notion of a 'tame problem', which they also refer to as a 'benign problem', as problems with which scientists and engineers encounter and solve. Examples are activities such as solving a mathematical equation or achieving checkmate in a chess game within a certain

number of moves (Rittel & Webber, 1973: 160). These two examples of tame problems show that there is a clear objective, and it will be readily apparent whether or not the problem has been solved.

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A problem is considered 'tame' if it has the following characteristics or distinguishing features (Conklin, 2005: 9-10; Ritchey, 2013: 2):

A well-defined and stable problem statement
Definite stopping point - it is apparent when a solution has been reached
The solution can be objectively evaluated as right or wrong
Belongs to a similar class of problems which are solved in a similar way
Have solutions that can be easily tried and abandoned
Comes with a limited set of alternative solutions ¹⁰

A tame problem, then, has a clear beginning and end (Hancock, 2010: 34) and is susceptible to solution using analytical methods or approaches used by researchers in their relevant disciplines (Kreuter et al., 2004: 442).

6.2 Wicked problems

The term 'wicked problem' was first introduced and documented in 1967. Churchman, an academic at the University of California, attended a seminar in which Rittel first introduced the term 'wicked problem' to describe a class of problems that had a strong social element to it, was ill-formulated, where the information relevant to it was confusing, and the decision-makers had conflicting values and opinions (Churchman, 1967: B-141). Subsequently, Rittel and Webber (1973) clarified that the usage of the word 'wicked' in 'wicked problem' as implying that they

are tricky and elusive and little influenced by social and political factors (Kreuter, et al., 2004: 442; Rittel & Webber, 1973: 160). Several researchers later concluded that the original set contains elements of repetition and that the set could be simplified. There is not complete agreement on which are the unique factors, however, and a typical example of this approach is the analysis conducted by Burns, Hyde and Killelt (2013), who proposed a simplified set:

Wicked problems have no definitive formulation
The search for a solution to a wicked problem is 'open-ended'
Solutions are not true-or-false, but good or bad
No rules or criteria to determine how a wicked problem should be explained
A wicked problem is a symptom of another problem.

⁹ Unoriginal text: 33 words
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6.3 Differences between Tame and Wicked problems

There are four factors that can be considered to distinguish a wicked problem from a tame problem. Table 1 lists the factors and identifies the differences between a tame problem and a wicked problem.

Table 1: Characteristics of a tame problem and a wicked problem

Characteristic

Tame Problem

Wicked Problem

1

The problem

A well-defined and stable problem statement. Has a clear definition of what the problem is and, as a result, it is also possible to 'unveil' the solution

Wicked problems have no definitive formulation. No

agreement about what the problem is and each attempt to create a solution results in the problem changing

2

The role of the stakeholders

Belongs to a similar class of problems usually solved in a similar way. The cause of the problem can be determined by experts in the relevant field through the use of scientific data

There are no rules or criteria to determine how the problem should be explained. Stakeholders will have differing ideas about what the problem is and the causes of the problem

3

The 'stopping rule'

The solution can be objectively evaluated as being right or wrong. The search stops when it is recognised that the problem is solved

The search for a solution is open-ended. There is no definitive solution to such a problem and, as a result, the task ends when external forces (such as time and budget) prevail; the search is 'open-ended'.

4

The nature of the problem

The solution can be objectively evaluated as right or wrong. The problem is similar to other problems that have protocols in place to achieve a solution; a potential solution is either 'true' or 'false'.

Solutions are not 'true' or 'false' but 'good' or 'bad'.

As every problem is unique, and there is no set protocol in place, solutions are based on the multiple judgements and opinions of the stakeholders. The problem may be a symptom of another problem

Source: Kreuter et al., 2004: 443; Batie, 2008: 1177;

Burns, Hyde and Killett, 2013: 515.

A tame problem can be solved, but a wicked problem

is incapable of solution. Instead, the effects of wicked problems can only be 'resolved' for a period before the issue recurs (Norton, 2005: 132). Conklin, in the course of an interview, concurs, indicating that the recourse is to 'negotiate shared understanding and shared meaning about the problem and its possible solutions' amongst the stakeholders (Conklin, Basadur and VanPatter, 2007: 4).

7.0 Research on E-book usage in academic libraries: is it a wicked problem or a tame problem?

To help understand whether the analysis of e-book usage is a wicked problem or not, research articles into e-book usage in academic libraries, collected in accord with the parameters set for this study, were examined. Several issues in the conduct of the research on e-book usage became apparent:

- Location of the research
- Magnitude of user response
- Method of data collection
- Confusion over terminology
- Usage and awareness of e-books

The characteristics of a wicked problem and a tame problem, in relation to the research findings about e-book usage in academic libraries and the literature discussing it, is analysed within the framework depicted in Table 1 and will now be discussed.

7.1 The problem

It is only recently that research investigating e-book usage has been initiated at an institutional level. While circulation statistics showed that people were accessing the e-books, it was unclear whether they

were actually being read and what their process of reading embraced. Hence, some institutions that have provided e-books for at least ten years, are researching what the attitudes and perceptions of patrons are in relation to e-books, only to discover that many do not know about the service.

While the aim of the majority of the articles in the reviewed research was to discover patterns of e-book usage and perceptions of use, it was not the sole purpose of some of the articles. The research questions and methods used did not necessarily focus exclusively on e-book usage and perceptions. This, in conjunction with the different results the research methods would produce and the variety of institutions examined, indicates that there is no well-defined and stable problem statement regarding the study of e-book usage within which the results can be framed. Furthermore, the reviewed research indicates that researchers are interpreting the issue of what constitutes the 'e-book problem' differently: it can thus be argued that there is no definite formulation or hypothesis and, until there is, a wicked problem exists.

7.2 The role of the stakeholders

One conducts research to discover whether a product or service is being used. However with e-book usage, there are many factors that may influence, such as screen size of the reading device, which may affect reading ease and comprehension. There is a relative lack of research about the substitutability of books in e-format for those in print format and the feasibility of interchanging different e-formats.

Electronic books are a relatively new invention, and this supports the notion that e-book usage, as a

problem, is 'unique'. However, when other concerns about e-book usage are considered, such as reasons for non-use, it may be concluded that there are some aspects that already have a history. For example, eye-fatigue associated with particular formats of information pre-dates the introduction of e-books, for example, the computer screen.

Researchers also interpret and approach the investigation of e-book usage in different ways and in relation to their institutions, thus resulting in a variety of views in research and literature. For example, one institution may find the provision of e-readers and tutorials on how to access e-books are needed while another institution may find that increased awareness of the service, such as posters, is needed.

The analysis of the research literature included in the study indicates that the approach to the investigation of e-book usage differs from researcher to researcher and hence from stakeholder to stakeholder, and while the overall problem (e-book usage) is acknowledged, the research into the problem and possible solutions are not the same from researcher to researcher. Consequently, there is, as yet, no research paradigm, which is suggestive of the presence of a wicked problem.

7.3 The 'stopping rule'

The need to understand e-book usage has only been identified as a problem within the past few years due to the realisation that the methods that have historically been used for assessing usage - loan statistics and similar measures - did not reveal accurate or adequate information about the real pattern of usage. Implicit in the assumptions of many

collection managers may be the expectation that a print resource and its equivalent e-book are interchangeable as far as the user is concerned. The analysis of the research literature included in this study indicates that this 'substitutionary' view may be mistaken and that 'usage' comprises a social component involving multiple views, including the researchers themselves and extending to the collection managers and the users. The literature itself does not provide solutions; it collects the data that e-book usage and awareness is low but does not stipulate how the situation could or should combat such issues. It seems likely that any policy that is developed regarding e-book provision and substitutability at an institutional level would be individual to that institution since each academic institution is affected and influenced by the community that it seeks to serve. Consequently, for an academic institution to adopt a collection management policy in respect to e-books similar to a neighbouring institution without having tested user acceptability may be unwise. In respect of this characteristic, the assessment of e-book usage may be seen as a wicked problem because there is no agreed-upon body of research techniques.

7.4 The nature of the problem

A scientific experiment embraces the control of experimental conditions so that the effect of confounding factors can be suppressed and a reliable conclusion (true or false) drawn about the particular phenomenon being studied. The solution to any problem that involves people should not be considered as either true or false, because each is different, reflecting education, culture and upbringing, and it is not easy to predict what an individual might

do or to control the confounding factors as one might do in an experiment.

Analysis of the literature included in this study revealed several examples where the difficulties of collection of valid and accurate data about e-book usage were exacerbated by the use of a survey as a research method, which exasperated issues such as confusion over terminology and misinterpretation of questions. Instead of a survey, a focus group or a semi-structured interview could be used, where the confusion over terminology would be (it is to be hoped) eliminated. However, these research methods are expensive. It would seem that any solution to the collection of accurate and representative data on e-book usage will be time-consuming and resource-hungry, to the extent that it may be a prohibitively expensive exercise.

A tacit assumption in the development of collection management policy around the supply of e-books is that the utility of the print format and the e-book format are similar and that the information conveyed by each is identical. However, a complicating factor is that recent research has suggested that there may be a cognitive difference in comprehension between those reading text using print-on-paper resources and those reading the same text as an e-book (see, for example, Mangen, Walgermo and BrÅ,nnick, 2013). This research tends to support the view that e-books and print-on-paper books may not necessarily be considered as substitutes for each other. It is also possible that there are other, less tangible, differences in the experiences of using each that only a psycholinguistic investigation may uncover.

E-book usage can be seen as a wicked problem with

regards to this and the earlier-described characteristics because there is no consensus on how reliably to measure e-book usage and the effects of reading results differ, depending on the research method used and questions asked; moreover, there may be an, hitherto unexplained, cognitive effect as a confounding factor.

8.0 The extent of the problem

The issue of whether e-book usage is a symptom of another problem is debatable. E-books were first invented as a potential answer to the need to facilitate information dissemination and also to prove that the infant technology was viable. In other words, it can also be understood that concern about e-book usage is a symptom of uncertainties surrounding the technology of e-books: this, in turn, is a symptom of the greater problem of information distribution.

Some would argue that the profession is over-analysing the issue of e-book usage as people will use whatever format is available to them at their time of need, while others would argue that e-book usage is a problem that produces long-term effects, such as reading comprehension, especially if the use of e-books is incorporated into the school curriculum. Nevertheless, there is evidence to suggest sufficient uncertainty about the problem space to suggest that this is a wicked problem.

9.0 Conclusion

Academics and researchers alike have been stating that the shift from reading print to reading from a screen was going to change how people read, write and comprehend. Levy (1997) states that:

[Digital libraries are] participating in a general societal trend toward shallower, more fragmented, and less concentrated reading (Levy, 1997: 202).

While research has focused mainly on e-book usage and users perceptions as well as comparative reports on e-book expenditure amongst institutions (Library Journal, 2010), little rigorous research has been conducted on print versus digital literacy and the positive or negative effects reading from a digital device may have on an individual.

Analysis of research conducted in the United States and the United Kingdom spanning a ten year period reveals a variety of research methods, target populations, questions and results, making it impossible to arrive at a reliable set of generalisable conclusions. However, two issues stood out the most. The first was that many participants did not know what an e-book was, and in some cases it was also discovered that participants did not know what an electronic resource was.

Another interesting observation is confusion over the term 'usage'. It is a term which highlights a particular weakness, so far, in the research of e-book usage: the idea of 'use' differs from person to person.

It is difficult to produce accurate results and for other researchers to interpret those results when there is confusion over what an e-book is and what is meant by the term 'usage'. Another point that emerged from the analysis of the research is that some questions were too vague to collect accurate data, and other questions were asked but had no apparent value in the overall research.

There is a lack of research being produced from European countries, Africa and Australasia. It is evident that more research needs to be done on the subject of e-book usage on a global scale especially as the internet and the use of electronic resources are - at least, in some contexts - replacing visits to the library and the reading of a physical book. This is especially worrying when studies have shown that the human brain does not necessarily comprehend and retain information read from a screen to the same extent as reading from the printed page.

The consequences of early adoption of e-books are that copious amounts of money may have been spent on a service that was not being used due to lack of awareness; that the disadvantages of spending long periods of time reading from a screen may have been ignored; and that the availability of the print format has become less promoted.

Earlier, the characteristics of a wicked problem were analysed in comparison to the problem of e-book usage, and while the comparison revealed that it appears to have the characteristics of a wicked problem, the researchers are still hesitant to call it such. This is because the characteristics of a wicked problem do not encapsulate the enormity and complexity that surrounds e-book usage. It is apparent that there is a problem: one that came into existence with the advancement of technology that changed the way in which the reader interacts with the physical format and replaced it with an apparent replication of that format. Furthermore, it will remain a problem until more research is conducted into the process of reading with electronic devices and understanding the advantages and disadvantages of

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such a process.

Folb, Wessel and Czechowski suggest the following:

Perhaps librarians are spending too much time thinking about information containers (print versus electronic), a library-centric way of thinking, and not about the content¹² (Folb, Wessel & Czechowski, 2011: 226).

They proceed to state (using data collected from their research) that users would use the format (or 'container') that was available to them. The idea that people are more interested in the content than the 'container' or format in which it is consumed is not a new idea, and was expressed by the OCLC in 2004 (OCLC, 2004). Researchers may be over-thinking and over-reacting, and while research evidence supports claims such as the negative effects of e-reading and comprehension, it has not stopped society from embracing this technology and, hence, it is safe to say that e-books are here to stay.

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