A Method to Disseminate and Communicate IS Research Outputs Beyond Academia

A thesis submitted for the degree of Doctor of Philosophy

By

Faris Alwzinani

College of Engineering, Design and Physical Sciences

Department of Computer Science

Brunel University London

2017

ABSTRACT

Academic researchers in many disciplines are facing difficulties in disseminating their research outputs beyond the academic community. Particularly, Information Systems (IS) academic researchers have been struggling to make their research more relevant to practice. The diversity of IS research means that should be a wide audience within and beyond academia who could benefit from IS research outputs. This audience includes educators, practitioners, patients, etc. How IS relevant to practice is a central dilemma of IS research. Research relevance is classified according to dimensions such as interesting, implementable, current, accessible "Article style" by many IS scholars. These dimensions are important to be investigated as some academic papers are yet to be beneficial to an audience beyond academia. The Accessible dimension is the focus of this study where accessible means the academic papers should be readable and understood in terms of tone, style, structure, and semantics by the potential audience beyond the academic community.

This study investigates the barriers that limit academic researchers in disseminating and communicating their research outputs beyond academia. This study aims to design a communication method to assist academic researchers in disseminating and communicating their research outputs beyond academia.

This study consists of three phases, in the first phase a qualitative method is applied by interviewing academics in the Information System and Computing Department at Brunel University to gain a better understanding of how and why academics disseminate beyond academia. Based on communication theories a research framework is adapted to analyse and explain the interview data. In the second phase, short videos are recorded of 10 academics where each explains one of their papers. In the third phase, two different groups are interviewed to evaluate the 10 short videos in regards the Information Quality (IQ) dimensions (i.e. appropriate amount of information, format, and timeliness).

By using the thematic analysis technique the academics highlighted three barriers that limit them to disseminate and communicate their research outputs beyond academia. The three barriers are the message (i.e. academic structure

Abstract

and language of research papers), channel (i.e. academic journal and conferences), and social system (i.e. lack of Incentives, lack of time, and lack of support). Moreover, academics emphasised the vital role of feedback loop in their communication with target audience beyond academia. The 10 short videos are designed to overcome two of these barriers (i.e. message and channels). Each short video is evaluated by its academic author on one hand and the potential audience/stakeholders of the short video from the other hand (e.g. practitioners). Thus, the academic authors of the video suggest some changes by adjusting the video structure and adding some examples for more explanations of their research papers. Also, authors concerned about format particularly the visual elements of the video which have to be completely matched with the title of the video. However, the opinions of potential audiences vary based on their information need. For example, some practitioners are concerned with the practical information, in other words, practitioners seek the applicable part of the information provided in the short video (i.e. how to apply something); and others watch the short video to increase their awareness of a particular topic.

This study will assist academic researchers to focus on how to disseminate their research outputs to audience/stakeholders beyond academia using media tools (i.e. video). Also, it provides a novel method of disseminating and communicating their research outputs beyond the academic community. Moreover, this study helps to create an interaction platform that enables academic researchers to build a collaborative framework and a mutual understanding with the audience beyond academia.

DECLARATION

I declare that this thesis has not already been accepted in substance for any degree and is not concurrently submitted in candidature for any degree. It is the result of my own independent research except where otherwise stated.

ACKNOWLEDGEMENTS

The writing of this thesis has been one of the most significant academic challenges I have ever had to face. Without the support, patience and guidance of the following people, this study would not have been completed. It is to them that I owe my deepest gratitude. First of all, I would like to express my deepest debt and gratitude to my supervisor, Professor Tracy Hall, for her support, guidance, insight, professionalism and patience. An extra special thanks for being such an inspirational role model in every aspect.

This work would never have been accomplished without your help, support and professional guidance. Thanks are also extended to my second supervisor, Professor Robert Macredie, for his advice and support during the homestretch of the thesis. Further, I would like to thank all the supportive people at the department – the wonderful administrative staff, especially Ela who always make sure PhD students are surrounded by an excellent academic environment, the encouraging academics; and my office colleagues, especially Helga, who reminded me in the worst moments of my special abbreviation "LIB".

I would also like to thank Dr. Sergio De Cesare, Dr. Pamela and Dr. Anastasia for their support and advice throughout my research. Similarly, thank goes to Dr. Arthur Money for his kind support. I am also thankful to my friends in the United Kingdom, Mohammed, Masoud, Anastasia, Roja, Dina, Armin, Chandrika, Hamoud, and Rand for their support throughout my writing up stage.

Warmest thanks to all my friends – near and far – who believed in me and supported me especially in those dark moments of coding, transcribing and analysing...and writing, writing, writing. And most importantly, a tremendous thanks to my parents, sister, brother, brother in-law, and sister in-law for all their support and for never losing the faith and confidence in me to finish. Thanks to my nieces and nephews Luluah, Hamoody, Danya, Yousef, Tamem, and Rose for their lovely smile and presence. I hope this makes you all proud – I couldn't have done this without your encouragement and patience. Last, but not least, my appreciation is extended to all who have participated in my research and who facilitated the research process by contributing to my data collection.

TABLE OF CONTENTS

Table of Contents

Table of Contents

Table of Contents

Table of Contents

LIST OF FIGURES

LIST OF TABLES

List of Tables

CHAPTER 1

1. Introduction

1.1. Scope of the Study

A variety of barriers have been reported across many academic disciplines that sustain the gaps between academic researchers and practitioners (Drury *et al.,* 2013; Lanamaki *et al.,* 2011; Haddow, 2011; Haddow and Klobas, 2004). The literature shows that academic research outputs are buried deeply in reports and not transmitted into real practice (Waddel, 2002). Lags of 8–15 years have been reported between the time research is done and the time it is used in real practice (Lomas, 1991; Utterback, 1974). The academic researchers are struggling to reach out to audiences/stakeholders (e.g. practitioners) beyond academia. In contrast, practitioners are not interested in reading academic research (Benbasat and Zmud, 1999). One of the reasons for this may be that the outputs of research are not always effectively disseminated. A great deal of effort is dedicated to doing research in academia and much of this research is funded by the public purse. For example, the UK's Engineering and Physical Sciences Research Council (EPSRC) spent £942 million (EPSRC, 2016) on funding research projects during 2014–2015. It is reasonable to expect national benefit from such publically funded research and, increasingly, research funders (e.g. Research Councils United Kingdom (RCUK) and (EPSRC) require explicit dissemination and impact from research projects. Consequently, it is important that solutions are formed to bridge the gap between academics and practitioners.

The dissemination and impact of research outputs cannot happen without those outputs being communicated to target audiences/stakeholders. Retrospectively, the strategies of effective dissemination to reduce time lags are becoming important in academic literature (Dobbins *et al.,* 2002). The aim of this thesis is to improve the dissemination of information systems (IS) research by enhancing the communication between academics and their potential audience beyond the academic community. The dissemination of IS research is important. Lang (2003) reported that IS research has useful and practical outcomes for IS practitioners and for society at large. Lang (2003) also reported that the aim of IS

research is, first, to contribute to knowledge, and second, to disseminate that knowledge. Many believe that knowledge that is neither shared nor distributed has no value (e.g. Kavan, 1998). Unfortunately Lang (2003) found that IS research does not reach IS practitioners for many different reasons. For example, the specialist language used in academic publications is a challenge for some practitioners (Finch, 2012; Lang, 2003). Research has also predominately been communicated via academic channels (Fry *et al.,* 2009), with little regard to other potential audiences (Procter *et al.,* 2010; Collins and Hide, 2010; Fry *et al.,* 2009).

The ineffective dissemination of IS research has many disadvantages, including limiting the development of the IS discipline itself. As Fitzgerald (2003) said, it is important in an applied discipline, such as IS, theory should inform practice, and it is inevitable that practice should inform theory. Without effective dissemination, this interaction is reduced and it is no surprise that Fitzgerald (2003) reported a gap between IS theory and practice. The dissemination channels that are used by academic researchers mainly include: conference presentations, journal articles and reports (Fry *et al.,* 2009). However, these dissemination channels do not reach the practitioners who might benefit from the research. Drury *et al.* (2013) reported that these channels particularly fail to reach practitioners below middle management levels.

There are few empirical studies in the IS discipline that have investigated IS research dissemination from a communication perspective. Therefore, this study is motivated by a research need, and the author empirically and theoretically pursues the understanding of the complex process of communication between academics and their potential audience, which ultimately results in better research dissemination beyond academia. In this study, the IS research relevance to practice is considered from a communication perspective.

1.2.   Research Aim, Question and Objectives

This study aims to develop an effective communication method to improve the dissemination of IS research to potential audiences beyond academia. The research question is:

How can IS researchers better disseminate and communicate their research outputs to potential audiences beyond academia?

The four research objectives are:

1. To understand the concept of research relevant to practice in the IS domain;
2. To investigate the barriers of disseminating and communicating IS research outputs beyond the academic community;
3. To develop a solution that overcomes dissemination and communication barriers;
4. To evaluate the developed solution.

1.3.   Methodology

To achieve the aim of this study, an interpretive approach is applied, using qualitative methods and mainly semi-structured interviews to have a thorough understanding of why and how academics disseminate their research outputs beyond academia. This study consists of three phases. First is the investigation phase, where the interview meetings took place to investigate the gap between academics and their potential audience. An adapted communication framework was applied to explain the status communication process that academics at the Information Systems and Computing Department use towards their intended audiences beyond academia. Second is the development phase, where the short videos were created based on what was discovered during the investigation phase. Third is the evaluation phase, where the aim was to evaluate the individual interview videos between the academics and their potential audiences by using the three information quality (IQ) dimensions to discover whether the videos delivered the relevant information clearly and whether the information would be understandable by the potential audiences.

1.4.   Expected Contributions

This study attempts to contribute to the domain of IS research dissemination especially in the following aspects with empirical evidences:

- To expand the scope of IS research dissemination based on the communication process by adapting the interpretive approach to better understand the methods that academics use to disseminate and communicate their research outputs beyond the academic community;
- To improve an appropriate communication model by enhancing different aspects of the model based on the empirical outcomes of this study.
- To provide practical evidence of additional research dissemination methods to support academics to disseminate their research outputs beyond academia;
- To contribute to the debates on research dissemination and research relevance to practice;

1.5.   Thesis Structure

Chapter 1

This chapter illustrates an introduction and an overview of this study. It highlights the issues that sustain the gap between academics and their potential audience beyond academia, particularly in the IS domain. In addition, the research aim, question and objectives are stated. Further, it illustrates a brief overview of the research paradigm applied and the theory utilised to achieve the aim and objectives of this study. Finally, this chapter provides the thesis structure and a brief summary of each chapter.

Chapter 2 (refer to Objective 1)

This chapter discusses the literature review regarding relevant research to practice within the IS domain. It also discusses the different environments of academia and practice. The dimensions of IS research relevancy are introduced and discussed to understand the critical elements of research relevancy assessment. Moreover, it illustrates the importance of communication theories and models, and their elements. The research framework adapted in phase 1 is discussed. Finally, the focus of this study is demonstrated.

Chapter 3

This chapter illustrates the research approach, methods and data collection techniques applied in this study. Considering the aim of this study, the interpretive approach is discussed to demonstrate its best use. The qualitative method is applied to collect data in all three phases. Then, this chapter highlights the use of theories in IS research within this study. The three phases used in this study are explained in this chapter, which signposts some details to the main findings' chapters (e.g. Chapter 4). Finally, the data collection strategy and data analysis strategy are explicated in detail.

Chapter 4 (refer to Objective 2)

This chapter illustrates the output of Phase 1, which is the analysis of the interview meetings that took place with academic participants at the Information Systems and Computing Department. The technique used was thematic analysis to construct and understand the academics' communication process towards their potential audiences beyond the academic community. There are three main themes emerging as barriers: (1) Message (i.e. academic structure and language of research papers); (2) Channel (i.e. Academic journals and conference proceedings); and (3) Social and Cultural System (i.e. lack of incentives, lack of time, lack of support).

Chapter 5 (refer to Objectives 3 and 4)

This chapter illustrates the second and third phases of this study, which create the solution to overcome two of the three barriers that emerge in Chapter 4 (i.e. "message" and "channels"). The solution is a three- to five-minute short video, which represents a particular academic paper. It also explains and describes the process of creating the short videos, including their structure; for example, sections, graphics, music, etc. The interviews took place with each academic video's author after the videos were developed. The criteria to evaluate the proposed solution are based on IQ assessment with regard to the Benbasat and Zmud dimensions of research relevance. These evolution criteria illustrate whether or not the proposed solution (i.e. short videos) is effective in the dissemination of academic research outputs beyond the academic community.

Chapter 6

This chapter discusses the five critical findings of this study against the literature review: (1) the diverse audiences of academic research beyond the academic community. It also discusses the lack of communication between the two ends (i.e. academics and their potential audiences); (2) the barriers that limit academics to disseminate and communicate beyond academia; (3) the channels used by academics and their potential audiences; (4) the benefits of disseminating and communicating research outputs beyond academia; and (5) the short videos and their evaluation. This chapter also discusses the overall findings with regard to the research question.

Chapter 7

This chapter illustrates the three aspects of the contributions to: (1) the communication model; (2) the knowledge; and (3) the practice. It also presents the future work and the limitations of this study. Also, the importance of this study is discussed.

CHAPTER 2

2. Literature Review

2.1.   Introduction

This chapter illustrates the extent to which IS research is relevant to practice, which has been argued for the last decade. This chapter presents the IS relevancy and its dimensions, and how IS research could be relevant to audience beyond academia such as practitioners. Additionally, it discusses the relevant IS research to practice debate and deliberates on the relationship between academics and their potential audiences beyond academia (e.g. practitioners).

This chapter is organised as follows: section 2.2 illustrates the scope and value of IS discipline; section 2.3 defines IS relevance and its dimensions; section 2.4 illustrates the barriers of research relevance in the IS domain; section 2.5 describes IS academics and IS practitioners; section 2.6 discusses the IS research audience/stakeholders; section 2.7 suggests ways to improve the research relevance; section 2.8 illustrates the research impact and its mechanisms; section 2.9 describes the importance of communication and its elements; 2.10 presents the research framework applied in this study; section 2.11 illustrates the research gap and finally, section 2.12 concludes the chapter.

2.2.   Scope and Value of Information Systems (IS)

This section illustrates the nature of the research that IS researchers tend to produce through their academic research. It also indicates the IS research diversity and its value in real life.

2.2.1. IS definitions and its research diversity

The definition of IS discipline has been argued for decades. In 2007, Professor Ray Paul – as an outgoing editor-in-Chief of the *European Journal of Information Systems* – claims that IS identity is one of the five challenges confronting IS discipline. It would be surprising if IS scholars reached a consensus on a unique definition of IS discipline, for many reasons (Alter, 2008). For instance, a variety of IS definitions have been reported based on what researchers have been

studying and researching (Paul, 2007). As Benbasat and Zmud (2003) argued, IS discipline is naturally an interdisciplinary field because IS scholars have different academic backgrounds. IS discipline has been accepted as having multi-perspective definitions. Hassan (2014) argued that IS research does not replicate what has been done already in management, computer science (CS), economics or other reference disciplines. However, IS research has been asking questions that other disciplines have not asked, and addressing issues that other disciplines are unable to address (Hassan, 2014).

IS research topics are multi-disciplinary in their nature, as different disciplines each have something to contribute, such as business process outsourcing, e-commerce, social networking or knowledge management (Walsham, 2012). Pure IS research does not exist anymore, and the interdisciplinary route is dominant in IS research topics. For example, IS security, which involves multi-disciplinary dimensions, such as technical aspects (CS), lack of trust (Sociology) and strategies in a security context (Security and Organizational Behaviour). IS contributions for a research project have been reported as unplanned; however, they are something to be understood during the process of interdisciplinary cooperation (Walsham, 2012).

Paul (2007) defined IS by clarifying what information technology (IT) is: a collection of devices; or, for example, a collection of software and accessories that when integrated may provide a delivery mechanism for IS to use. He then identified IS as that which emerges from the combination of technology, people and process. The processes are classified into two segments: formal and informal. First, the formal process is the decision of what IT should be used and its suitability for a particular case; and confirm that the work has been done usefully. Second, the informal process is who uses the IT.

Carvalho (2000) indicated that people who talk and/or write about IS are referring to different objects. Four different objects that considered to be IS are:

- IS1. Information delivered by organizations to provide their customers (e.g. libraries, information services, information brokers, newspapers, radio or TV stations).

- IS2. A subsystem within any system that confirms communication between operations and management of an organization (e.g. computer-based artefacts that process, store, collect, present or transmit information). These artefacts have different functions based on their individual purpose.

- IS3. A system that processes information by computers, computer-based devices or computer-based systems (i.e. data processing systems, management information systems, decision support systems, workflow management systems, data mining systems and executive information systems).

- IS4. A system that processes information. This view corresponds to all organizational activities except those that deal with materials or energy.

All these objects are dealing with information. They are also related to IT and the work processed in organizations (Carvalho, 2000). Alter (2008) provided examples of these IS, which includes work systems, such as creating computer programs, generating corporate plans and creating digital products (i.e. software and electronic games, and determining prices of airline seats based on complex yield management calculations).

The three IS definitions given are based on different perspectives. Walsham (2012) defines IS discipline from a theoretical perspective, while Paul (2007) emphasised the combination of IT, people, and the process of selecting and evaluating the use of particular IT, such as a collection of devices. Carvalho's (2000) definitions and the IS definitions are listed in Table 2.1 and are consistent with Paul's IS definition – particularly the IS dimensions of his definition (i.e. IT, people and process).

Chapter 2: Literature Review

Table 2-1: Definitions of Information Systems (IS)

Author	IS definition	IS dimensions
Buckingham et al. (1987, p. 18)	"A system which assembles, stores, processes and delivers information relevant to an organization (or to society) in such a way that the information is accessible and useful to those who wish to use it, including managers, staff, clients and citizens. An information system is a human activity (social) system which may or may not involve computer systems"	IT, people, information and processes
McLeod & Schell (2007, p. 19)	"Information systems are virtual systems; their data represent the physical system of the firm"	Information & process
Huber et al. (2007, p. 392)	"An organized collection of people, information, business processes, and information technology designed to transform inputs into outputs, in order to achieve a goal"	People, information, processes and IT
Watson (2008, p. 9)	"An information system is an integrated and cooperating set of software directed information technologies supporting individual, group, organizational, or societal goals"	IT, information, processes and people
Kroenke (2008)	"An information system consists of five components: hardware, programs, data, procedures and people"	IT, processes, information/data and people
Jessup & Valacich (2008, p. 567)	"Assumed to mean computer-based systems, which are combinations of hardware, software, and telecommunications networks that people build and use to collect, create, and distribute useful information"	IT, processes, people and information

IT = information technology.

Table 2.1 also confirms the diversity of IS. As Vessey *et al.* (2002) report, IS is a diverse discipline; and their study analyses papers that have been published in top IS journals namely, *MIS Quarterly*, the *Journal of Management Information Systems* and *Information Systems Research*. Vessey *et al.* (2002) developed five key dimensions of IS research diversity: (1) reference discipline; (2) level of analyses; (3) topic; (4) research approach; and (5) research method.

Vessey *et al.,* (2002) defined the five keys dimensions as follows:

- ***Reference discipline:*** Any paper that builds its model, theoretical framework or hypotheses by citing papers of other discipline(s);
- ***Level of analysis:*** Any paper that investigates, for example, IS issues at a national level, international level or societal level that does not have an organizational context; and papers that investigate project management and software engineering issues (Table 2.2);

Table 2-2: Examples of the Five Components of Information System (IS) Diversity

Diversity dimensions	Examples
Reference disciplines	Cognitive psychology, Social & behavioural Science, Computer Science, Economics, Information Systems, Management, Management Science and others, such as Marketing
Level of analysis	Society, profession, inter-organizational context, organizational context, project, group/team, individual, abstract concept, computing system and computing element-program, component & algorithm
Topic	Computer concepts (e.g. computer/hardware principles/architecture), systems/software concepts (e.g. software life cycle/engineering including requirements, design, coding, testing, maintenance), data/information concepts (e.g. data base/warehouse), problem domain-specific concepts (e.g. scientific/engineering including bio-informatics), systems/software management concepts (e.g. project/product management including risk management), organizational concepts (e.g. organizational alignment (including business process reengineering), societal concepts (e.g. cultural implications & political implications), disciplinary issues (e.g. "computing" research & "computing" curriculum/teaching)
Research approach	Descriptive (e.g. descriptive system & descriptive approach for describing something other than a system such as an opinion), evaluative (e.g. evaluative-deductive & evaluative-critical), formulative (e.g. formulative-model & paper that formulates something other than a model such as methods, algorithms, taxonomies, or frameworks)
Research method	Conceptual analysis, conceptual analysis/mathematical, case study, action research, ethnography, grounded theory, data analysis, literature review, field study, descriptive/exploratory survey, instrument development, laboratory experiment (human subjects), protocol analysis, field experiment, systems evaluation, laboratory experiment (software), concept implementation (proof of concept) & simulation

- *Topics:* These are classified based on the general disciplines of computing (i.e. the ACM Computing Classification System, the ISRL categories) and the topic areas identified by Glass (1992) classification in particular;

- *Research approach:* The research methodology section (e.g. the research approach or methodology that is applied);

- *Research method:* The specific method that has been applied in the paper (e.g. action research or grounded theory).

Table 2-3: Cross Dimensions between Information System (IS) Diversity Dimensions and Definition Dimensions

IS diversity dimensions		IS definition dimensions
Level of analyses	**Topics**	**IT, people, process & information**
Society, profession, inter-organizational context, project, group, individual, abstract concept, computing system & component & algorithm	Computer concepts, systems/software concepts, data/information concepts, systems/software management concept & organizational concepts	*IT* (e.g. software/hardware & computing system), *People* (e.g. organizational context, Project, Group, individual), *Process* (e.g. organizational concepts & alignment including business process reengineering), *Information* (e.g. data/information concepts)

IT = information technology.

It is important to consider the cross dimensions of the IS definitions dimensions list shown in Table 2.1 and the IS diversity dimensions reference discipline, level of analysis, and topics in particular shown in Table 2.2. Thus, Table 2.3 shows the cross dimensions between both concepts of IS definitions and IS diversity in terms of interdiscipline and multidiscipline. In other words, the two dimensions of IS diversity include the level of analysis and topics that combine four dimensions of IS definitions; namely IT, people, process and information. The crossroads are between the level of analysis and topics on the one hand, and IT, people, process, and information on the other. This illustrates how IS research is involved in other disciplines (e.g. CS and Management).

The variety of IS definitions and the diversity of IS research create a great opportunity to address issues that relate to the use of such a technology. As highlighted earlier in this section, Hassan (2014) claimed that IS research addresses issues by asking research questions in its reference disciplines (e.g. Management and CS) without replicating what these disciplines have done already. Indeed, it addresses issues that have not been addressed by these reference disciplines (Hassan, 2014).

2.2.2. IS research value

The value of IS research has been reported as an imperative factor of its relevance (Desouza *et al.,* 2006). These authors indicate that information systems have been useful in human endeavours, such as finding and rescuing survivors in the tsunami disasters. However, IT-based information systems could be misused or abused, such as the 9/11 attacks where IT infrastructures were used in planning and executing the suicide attacks (Desouza *et al.,* 2006). Hidding (2012) argued that IT utilization can be found everywhere; for example, analytics research is an important factor in the current businesses of vendors (e.g. SAP and IBM) to gain insights into the data sets.

Much IS research have been dealt and still dealing with issues related to the Millennium Development Goals (MDGs) (Ezenwa and Brooks, 2013; Afridi and Farooq, 2011; Calloway, 2011). MDGs were created by the United Nations and target global challenges, such as universal and affordable access to healthcare

and education, the eradication of poverty and hunger, global partnership for development, gender equality, and environmental sustainability (Table 2.4).

Table 2-4: United Nations Millennium Development Goals and Targets (source: Rickenberg *et al.,* 2014)

Goals	Targets
(1) Eradicate extreme poverty and hunger	a) halving the proportion of people whose income is less than $1.25 a day between 1990 and 2015, (b) achieving full and productive employment and decent work for all, including women and young people, and (c) halving the proportion of people who suffer from hunger.
(2) Achieve universal primary education	(d) ensuring that children everywhere, boys and girls alike, should be able to complete a full course of primary schooling.
(3) Promote gender equality and empower women	(e) eliminating gender disparity.
(4) Reduce child mortality	(f) reducing child mortality by two thirds of under five year old children.
(5) Improve maternal health	(g) reducing the maternal mortality ratio by three quarters, and (h) achieving universal access to reproductive health.
(6) Combat HIV/AIDS, malaria, and other diseases	halting and beginning to reverse by 2015 (i) the spread of HIV/AIDS, (j) the incidence of malaria and other major diseases, and (k) achieving universal access to treatment for HIV/AIDS by 2010.
(7) Ensure environmental sustainability	(l) integrating the principles of sustainable development into country policies, (m) significantly reducing biodiversity loss, (n) halving the proportion of the population without sustainable access to safe drinking water and basic sanitation by 2015, and (o) achieving a significant improvement in the lives of at least 100 million slum dwellers by 2020.
(8) Develop a global partnership for development	(p) developing an open, rule-based, predictable, non-discriminatory trading and financial system, addressing the special needs of (q) least developed countries and (r) landlocked developing countries as well as small island developing states, (s) dealing comprehensively with debt problems, (t) providing access to affordable essential drugs in developing countries, and (u) making available benefits of new (information, communication) technologies in cooperation with the private sector.

Hassan *et al.* (2013) claimed that it was possible to show how IS research helped to solve some of humanity's issues. For example, Calloway (2011) reported an applied sustainability learning model that relates Information and Communication Technologies (ICT) with the MDGs. Also, Afridi and Farooq (2011) addressed MDG 5 by developing a health tool that uses a data mining approach to identify and classify the risks of pregnant women.

As presented in this section, the value and diversity of IS research shows the significance of its impact/benefit on many humanitarian cases because IS research addressed the MDGs. The given diversity of IS research leads to a wider audience/stakeholders who benefit from and use IS research. The next section discusses IS research relevance and its dimensions.

2.3. A Definition of Relevance within the IS Domain

Since the 1990s, the relevance of IS research to IS practice has received attention from the IS community as an issue of discussion (Kock *et al.*, 2002; Bhattacherjee, 2001). The gap between what has been done in IS research and IS

practice has been argued and researched (Tax, 2014; Hassan *et al.*, 2013; Gallivan and Aryal, 2012; Wang *et al.*, 2009; Desouza *et al.*, 2006; Steinbach and Knight, 2006; Pearson *et al.*, 2005; Lang, 2003; Kohli, 2001). IS researchers have reported that the central issue of IS is its relevant research to practice (Otto and Österle, 2010; Gill and Bhattacherjee, 2009; Pliskin, 2001).

It is important to identify relevance for a better understating of the concept within the IS domain. Relevance is subjective in its nature (Khazanchi and Munkvold, 2001); relevant research is defined as research that addresses a practical need and could be evaluated by practitioners in terms of relevance and utility (Moody, 2000). Also, Fitzgerald and Howcroft (1998, p. 10) defined relevant research as the "External validity of actual research question and its relevance to practice vital, rather than constraining the focus to that researchable by 'rigorous' methods." These two definitions show that research should be used by practitioners to evaluate its usefulness (Table 2.5).

Table 2-5: Definition of Relevance

Relevant research	Author
Any research that is appropriate to business practice	Senn (1998)
Any research that solves significant issues in business practice	Saunders (1998)
Any research that is perceived as valuable by practitioners	Kavan (1998) Benbasat and Zmud (1999)
Any research that solves future problems in business practice	Rollier (2001)

Lang (2003) indicated that practitioners are not the only audience/stakeholders of IS research. Also, Lee (1999a) reported that practitioners are not the only stakeholders of academic IS research that use the outcomes; therefore, it is unfair to have them as the only indicators of IS research relevance. IS research has different audience/stakeholders because of its research nature (Walsham, 2012). Relevant research to practice could be measured by its dimensions as classified by Benbasat and Zmud (1999). The next section illustrates the

dimensions of relevance.

2.3.1. Dimensions of research relevance

Benbasat and Zmud (1999) defined the term relevance based on two categories: the article's content with three dimensions (i.e. interesting, applicable and current) and the article's style with a single dimension (i.e. accessible). Table 2.6 demonstrates the key aspects of relevance and its explanations. Benbasat and Zmud (1999) claimed that IS research paper has a potential to be useful IS research when it is interesting, applicable, and current to IS practitioners which this potential usefulness is conditional by the accessibility of the research (i.e. the paper is understood by its intended audience). The audience meant to be IS managers and IS professionals (Benbasat and Zmud, 1999).

Table 2-6: Relevance Dimensions (source: Benbasat & Zmud, 1999)

Category	Dimensions of Relevance	Description
Article's Content	*Interesting*	*Does IS research address the problems or challenges that are of concern to IS professionals?*
	Applicable	*Does IS research produce the knowledge and offer prescriptions that can be utilized by practitioners?*
	Current	*Does IS research focus on the current technologies and business issues?*
Article's Style	Accessible	Are IS research articles able to be understood (in terms of tone, style, structure and semantics) by IS professionals?

These dimensions of relevance have been adopted by several IS scholars (Table 2.6). For example, Klein *et al*. (2006) examined the abstracts of a collection of academic papers by measuring three dimensions of relevance (Table 2.7) to discover whether or not an abstract of a research paper attract IS practitioners and IS academics enough to read the complete paper. They indicated that the three dimensions of relevance – importance, accessibility, and applicability – are significant indicators for reading an academic paper based on its abstract. However, these aspects do not represent comprehensive elements of research relevance.

Other studies define relevance as the citation or mention of IS research and IS researchers in business magazines, newspapers and mainstream media (Gallivan and Aryal, 2012). Their empirical study reveals that practitioners' magazines are more frequently citing information system research from the other four top IS journals selected. The IS economist scholars are most often mentioned in practitioners' magazines and newspapers; however, the IS research topics cited are not identified.

Table 2-7: Dimensions of Research Relevance

Author	Dimensions of Relevance
Khazanchi and Munkvold, (2001)	Scope/value of relevant research Time frame Situatedness of relevance
Klein et al., (2006)	Important Accessible Applicable
Rosemann and Vessey, (2008)	Important Suitable Accessible

Potential audience/stakeholders could be a significant aspect of research relevance. Khazanchi and Munkvold (2001) extended Benebasat and Zmud's (1999) notion of relevance by incorporating a wider definition of audience/stakeholders and included three dimensions: scope/value of research relevance, time frame, and situatedness of relevance (Table 2.7). The scope/value of IS research vary based on the target audience/stakeholders group. A time frame implies when and for how long the research implications are needed by the potential audience/stakeholders; this aspect considers that what is relevant in a particular time frame could be less relevant over time. Situatedness suggests that research implications may vary depending on the industry context. Also, Khazanchi and Munkvold (2001) claimed that IS research value should not be assessed solely by practical relevance; different audience/stakeholders and other dimensions should be included in the assessment of research relevance.

These dimensions are the criteria of the IS research relevance to practice. IS

audiences (e.g. practitioners) are the assessors of these criteria. The IS research dimensions of relevance highlight the IS audience as an important element that decides whether or not a particular paper is relevant. The next section illustrates the barriers that are continuing to be problematic in sustaining the gap between academics and their potential audiences beyond academia.

2.4.   Barriers of Research Relevance in the IS Domain

The review of IS literature concerning relevant research to practice has attracted much attention from the IS community over many years. *MIS Quarterly*, for example, called for papers that debated the relevance of IS research to practice (*MIS Quarterly* Vol. 23, Issue 1, 1999). This special issue identified some reasons behind the lack of IS relevance to practice (Benbasat and Zmud, 1999). In additional, several suggestions were advised to make IS research more relevant to practice, such as reviewing the academic reward system and the article's style of writing (Benbasat and Zmud, 1999).

Table 2-8: Reasons for IS's Lack of Relevance to Practice

Author	Rationale of irrelevance	Paper type
Keen (1991); Davenport (1997); Senn (1998); Benbasat and Zmud (1999)	Academic IS journals are rarely or not subscribed, read and/or valued by professionals.	Opinion
Keen (1991)	Research lacks impact on its intended audience	Opinion
Robey & Markus (1998)	Academic system incentives and motivation are focus on publishing in the main two channels (i.e. academic journals and conference proceedings)	Opinion
Senn (1998), Kohli (2001); Heart & Pliskin (2001)	Lack of interaction between academia and industry. Also, practitioners do not submit articles for publications in academic journals.	Opinion
Westfall (1999)	Academic system does not promote or support researchers to do research that is relevant to practitioners	Opinion
Moody (2000)	Extreme attention to research rigor. Researchers and consumers are the same "articles targeted only academic stakeholders". Researchers have less priority to practice. Institution policy of tenure. Limited dissemination of research outputs beyond academia. Lack of knowledge transfer	Opinion
Ramesh (2001)	Ineffective relationship between academia and industries	Opinion
Bhattacherjee (2001)	The pluralistic & dynamic of IS research	Opinion
Kazanchi & Munkvold (2001); Desouza et al. (2006)	The wide stakeholders of IS field and the IS identity	Opinion, Panel Discussion

Alter (2001)	Complexity of academic journals	Opinion
Kock et al. (2002); Rosemann & Recker (2009)	The length of time of the review process in academic publications	Opinion, Empirical Study
Loebbecke et al. (2003)	Co-opetition challenges between academia and industries	Panel Discussion
Lang (2003); Pearson *et al.* (2005); Cranefield & Yoong (2007)	IS practitioners do not often read academic journal articles or white papers. IS practitioners do not subscribe to academic publications (i.e. journals) unless they are members in a professional society. IS practitioners do not publish in academic journals unless they are co-authors with an academic researcher. IS practitioners do not pay attention to models or frameworks that developed in an academic research	Opinion, Empirical Study and Opinion
Darroch & Toleman (2005)	The academic-practitioner relationship, stakeholder issues, and academic rewards system	Opinion
Gallivan & Aryal (2012)	IS researchers are not mentioned or cited by trade magazines (not engaged in media)	Empirical Study
Hassan et al. (2013); Benamati et al. (2006); Desouza et al. (2006); Keen (1991)	IS researcher should focus on the value "benefits" of their research towards real-life issues	Panel Discussion

A similar debate took place in the *Communication of the Association of Information Systems* (*CAIS* Vol. 6, Issue 1529-3181, 2001). This issue of *CAIS* discusses IS research topics and the relevance to IS practitioners, and whether or not IS research provides knowledge for business practitioners (Khanzanchi and Munkvold, 2001). In addition, this collection of papers provides some suggestions to make IS research more relevant to practice, such as defining research relevance into subordinate dimensions (e.g. the paper should be accessible in terms of tone, style, structure and semantics).

Table 2.8 lists some key papers from 1998 to 2013 that address the rationale behind the lack of the relevant research to practice. These papers discussed the lack of relevant research to practice from different perspectives; for instance, the identity of IS discipline and its research topics as reasons for being irrelevant to practice, IS research value, IS research audience/stakeholders and IS academic researchers' interactions with IS practitioners.

Only a few empirical studies regarding the topic of relevant research to practice have been reported; for example, the survey of IT managers by Pearson *et al.* (2005). As Gallivan and Aryal (2012) stated, most studies of IS that are relevant to research to practice lack empirical data, except for two studies that reflect the

perceived relevance of IS conference papers by IS academics. Academic researchers focus on reporting issues academically, whereas practitioners focus on dealing with issues in real-life "practical and immediate solutions" (Gill and Bhattacherjee, 2007; Heart and Pliskin, 2001; Kholi, 2001; Robey and Markus, 1998; Senn, 1998). In fact, academic conferences have been largely ignored by IS practitioners, except for a few who are interested in academic research (Lang, 2003). An analysis of *MIS Quarterly* articles from 1977 to 2006 by Gill and Bhattacherjee (2009) that indicated a decrease in the number of practitioners as a co-authors from 1990, and this could have expanded the gap between IS academic researchers and IS practitioners.

Moreover, many studies indicate that the submission process of academic papers at conferences cause the lack of relevant research to practice; for instance, IS researchers and editors in the top IS academic journals put the emphasis on rigor, which negatively affects the research relevance to practice (Benbasat and Zumd, 1999). Rosemann and Recker, (2009) investigated the reviewing practices of three IS conferences:

- The European Conference on Information Systems 2007 is considered the largest in different tracks of IS research.
- The International Business Process Management Conference 2007 is well known as being relevant to current business and management activities.
- The International Conference on Conceptual Modeling 2007 is recognized by the IS domain as one of the top conferences in conceptual modelling for IS design.

Rosemann and Recker's (2009) results indicated that all papers submitted to these three conferences were balanced between rigor and relevance. However, the analysis of all accepted papers revealed that the editorial decision team emphasized rigor to a higher degree than the cost of relevance (Rosemann & Recher, 2009). IS researchers investigated the two environments of academia and practice. IS literature shows the differences between these two environments (i.e. academia and practice), which are illustrated in the next section.

2.5. IS Academics and Practitioners

Lang (2003) reported that the majority of academic researchers do not have real world experience. Harel (1997) claimed that academic researchers who work in isolation from industry are likely to fail to impose their ideas on industry. In contrast, it has been reported that IS/IT practitioners are weak in communicating their needs to academia (Pearson *et al.,* 2005; Davenport, 1997). The isolation of both academics and practitioners has been noticed by Glass (1997) indicating that both academics and practitioners are biased to their own communities, and, unfortunately, they have a disdainful view of each other. Moreover, prosperous software industries generally ignore the research community, which produces papers rather than software (Pike, 2000).

The literature has reported that IS academic researchers confront many different challenges to deliver their research findings to IS practitioners (Hassan *et al.,* 2013; Roseman and Recker, 2009; Lang, 2003; Senn, 1998; Robey and Markus, 1998). This issue has been addressed from different angles; for instance, Benbasat and Zumd (1999) reported five critical elements that are behind the lack of IS research relevance: (1) an emphasis on rigor over relevance; (2) a lack of a cumulative tradition; (3) the dynamism of IT; (4) the limited exposure to relevant contexts; and (5) various institutional and political factors. Moreover, an empirical study by Pearson *et al.* (2005), indicated that practitioners face some issues and crucial challenges in approaching IS academic publications; for example, they find the recommendations provided by academic research to be of little value.

Lang (2003) claimed that the central issue of research that lacks relevance is the traditional academic publication process, and investigated this issue by applying the communication theory of Shannon and Weaver (1949) on the traditional academic publications process (Figure 2.1). He illustrated the process flow of the dissemination of academic research findings (Figure 2.1) and indicated three major issues: (1) the channels for communicating research findings; (2) the esoteric language used by academics; and (3) the isolation of academia from industry.
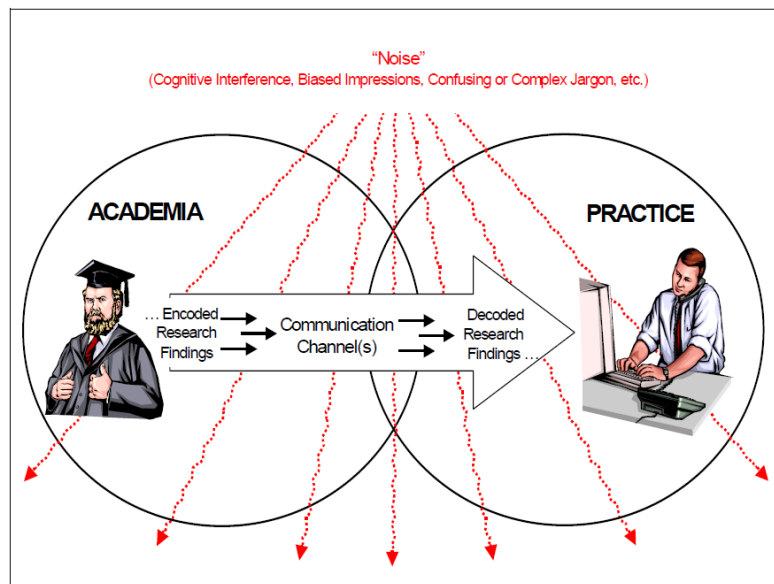
Figure 2.1: Basic model of human communication (source: Lang, 2002).

Channels for communicating research findings

Researchers are encouraged to publish "high quality research" in the main academic channels (i.e. academic journals and conference proceedings), which are of interest mostly to the academic community (Steinbach and Knight, 2006; Lang, 2003; McCubbrey, 2003; Avgerou *et al*., 1999; Robey and Markus, 1998; Senn, 1998). To practitioners, academic research does not explain everything; for example, a paper does not say to practitioners what to do, but it does clarify what not to do (Kock *et al.,* 2002). These academic channels are not immediately directed at the intended consumers (the practitioners), but are disseminated in detail through other methods, such as teaching and textbooks (Figure 2.2). While it is true that research informs teaching, teaching informs students and students practice what they learn (Olfman, 2001), but this is insufficient, ineffective, and a very slow process to disseminate research (Moody, 2000).
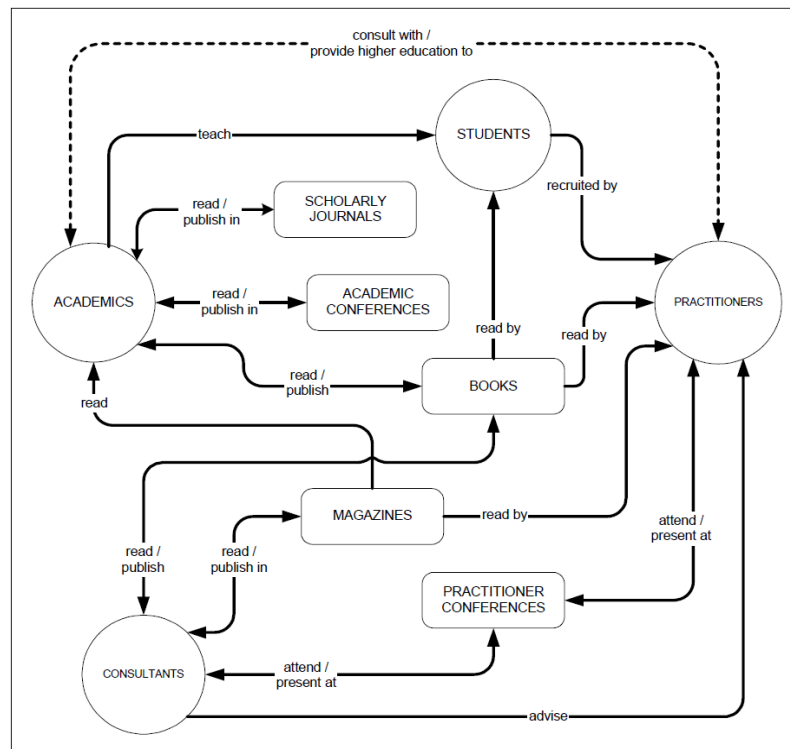
Figure 2.2: Communication flows in dissemination of research results (source: Lang, 2002).

Academic journals and conference proceedings are usually avoided by practitioners (Lang, 2003). Practitioners are not interested in reading academic journals, as highlighted by Robey and Markus (1998). Pearson *et al.* (2005) revealed that half of the high level managers neither know where academic research is published nor what the practitioner's publications are (i.e. the *Harvard Business Review* and the *Sloan Management Review*). This supports what has been reported by Benbasat and Zumd (1999): that practitioners look for practical and immediate solutions.

Moreover, practitioners believe that academic research and the findings of those studies are no longer up-to-date when they are published (Pearson *et al.,* 2005; Kock, 2002). This is caused by the long processes of peer reviewing through to editing and other necessary procedures prior to publication (Lang, 2003). Academic researchers attempt to avoid this issue by approaching the trade press to provide timely research contributions (Lee, 1999b). However, journalists and industry analysts rarely seek to interview academic researchers that frequently publish academic papers (Robey and Markus, 1998).

Chapter 2: Literature Review

Esoteric language used by academic researchers

Benbasat and Zumd (1999) stated that practitioners do not understand academic articles and relate this to the esoteric language used in the articles. The academic community is well aware that academic writing is required to publish a good quality paper, as reported by Lang (2003), and a poorly written paper will never be published in academic journals. Recently, Finch (2012) reported that publications from different disciplines are difficult to understand by some academic researchers due to the esoteric language used. This is a significant reason why IS practitioners cannot understand academic papers (Tax, 2014; Gill, 2008; Pearson *et al.,* 2005; Senn, 1998).

The rationale behind esoteric language is the reviewing criteria. Straub *et al.* (1994) have indicated that some leading IS journals consider presentation, professional style and tone as a lesser priority of their reviewing criteria. Usually, the guidelines of these leading IS journals do not pay attention to style and tone when calling for papers (Lang, 2003). However, the *Harvard Business Review* does pay attention to these issues as it is targeting both the academic community and the practitioner community, and they clearly state in the submission criteria that "accessible and jargon-free expression" is required. Similarly, *Communications of the ACM* highlighted that authors who written in a theoretical tone and use esoteric language will have their papers returned. These two journals seem to be striving to reduce the language gap between IS theory and IS practice.

The academic writing style in many top IS journals is complex to read and/or understand for people other than academics, as emphasized by Benbasat and Zumd (1999). Specialist language or stilted language used in academic articles are real issues for practitioners (Gill and Bhattacherjee, 2009; Steinbach and Knight, 2006; Pearson *et al.,* 2005; Lang, 2003; Kock *et al.,* 2002). Gill and Bhattacherjee, (2009) stated that IS researchers should write for practitioners in their everyday language, but this does not guarantee that their research findings will have a substantial impact on the practice. For decades, academic researchers in management disciplines have activated other channels to disseminate research findings. However, academics believe that the impact of their research

on practice has fallen behind expectations (Pfeffer, 2007).

Isolation of academia from industry

There are different environments between academic research and practice (Table 2.9). Academia and industry lack interaction due to the extreme differences in their cultures (Lanamaki *et al.,* 2011).

Table 2-9: Academic Research and Practice: Different Values for Different Purposes (source: Senn, 1998)

ACADEMIC RESEARCH	PRACTICE
Focus on long-term value of knowledge	Focus on short-term application of knowledge
Building cumulative tradition	Solving current problems
Emphasis on research process	Emphasis on best practices
Rigor overshadows relevance	Relevance overshadows rigor
Value broad representative sample	Value situational cases
Journals serve as principal means of gaining and sharing knowledge	Trade publications, white papers, and personal communications serve as principal means of gaining and sharing knowledge
Publications incorporate citations of prior work in field	Publications focus on situations, experiences, and results
Lengthy publication channel	Short publication channel

Table 2.9 shows the two different communities in detail (i.e. academic research and practice). It also presents the values and aims of each community; for example, the academic research community spends a long time gaining valuable knowledge, which is peer reviewed in terms of methodological quality (Rosemann and Recker, 2009; Benbasat and Zumd, 1999). Academic journals are the primary channel to both retrieve and to share information (Robey and Markus, 1998). However, the practice community has a short time between problem identification and the need for a solution (Benbasat and Zums, 1999); practice focuses on real issues through experience during work time (Robey and Markus, 1998). The issues reported for both academics and practitioners are show below.

2.5.1. Academic researchers

Moody (2000) in a more focussed study, indicated the current situation of IS research and what should happen (Figures 2.3 and 2.4). In particular, Moody stated that the issues of communication flow between IS research and IS practice, and claims that the disconnection between research and practice

"relevant research to practice" exists because of:

- Extreme attention to research rigor;
- Researchers' articles targeted only academic stakeholders (i.e. researchers and consumers are the same);
- Researchers prioritise academic rigours than practice;
- The institution's policy of tenure;
- Less dissemination of research outputs beyond academia;
- Lack of knowledge transfer.
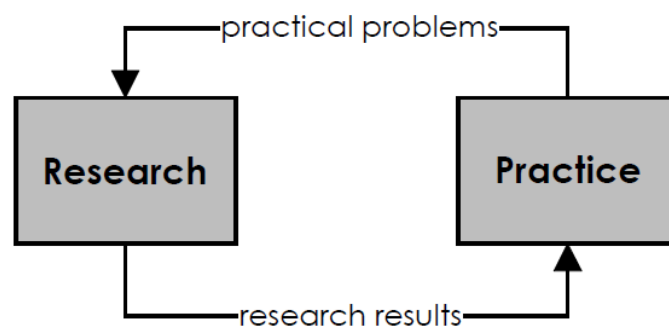
Figure 2.3: What should happen (source: Moody, 2000)

Some of these issues are claimed to be institutional, as Jennex (2001) argued that tenure and rewards of academia encourage researchers to publish in a particular list of high ranking journals (Gill and Bhattacherjee, 2009; Lang, 2003; Benbasat and Zmud, 1999).
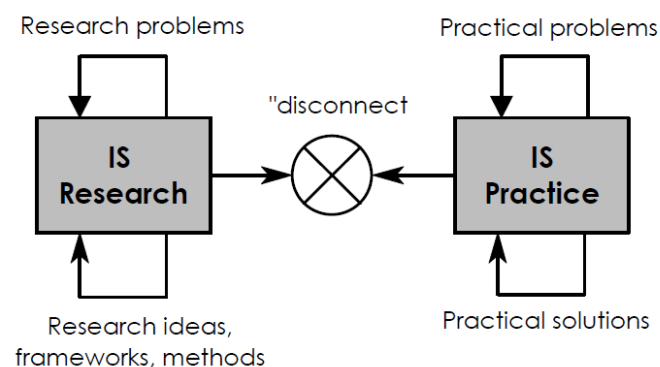
Figure 2.4: The current situation (source: Moody, 2000)

2.5.2. Practitioners

The following highlight the practitioner's behaviour towards academic journals identified by many IS scholars (e.g. Cranefield and Yoong, 2007; Pearson *et al.,* 2005; Lang, 2003; Alter, 2001; Senn, 1998; Robey and Markus, 1998):

- IS practitioners do not often read academic journal articles or white papers.
- IS practitioners do not subscribe to academic publications (i.e. journals) unless they are members in a professional society.
- IS practitioners do not publish in academic journals unless they are co-authors with an academic researcher.
- IS practitioners do not pay attention to models or frameworks that were developed in academic research.

As discussed in this section, IS literature highlights that the ineffective interaction and communication between academics and practitioners is an issue that retains the gap between what IS researchers produce and what IS practitioners actually do in real life. Moreover, many IS scholars highlight the academic policy as a barrier that limits IS research from being relevant to the IS audience. For example, the traditional dissemination of academic research is one of the barriers that need to be crossed to reach wider audiences beyond the academic community. Also, the wider audience of IS research could be one of the barriers that limits academics in disseminating their research beyond academia. As mentioned previously in section 2.2.1, IS discipline is a diverse one, and has multiple research topics that potentially could benefit many audiences. The next section discusses the diversity of the IS research audiences.

2.6. IS Research is Relevant to Whom?

This section identifies and discusses the nature of IS audiences/stakeholders. It is important to know who benefits and/or uses IS research to enable the research to be consumable. A number of IS authors have discussed and defined the IS audience/stakeholder groups (Looney *et al.,* 2014; Lanamaki *et al.,* 2011; Desouza *et al.,* 2006; Agarwal and Lucas, 2005; Kock *et al.,* 2002; Benbasat and Zumd, 1999). The IS literature has emphasized and argued the importance of

stakeholder identification in terms of relevance assessment of any IS research (Gill and Bhattacherjee, 2009; Baskerville and Myers, 2002; Benbasat and Zumd, 1999). In order to assess the relevance, the researcher should consider both the aims and the target audience of such research (Bhattacherjee, 2001). As Benbasat and Zumd (1999) reported, relevant research should be useful for, and accessible to, its target audience. They identify IS stakeholders as the IT practice community, IS professionals and managers that have an IT interest and who consume IS research (Benbasat and Zumd, 1999, 2003). In fact, the IS research that addresses the concerns of multiple stakeholders has a wider relevance to the IS academic and practitioner community (Bhattacherjee, 2001).

Professor Sawy of the *International Conference on Information Systems* (ICIS) panel defined IS research stakeholders as an all business community, such as managers, professionals and employees who use IS to manage businesses (Desouza *et al.,* 2006). In contrast, Galliers and Desouza, in the same, panel have argued that while IS stakeholders are human, they differ based on what the research aspect of IS is (Desouza *et al.,* 2006). Examples of these aspects are healthcare system development, quality of life improvement, development of undeveloped nations and improvement of the management of organizations (Desouza *et al.,* 2006). Another panellist, Loebbecke, illustrated in particular that the major stakeholders are those who contribute money to the research, such as funding bodies in Europe (Desouza *et al.,* 2006).

Hassan (2014) classified stakeholders as internals who are critical to the development of the IS field, whereas external stakeholders have a greater impact on the field existence. Harvey and Myers (1995) defined IS stakeholders as scholars, educationists (internals), practitioners, users, politicians, economists and citizens in the present and the future (externals). Khzanachi and Munkvold (2001) introduced a list of potential IS audience/stakeholder groups based on IS the stakeholders' definition by Harvey and Myers (1995) as shown in Table 2.10. They provided examples of the IS research scope/value and areas of research. Additionally, the authors illuminated the diversity of IS research topics as discussed previously (section 2.2.1). Their main argument was how the different audience/stakeholder groups could identify the value and the areas of IS

research that were relevant to each group. This differs strikingly with Galliers and Desouza (2006) in the previous paragraph.

Table 2-10: Stakeholders and Value of Information Systems (IS) Research (source: Khazanchi and Munkvold, 2001)

Audience/ Stakeholder Group	Examples of Potential Scope and Value of IS Research	Examples of Related IS Research Areas
Practitioners	Improving existing business practices; Lead the way to new practices; Legitimate decisions	Strategic alignment, TAM, BPR
Scholars	Theory development; Communication of knowledge-claims to peers; Satisfy researcher's intellectual curiosity; Impact personal motivation	"Philosophical" research in IS; Relevance of research; Methodological issues in IS
Educators	Utility of knowledge claims; Engender intellectual curiosity; Develop new instructional methods	Research on IT educational aspects such as pedagogy, delivery, and integration of research in teaching
Users	Empowerment; Improvement of quality of work life	Action research, Socio-technical research, "Scandinavian tradition"
Politicians	Legitimate political decisions; Value for public policy making	The Internet, Privacy issues, Encryption and security, e-government, e-democracy
Economists	Utility through improved understanding of IS phenomena	IT evaluation research
Citizens	Encourage general understanding of the IS discipline; Education about the IS field	IS education and pedagogy, IS ethics, Impact of IT on people
Society	Legitimatize public policy making (e.g., privacy issue and related laws); Engender rational discourse on societal issues	Critical research, Impact of IT on society, Privacy and ethical issues of IT
Nation	Education regarding IS issues at national level	Y2K research, National information infrastructures, IT in developing countries
Global	Education regarding IS issues at international/global level; Understanding OS phenomena in the International context	Transborder data flow, Intellectual property issues, Global diffusion of the Internet

BPR = business process reengineering; IT = information technology

Table 2.11 shows the variety of IS stakeholders and their different levels of salience. Looney *et al.* (2014) developed a survey that presented a variety of IS stakeholders, which were listed then ranked from the least to the most important by 22 IS scholars from different countries (i.e. Australia, Asia, America, and Europe) where the most important stakeholders have the lower rankings. Different IS stakeholders needed different levels of prioritization based on those rankings.

Table 2.11 also illustrates the practitioners and employers as the most important stakeholders; the rationale behind this was that practitioners and employers were:

- Employing students
- Partnering on research projects and consumer research
- Providing funding for programs
- Serving as program advisors and guest speakers.

Table 2-11: Information Systems (IS) Discipline Stakeholders (source: Looney *et al.,* 2014)

Stakeholder	Stake in the IS Discipline	Ranking*
Practitioners/ Employers	• Employ students • Partner on research projects and consume research • Provide funding for programs • Serve as program advisors and guest speakers	33
Students	• Consume teaching and research • Work in IS jobs	55
IS Faculty	• Produce and consume research • Produce and consume course material • Teach courses and mentor student • Manage programs • Serve as reviewers and editors of journals	67
Journals/Research	• Publish research results • Define quality and legitimacy of academic knowledge	70
Funding Sources	• Provide resources for research efforts and teaching • Define research legitimacy	74
Administrators/ University Colleagues	• Set strategic objectives for universities, schools, and programs • Allocate resources to programs • Allocate teaching resources to courses	94
Regulators	• Define course standards • Dictate course offerings (e.g., AACSB) • Establish program legitimacy (e.g., accreditation)	101
* Twenty-two IS scholars responded to the survey. The most important stakeholders have lower rankings.		

AACSB = the association to advance collegiate schools of business

In contrast, the IS scholars indicated that practitioners and employers were the most important stakeholders of IS discipline (Table 2.11). Gill and Bhattacherjee, (2009) indicated that IS researchers were rarely used in teaching and in practice. In addition, IS stakeholders may vary in terms of importance based on potential factors such as time, geographic location, prevailing market trends and the political environment (Firth *et al.,* 2011; Desouza *et al.,* 2006). Recently, IS scholars reported that IS stakeholders beyond academia should have the attention of IS researchers (e.g. Hassan, 2014).

Accordingly, IS research could impact other potential IS audiences/stakeholders than IS practitioners; for example, patients and the government (Tables 2.10 and 2.11). Recently, research impact has high attention of the research fund centres

such as RCUK and EPSRC. Research impact is an imperative topic in academia and research fund bodies and has been argued in many different academic fields; for example, in the healthcare discipline concerned with nurses and patients who are the potential audiences/stakeholders of its research outputs. The next section illustrates and explains the solutions of IS scholars that make IS research more relevant to IS audience.

2.7. Suggestions to Improve the Relevance of IS Research

Several studies have proposed some solutions to improve the relevant IS research to practice.

2.7.1. Topic selection

Benbasat and Zumd (1999) suggested that IS researchers should identify research topics through closely looking at practice. They strongly recommend that IS researchers carefully select a topic that will be of future interests to key audiences/stakeholders. As Klein *et al.* (2006) states, IS topic selection is an important dimension of relevant research to practice. Westfall (1999) suggested that IS researchers should address unsolved and commercial issues that are not of interest or are unattractive to business researchers.

2.7.2. Methodology selection

The 2009 *ICIS* called for papers on the theme of "Doing IT Research That Matters", where the focus was on how to deliver the relevant research into practice by research methodology (i.e. action research and design science). Many IS scholars highly recommended action research as a method to make the research more relevant to practitioners. As Robey and Markus (1998) reported, the IS researcher should adopt new research models in order to be relevant to practice. Other recommendations were that IS researchers could use high-tech laboratories as a method of their research (Watson and Huber, 2000).

2.7.3. Dissemination of results

The production of consumable research reports have been highlighted by Robey and Markus (1998), and are helpful to disseminate research findings (Ho, 2000). Benbasat and Zumd (1999) also indicate that IS researchers should communicate through outlets that are expected to be used by practitioners. In addition, placing

summary pages of research on the Web would be useful to widely disseminate research (Ho, 2000). Modifying the traditional academic journal review process has been emphasized by some researchers (Weber, 1999; Westfall, 1999; Ho, 2000; Lang, 2003). The review cycle time has to be reduced in order to keep research findings up-to-date as well as the style and tone of the academic articles (Benbasat and Zumd, 1999; Westfall, 1999). Moreover, it has been reported that academic institutions should recognize the practitioner-oriented outlets and/or any other effective channels to help IS researchers be relevant to practice (Lanamaki *et al.,* 2011; Lang, 2003; Westfall, 1999). Moody, (2003) strongly recommended the use of the Web as a dissemination platform for research findings. However, Fry *et al.* (2009) indicated that UK researchers are inactive users of Web 2.0 technology tools (e.g. social media).

2.7.4. Creating closer relationships

IS researchers should pursue practitioner sponsorship to be able to form an alliance with practitioners (Senn, 1998; Robey and Markus, 1998). Watson and Huber (2000) indicated that academic institutions have to offer a specialized Master's degree and training programs to create a relationship platform. They also highlighted that faculties should be supported for sabbaticals, and internships should be offered in corporations. Khazanchi and Munkvold (2001) advised that business experience should be included as a doctoral program requirement. Academic researchers need to spend more time within industrial contexts by attending practitioner conferences and/or inviting practitioners' to special academic conferences, for example (Lang, 2003).

2.7.5. The change of faculty criteria promotion/or tenure

Academic system appraisals need to be revised to offer greater recognition for professional experience and the technical skills of faculty (Lang, 2003; Westfall, 1999). Recently, Lanamaki *et al.* (2011) indicated that the higher education or the academic institutions should focus on and recognize all outlets or channels that are effective to disseminate academic research. Academic institutions need to emphasize incentives for academic researchers to disseminate their research outputs to their intended audience (Lanamaki *et al.,* 2011; Lang, 2003; Robey and Markus, 1998).

The previous five suggestions have been considered by some IS researchers. For example, Otto and Osterle (2010) discussed the relationship between IS academics and IS practitioners to build a collaborative work, and Lanamaki *et al.* (2011) proposed "mutual informing" as a collaborative relationship between academics and practitioners. Despite the recommendations and suggestions put forward by prior IS researchers, as given above, clearly a gap still exists between IS researchers and IS stakeholders. As IS research is required to have more impact on practice, IS researchers are attempting to have an impact on their potential audience (Tadhg *et al.,* 2016; Straub and Ang, 2011; Gill, 2010). Most IS studies regarding the relevance of research are oriented to practitioners where they are not the only audiences/stakeholders of IS research (e.g. Looney *et al.,* 2014; Hassan, 2014; Rosemann and Vessey, 2008; also refer to the previous section 2.6 for more details).

This study focusses on the dissemination of academic research outputs to an audience beyond the academic community. There are many methods and channels to disseminate research outputs for different purposes. The next section illustrates the methods that are considered to be useful mechanisms for research to have an impact on society.

2.8. Additional Methods of Research Dissemination (Research Impact)

This section illustrates the definition of research impact and provides examples of its mechanisms in academic research projects. According to the RCUK (2011), impact is defined in two aspects. First is academic impact. "The demonstrable contribution that excellent research makes to academic advances, across and within disciplines, including significant advances in understanding, methods, theory and application" (RCUK, 2011, pp. 1). Second are the economic and societal impacts. "Impact is the demonstrable contribution that excellent research makes to society and the economy. Impact embraces all the extremely diverse ways in which research-related knowledge and skills benefit individuals, organizations and nations by:

- Fostering global economic performance, and specifically the economic competitiveness of the United Kingdom

- Increasing the effectiveness of public services and policy
- Enhancing quality of life, health and creative output" (RCUK, 2011, p. 2).

Many different indicators measure the academic impact (e.g. academic citations). Other indicators by funded bodies measure the economic and societal impacts (e.g. research projects); however, the economic and societal impacts may occur if the research is translated into cultural, societal, and economic benefits. This translation of academic research is supported when the connection between the individual academic researcher and the potential user is effective (Torrens & Thompson, 2012). Different mechanisms are used by the Russell Group Universities to enhance the exchange between academic researchers and potential users of academic research as follows:

- The direct engagement with the public, business and policymakers;
- To create collaborations and formal partnerships with other universities, business and communities, to generate and disseminate excellent and different ideas, knowledge and discoveries;
- Engaging with partners at a local and regional level, whereby Russell Group universities contribute directly to the prosperity of communities and regions throughout the UK;
- Communicating and exchanging knowledge via global and interdisciplinary networks, which Russell Group universities report global challenges and have substantial reach (Torrens & Thompson (2012).

Benefits should be obtained when outreaching or communicating with the intended audience beyond academia (e.g. users and practitioners). Indeed, impact with its wider definition (e.g. awareness) should be the aim of a communication process (Euston, 2013).

2.9.   The Importance of Communication and its Elements

The importance of communication and its elements are addressed from many aspects in this section, including different communication theories and their limitations, and the adapted communication model is explained. Communication models have been modified by many other scholars from different disciplines, such as rhetoric and writing, social and organizational psychology, English and linguistics (Penrose, 2015). Communication theories have been developed for many different purposes; for instance, to measure attitude and persuasion, cognitive dissonance, communication network analysis, group dynamics, effectiveness, cohesion, pressure and satisfaction, the process of communication, semantics, words and meanings, and transactional analysis (Penrose, 2015). Each communication theory has considered a specific element; for example, Aristotle's model of communication has emphasised that the receiver is the vital element in the communication process. In this study, the process of communication has been applied to explain and understand the current communication process of academics while disseminating their research to audiences/stakeholders beyond academia.

Many communication models and theories were introduced in the 1940s and others, such as Who? With what effect? (Lasswell, 1948), source-destination (Shannon & Weaver, 1949), sender-receiver (Berlo, 1960), speaker-receiver and addresser-addressee (Jakobson, 1987). As mentioned earlier, communication models are built for different purposes within different contexts. Many of these models are aiming to understand the status of the communication process. For example, people use a map to discover a new place and to assist them in reaching the desired destination (Eunson, 2012). The map explains the directions, which is mostly represented in diagrams with a schematic method of seeing things. This is exactly what communication models perform and these models are one of the best ways to understand the process of communication (Eunson, 2012). In addition, communication models assist in understanding a particular communication process. The next section illustrates four well-known communication models with their functions and limitations.

2.9.1. Communication models

This section explains the four communication models stated earlier in section 2.9. Lasswell (1948) indicated that any communication process should begin with who says what, in what channel, to whom, and with what effect (Table 2.12). This is a communication formula defined as follows (Lasswell, 1948):

- Scholars who focus on *"Who/communication"* are studying the factors that affect the communication action.

- Specialists who focus on *"Says what/message"* are involved in content analysis.

- Researchers/those who consider communication channels *"Medium"* such as press, radio, and film are engaged in media analysis.

- A researcher who concerns *"To Whom/audience/receiver"* the people who receive information through communication channels involve in audience analysis.

- The effect analysis *"What Effect"* is concerned with the impact upon the audience.

Table 2-12: Lasswell's Communication Process (1948)

Who	What	Channel	Whom	Effect
Who?	Says what?	In what channel?	To whom?	With what effect?

Lasswell's communication process has been applied in mass media communication, propaganda effects, and public communication studies (Cobley and Schulz, 2013). Other scholars have criticised Lasswell's communication process; for example, Euston (2012) claimed that it is only one-way communication where the feedback loop is missing.

As shown in Figure 2.5 the well-known general communication system was introduced earlier in 1948 by Claude Shannon and it was modified by Shannon and Weaver in (1949). This communication model was based on an engineering perspective concept as they were engineers, and appears as one way communication, which starts from a sender and ends with a receiver. According to Shannon and Weaver (1949), the process of communication has five elements:

information source, transmitter, channel, receiver, and destination, where noise could appear within any element. These five elements are related to electronic communication, such as television and radio.
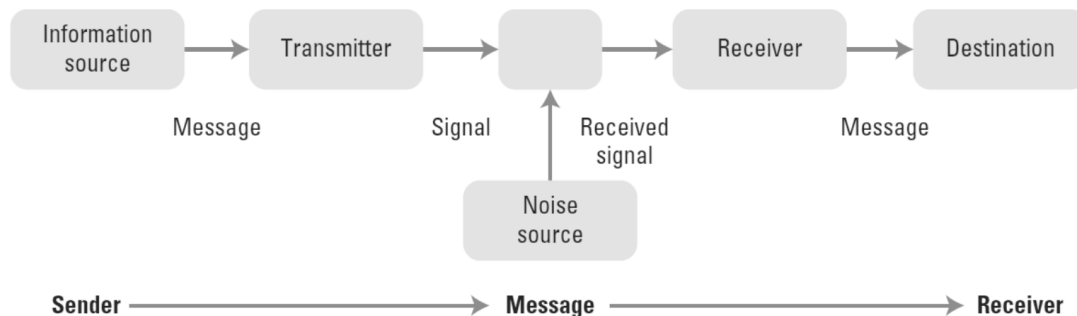
Figure 2.5: Shannon's and Weaver's general communication model (1949)

As Shannon and Weaver's model simplifies the understanding of communication processes and where, if any, barriers occur. However, some limitations have been addressed by other scholars, for example, Chandler (1994) and are listed below.

- The linear model: this communication model is a one-way communication, whereas commutation is a two-way communication. For example, the sender sends a message to the receiver, and the receiver responds with feedback to the sender, and both exchange the role of sender and receiver through feedback.

- A poor metaphor: the model expresses a bad metaphor where information is a container transported meanings which are neutral by default. In contrast, meanings are constructive and subjective in nature due to the different interpretation of individuals of the same given information.

- All communications are intentional and transparent: the model does not consider unintentional communication, such as body language. Also, it does not recognise some hidden meanings, which are non-transparent.

- Social contexts are missing: Shannon and Weaver's model ignores what occurs in social communication; for instance, gender differences, cultural patterns, spoken and unspoken rules and norms and other aspects that

could influence the meaning of messages.

Shannon's and Weaver's (1949) communication model was modified by Berlo (1960) who developed the communication theory with four main elements: source, message, channel and receiver (SMCR). Also, Berlo (1960) emphasised that source "sender/encoder" and receiver/decoder play an important role in the entire communication process. Communication skills should be considered between source "sender/encoder" and receiver/decoder; as Berlo (1960) indicates, "A given source may have a high level of skill not shared by one receiver, but shared by another. We cannot predict the success of the source from his skill level alone" (p. 53). In addition, communication theories should explicate the source, process, and effects of a given communication (Cobley & Schulz, 2013).

As shown in Figure 2.6 Jakobson (1987), indicates that scholars need to investigate language in all its roles and aspects. He developed a concept based on verbal communication. As shown above, four functions are important for both the addresser and the addressee. Context is the essential function to gain an effective message and should be referred to (the referent in another slightly ambiguous and nomenclature) understandable by the addressee. Both the addresser (i.e. encoder) and the addressee (i.e. decoder) of a message should have a total or at least partially common code. The contact between them needs to have a physical channel and a psychological connection to enter and remain in communication (Jakobson, 1987). Jakobson built this model based on a linguistic context, and it is enhanced specifically in a poetic aspect.
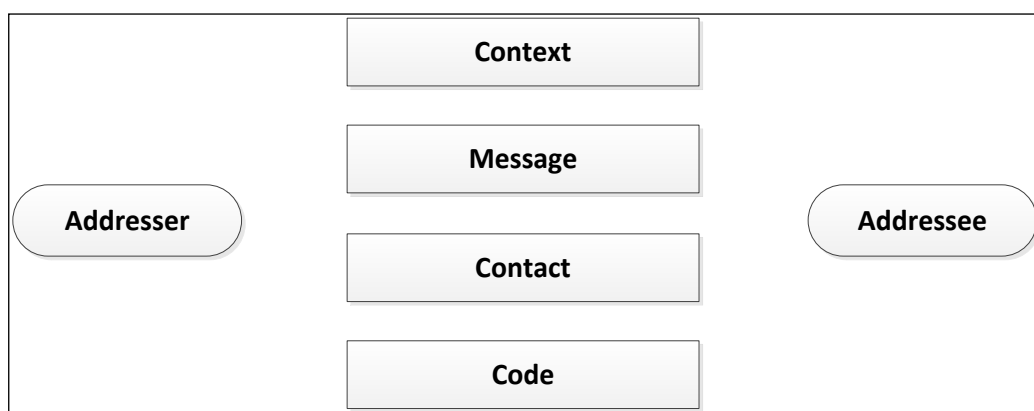
Figure 2.6: Jakobson's model of communication

Table 2-13: Summary of Communication Models

Author	Communication aspect	Limitations
Lasswell (1948)	Public studies	Linear model: one-way communication (feedback missing)
Shannon & Weaver (1949)	Engineering	Linear model: one-way communication (feedback missing)
Berlo (1960)	Social studies	Feedback is not really considered and it assumes that the sender and the receiver have the same level of communication skills and knowledge
Jakobson (1987)	Poetry studies	Only verbal communication

As highlighted earlier in this section, communication models are quite similar in terms of the elements, and quite different in terms of the concept, which is based on the aim of the communication itself and/or the context, such as engineering and poetry. Additionally, Table 2.13 summarises the communication models discussed above.

2.10. Research Framework of this Study

As highlighted previously in section 2.9, communication theories/models vary from one another. Every author defines the communication process based on a specific context (e.g. Shannon and Weaver (1949) from an engineering perspective). In this study, Berlo's communication model has been adapted to guide the data analysis. According to Berlo (1960), communication has four basic SMCR elements that affect the fidelity of communication. Fidelity is the source's purpose of communication. High fidelity indicates that the source effectively expressed the meaning to the receiver. Fidelity could be affected in any element of the communication process. Berlo's (1960) communication model investigates and analyses the communication process and what positively or negatively

affects the fidelity (Figure 2.7).
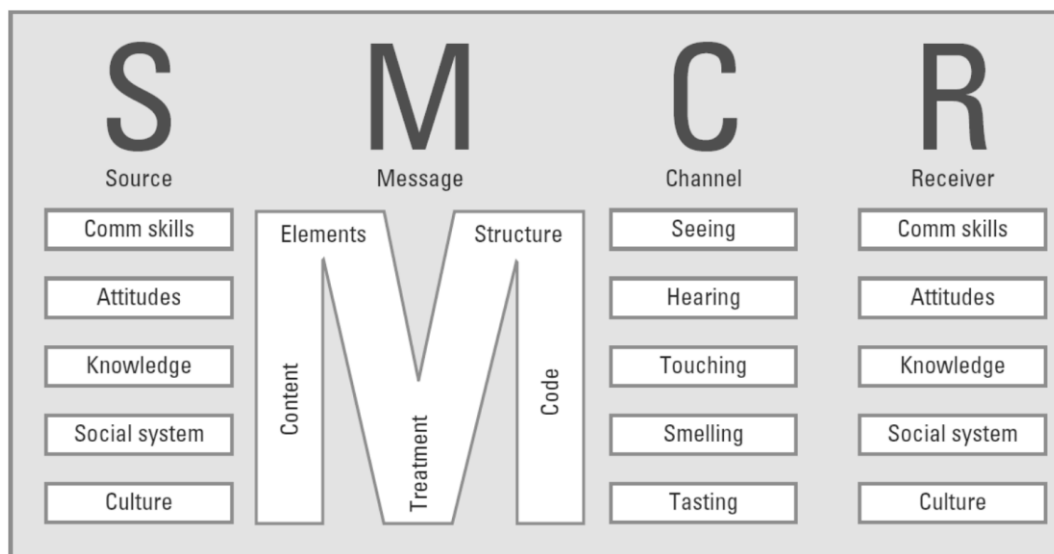
Figure 2.7: Berlo's (1960) SMCR Communication model

As emphasised earlier in section 2.4, that communication between academics and audience beyond academia is important, this study has adapted a research framework to analyse and explain the data collection of this study. The research framework is based on the analysis of the communication models that help to understand the communication process of a situation. Berlo's (1960) model "The process of communication" was used, and this study considers its definitions. His model is rich and considers human beings within different components. Section 3.5.1 illustrates the strengths and limitations of the research framework adapted in this study. The next sections explain the theoretical framework elements that are applied in this study.

2.10.1. Source

The communication source could be an individual, a group or an organization that contains four elements as shown below.

Communication skills

There are two types of communication skills: verbal and non-verbal. Berlo (1960) indicates the five verbal communication skills of the source/encoder and the receiver/decoder. The source/encoder uses speaking and writing, whereas the receiver/decoder uses listening and reading. Thought and reasoning are vital elements for both the encoder and the decoder in the entire communication

process, including the purpose of the communication itself. In addition, the encoder has non-verbal communication skills; example, drawing, painting, posturing and gesturing (Berlo, 1960; Adler and Rodman, 2006). The communication skills of the source affect his/her communication fidelity in two aspects: (1) the ability to express goals, intentions and to say something while the communication process is in action; (2) the ability to encode a message in the way it is intended (Berlo, 1960).

Attitude

In social science studies, attitude has many different concepts (Dillard, 1993). Attitude has been related to cognitive, emotional, and behavioural processes (Breckler and Wiggins, 1989); these are the three main critical elements that have been defined by O'Sullivan *et al.* (1994); (1) cognitive or intellectual: the knowledge or information that is already known about the target; (2), emotional or affective: the reaction derived from a person's experience towards information; and (3) behavioural: the degree of actions based on what people know or feel. These definitions are conceptualised in many different contexts. As this study considers Berlo's communication model to analyse its data, the definition of his attitude is considered as the main definition of this study. He defined attitude as predisposition, tendency, and the desire of a person for another or an object. He argued that attitude affects the source's communication behaviour in three different positions as outlined below.

Attitude toward self: The attitude of a source towards her/himself can affect the source's communication behaviour. For example, if a person underestimates her/himself in public speaking, this will affect the person's message and how she/he communicates.

Attitude toward subject matter: The attitude of a source towards her/his subject matter affects the communication process. With this type of attitude, the receiver can obtain an impression of the source's attitude towards her/his subject matter through reading an article, or listening to a lecturer or teacher, a salesman or an actor. However, some writers receive assignments to write and if the writers do not believe in the value of their subject matter, it will be a complex

task for them to effectively communicate regarding the assignment.

Attitude toward receiver: The attitude of a source towards a receiver affects the source's communication behaviour. It is important that the source's attitude appears positively to her/his receiver; thus, to communicate effectively.

Knowledge level

The knowledge level of a source regarding her/his subject matter can affect the source's message. A source is unable to communicate what a receiver does not know. For example, if a source is overspecialised "knows too much" that might lead her/him to select a specialised works/terminology which a receiver cannot understand. Also, regarding teaching, some authors indicate that teachers do not need to know about the subject matter as they need to know how to teach (Berlo, 1960). While others contradict and considering that a teacher does not need to know how to teach rather a source needs to know her/his subject matter thoroughly to be able to communicate knowledge effectively.

Berlo (1960) emphasises knowledge as an imperative component that a source is affected by how much she/he knows regarding the subject matter, the characteristics of a receiver, the techniques of how to produce and treat a message, and the type of selections that source can make regarding channels. Thus, communication behaviour is affected by the knowledge level.

Social and cultural system

This component is affecting the sender/encoder's communication process, for example, an academic speak differently in a business community (Berlo, 1960). This element is affecting the sender/encoder decisions in selecting words, purposes of communication, word meaning, receiver/decoder, and channels for the communication process. Words selections are important to convey the message to the receiver (Berlo, 1960). Purposes of communication are based on the current role, position, or work that sender/encoder holds (e.g. teacher at school and customer in a supermarket).

2.10.2. Receiver

Berlo (1960) claims that calling a source or a receiver as an independent; this will prevent the dynamic of the communication process. The source could be the receiver and vice versa; and the relationship between source and receiver is important (Berlo, 1960). Berlo's communication model assumes that if the reviver does not have the same source's components (i.e. communication skills, attitude, knowledge, and social and cultural system) receiver is most likely unable to communicate with the source. The four components of the receiver illustrated as follows (Berlo, 1960):

Communication skills

The receiver ability to listen, to read, and to think are key elements to be able to communicate with the source.

Attitude

The receiver's attitude is divided the same as source, where receiver's decoding code is attitude toward himself, toward source, and toward message's content. In fact, all the explanations of source's attitude apply on receiver's attitude (refer to section 2.10.1).

Knowledge level

The receiver's knowledge regarding the subject matter, source, and the communication process is critical as Berlo indicates that if the receiver does not know the code and content of a message, he is unable to understand the source's message. All the explanations of source's knowledge level apply on receiver's attitude (refer to section 2.10.1).

Social and cultural system

The receiver's culture, social status, group membership and position in the social system affect the way he/she receives, decodes and interprets a message. Berlo (1960) claimed that the receiver was the most critical component of effective communication. However, he did not elaborate at this point in the feedback process (Cobley and Schulz, 2013) Berlo's communication process remains a one-way communication process.

Concerning the source, the receiver is the critical component of a communication process (Cobley and Schulz, 2013). As Timm *et al.* (2016) indicated, it is important to identify and to be aware of the communication audience; the receiver needs to have a dynamic and iterative communication cycle. The audience, as a component of the communication process, has been classified based on the effect of TV, radio and print media (Cobley and Schulz, 2013). For instance, the audience can be classified as passive and impressionable, or reactive and mass, or as individuals with certain reasons for their use of media (Cobley and Schulz, 2013). However, a new classification emerged – the hyperactive audience – who create the personal connection that leads individuals into groups (Yus, 2011). The hyperactive audience includes people who listen, read, view, comment and tweet (Cobley and Schulz, 2013). Individuals now shape their personal online identities, which can appear as social communities.

2.10.3.   Message

The message is the physical product of the source; for example, a person who speaks the "speech" is the message; who writes the "writing" is the message; and who paints the "picture" is the message. It is important to investigate the components of a message that affect the fidelity (Berlo, 1960). The message is the complex component of the communication process (Busu, 2014). One of the reasons is the sender encoding and receiver decoding process of the message (Busu, 2014). The message comprises of three components: code, content and treatment. Each of these components has different structured elements. For example, letters are elements of a work and words are elements of a sentence, and all these elements individually or together have to be structured in a certain way to create a message (Berlo, 1960). Elements and structure cannot be independent; the words have to be imposed in a certain order to deliver a message (Berlo, 1960). The following paragraphs show the components of a message.

Code

A code is defined as a language consisting of elements (i.e. sounds, letters, words, etc.) or symbols that are structured to be meaningful to someone "a person".

While encoding a message, it is important to consider what code, what elements of the code, and what appropriate method to structure the elements of the code should be selected (Berlo, 1960).

Content

Content is defined as the material in a message. Everything needs to be communicated, which is the aim of the source "sender/encoder" of the message. For instance, three types of information are elements of content and they have to be structured in a certain order to be meaningful to someone (Berlo, 1960).

Treatment

Treatment is the selection and the organization of code elements and content elements in creating a message. Berlo (1960) indicated that "We can define the treatment of a message as the decisions which the communication source makes in selecting and arranging both codes and content" (pp. 60). For example, while a journalist is preparing an article for a newspaper she/he selects words and information within certain structure that she/he thinks the reader will understand (Berlo, 1960).

However, a message seems to be more than what Berlo formulated. Watzlawick *et al*. (1967) indicated that a message has two degrees of meaning: content and relationship. The content meaning is:

- The statements
- The statements' literal meanings
- The statements' implication and assumptions.

The relationship meaning is:
- A focus on projecting identity definitions
- The relationship between sender and receiver of a message.

Every message inevitably includes these two degrees of meaning (Cobley and Schulz, 2013).

2.10.4.   Channel

In communication theory, the term "channel" has been used to mean many different things. According to Berlo, (1960) channels are classified into five

sensorial elements (i.e. hearing, seeing, touching, smelling and tasting). Berlo provides an analogous example to explain what channel means in communication theory. For instance, two people (i.e. Person A and Person B) are on both the opposite side of a wide lake (i.e. Person A is on the lake side with steep banks). Person A has a parcel that has to be delivered to Person B. Berlo (1960) questioned what Person A needs in order to deliver the parcel to Person B. The answer is:

- First: Person A needs a boat to carry the parcel;

- Second: Person A needs to be connected to the boat by using a boat dock to place the parcel in the boat.

- Third: On the other side of the lake, Person B needs something to retrieve the parcel from the boat.

- Fourth: As before, a boat dock is needed for Person B to be connected to the boat.

- Fifth: Person A needs water or something to be used as a carrier to assist the boat to travel.

Both Person A and Person B have to obtain the three materials (i.e. boat-docks, boat, and water) to be able to approach each other otherwise this will be more complicated. However, in terms of communication theory, these three materials are channels (Berlo, 1960). However, Berlo's (1960) communication process did not consider the online channels as the Internet was yet to be invented.

Table 2-14: Examples of Information Communication Technology Channels (source: Cobley and Schulz, 2013)

Input / Output	Sight	Hearing	Touch	Smell
Sight	Eye-tracking technologies	...with acoustic displays	...with haptic interfaces	...with smell-output devices
Voice	Voice-access technologies	...with acoustic displays	...with haptic interfaces	...with smell-output devices
Touch	Touch screens	...with acoustic displays	...with haptic interfaces	...with smell-output devices

Cobley and Schulz (2013) extend Berlo's concepts of channels within ICT. Table 2.14 illustrates how Berlo's sensorial elements have been adapted within ICT. Berlo's sensorial elements are inputs in the table to match within ICT as outputs.

Cobley and Schulz (2013) indicate their extension of channels with examples of the everyday use of modern ICT "By simply considering an example of today's mobile phones, or the so-called 'smart phones', we can see at play a channel which relies on the human ability to directly interact with objects by touching them (touch screens as input), combined with the visual (typical of graphical user interfaces) and the aural channel (listening to a phone call, but also listening to screen labels being read aloud by a software) as output modalities" (p. 402). The sensorial elements are used within ICT as shown in the previous example.
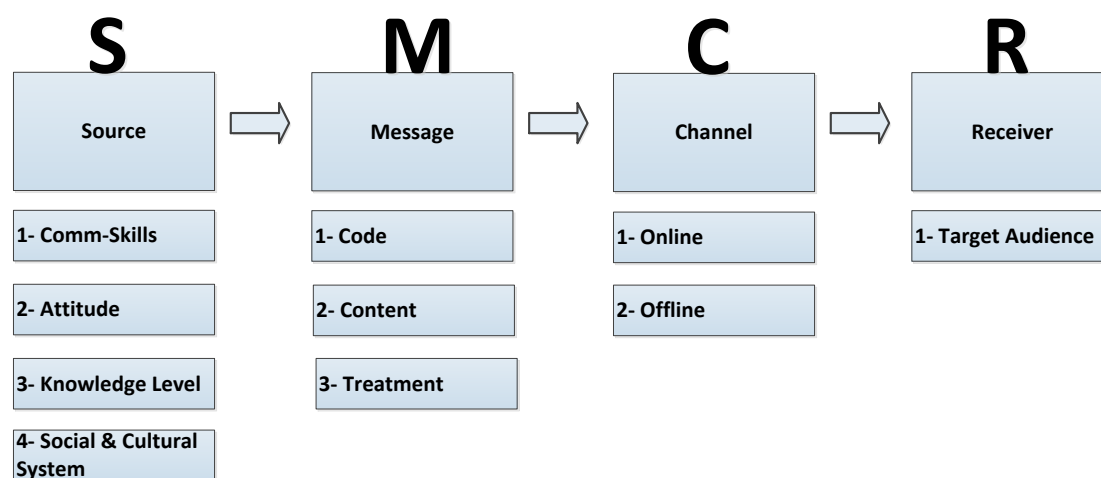
Figure 2.8: The adapted Berlo's Communication model

This study is applying the above research fram-ework in Figure 2.8 which is adapted from Berlo's communication model to analyse the data of the first Phase (i.e. Investigation Phase). As shown in the research framework the receiver will be identified by the Sender (i.e. Academics) due to the focus of Phase 1 (Refer to section 3.6.1).

2.11. The Research Gap

As mentioned earlier, IS research lacks relevant research to practice. IS scholars have claimed different reasons that have caused irrelevant research to practice (refer to Table 2.8 in section 2.4). For example, academics and practitioners focus on entirely different environments (Lanamaki *et al.,* 2011). Academics are focused more on research rigor, which is highly encouraged by institutional policy (Gallivan and Aryal, 2012; Jennex, 2001; Moody, 2000). In contrast, practitioners are not interested in reading academic papers for various reasons, such as academic language and irrelevant information in the academic papers

(Cranefield and Yoong, 2007; Pearson *et al.,* 2005).

In fact, some studies attempt to improve IS research in order to make it more relevant to practice. For instance, Lanamaki *et al.* (2011) and Otto and Osterle (2010) indicate that a collaborative relationship between academics and practitioners improves research relevancy. Other IS scholars claim that the research methodology selection assists IS researchers to be relevant to practice; for example, action research and design research (ICIS, 2009).

Also, IS research is not only relevant to business managers and practitioners, but also to society (Desoza *et al.,* 2006). Kazanchi and Munkvold (2001) claimed that IS research is not only of practical relevance, but also it can be relevant to the government, to users, and to society (Table 2.10). Relevance is categorized into different dimensions as proposed by Benbasat and Zmud, (1999): the research paper must be interesting, applicable, current and accessible. Few of these dimensions have been investigated by IS researchers, such as Klein *et al.* (2006), who examined three dimensions by asking practitioners to indicate whether or not an abstract of a given paper is important, applicable and accessible. Despite all these attempts, there is still a lack of relevant research to potential audiences/stakeholders beyond academia. The focus of this study is on the accessible dimension of relevance (i.e. the paper is understood by IS practitioners in terms of tone, style, structure and semantics).
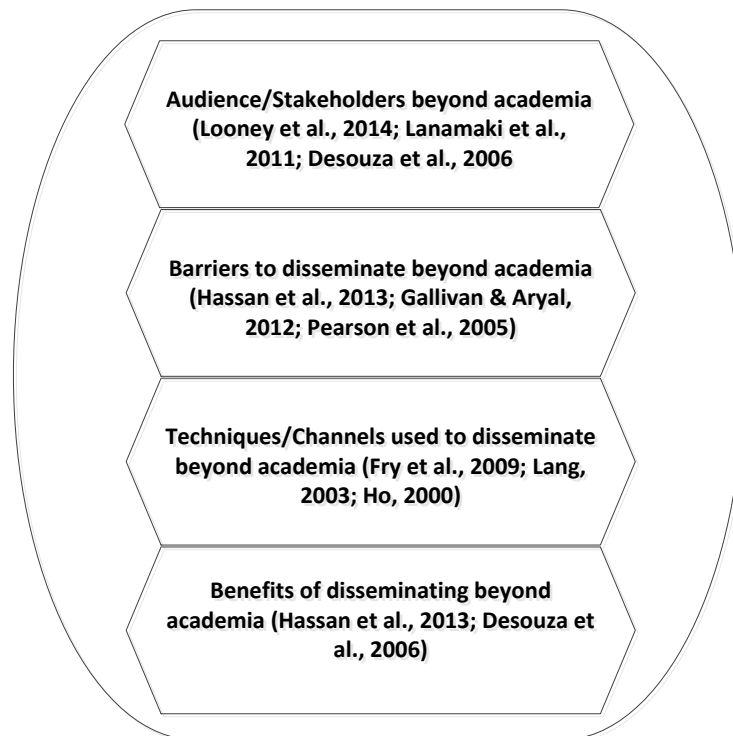
Figure 2.9: The focus of this study.

This study investigates four critical aspects from the perspective of academics at the Information Systems and Computing Department, which could be behind the irrelevant research to practice and the potential audience of academic research. The four critical aspects are (Figure 2.9):

1) The potential audience/stakeholders of academic research. This will assist in understanding the type of audience that an academic is targeting.

2) The barriers that academic researchers face while disseminating or communicating their research outputs beyond academia. This will assist in understanding what demotivates academics from disseminating to or communicating with audiences beyond academic communities.

3) The methods and channels used to disseminate and communicate research outputs beyond academia. This will assist in understanding the preferred ways or channels that academics use to disseminate beyond academia.

4) The benefits that academic researchers gain while reaching the intended audience and vice versa. This will assist in understanding whether or not IS academics are aware of their research value while disseminating beyond academic communities.

2.12. Conclusion

This chapter scrutinized the IS literature regarding research relevance to potential audiences beyond academia. It also showed the IS definition of relevance research to IS audiences, and practitioners and professionals in particular. The barriers to make IS research relevant to IS audiences were described. This chapter indicated the importance of communication and its processes. Moreover, it illustrated the research framework applied in this study. The main focus aspects of investigation were determined.

CHAPTER 3

3. Methodology

3.1. Introduction

This chapter describes the process, research paradigm and method that have been applied to achieve the aim of this study, which consists of three phases: investigation (Phase 1), development (Phase 2) and evaluation (Phase 3). This chapter is structured as follows: section 3.2 explains the research paradigm and its application. Section 3.3 illustrates the research methods applied. Section 3.4 explains and justifies the theories used in IS. Section 3.5 explains the research framework. Section 3.6 illustrates the research design and the three phases mentioned earlier. Section 3.7 illustrates the data collection strategy. Section 3.8 illuminates the data analysis strategy. Finally, section 3.9 concludes the methodology chapter.

3.2. Research Paradigm

Research in IS is classified as a multidisciplinary field. The nature of IS research is complex and has a significant relation with many disciplines, such as engineering, medicine, CS and management (Land, 1992; Baskerville and Myers, 2002). In addition, research in IS does not have a unique approach or method. IS research is carried out by multiple approaches, methods, methodologies, paradigms and techniques (Baskerville and Myers, 2002). Pluralist paradigm research has been gradually accepted in IS research (Mingers, 2001).

Paradigm is an essential set of beliefs that reflect researcher beliefs and understand of a phenomenon. It consists of three main terms: ontology, epistemology and methodology. There are three main questions that indicate a researcher's beliefs:

- *Ontology*: what is the nature of the knowledge? Or, what is the nature of the reality?
- *Epistemology*: what is the nature of the relationship between the knower (researcher) and the known (knowledge)?

- *Methodology*: how should the inquirer (researcher) go about finding out knowledge? (Guba, 1990).

Other studies have added a fourth belief; for example, axiology or ethics: how being a moral person in the world is a significant aspect of a paradigm (Denzin and Lincoln, 2011).

IS research paradigms can be classified into three main paradigms: positivist, interpretive and critical (for an overview refer to Chua, 1986; Orlikowski and Baroudi, 1991; Lincoln *et al.,* 2011).

To achieve the aim of this study, an interpretive paradigm is seen as the most appropriate. Interpretive paradigm is recognised if there is any research study that seeks to deeply understand a phenomenon within the aspects of cultural and contextual cases or situations. Many researchers identify interpretive research in IS as deeply understanding a phenomenon surrounded by context; for example, Walsham, (1993) indicates that interpretive research aims to understand the context of IS context and its process. Accordingly, the IS is influenced by the context and vice versa. Interpretive researchers believe that a phenomenon of interest is examined from the participants' point of view without the intervention of the researcher's understanding of that phenomenon (Orlikowski and Baroudi, 1991).

Table 3-1: Interpretive Paradigm and the three Basic Beliefs

Interpretive Paradigm		
Ontology	**Epistemology**	**Methodology**
The reality is subjective and constructed by the human's mind within different social contexts	The interaction between the researcher and the participants that results in interpretation of subjective meanings	The qualitative method is the one mostly used in the interpretive paradigm

As shown in Table 3.1, the interpretive paradigm is defined based on the three main basic beliefs as follows:

- **Ontology**: The interpretive paradigm is the "construct of the human mind" (Bassey, 1999). Schwartz-Shea and Yanow, (2013) indicate that the researcher's primary goal is to understand the reality from the participants' perspective on a particular situation or case. Interpretive research provides multiple different points of view in the same situation based on the individual's experience. In this study, this reflects the academics' view in disseminating and communicating their research outputs beyond academia.

- **Epistemology**: The interpretive paradigm is the impact of the researcher's experience and knowledge on the research, particularly in the data collection stage. The interpretive researcher interprets actions or meanings of the participants in a particular situation to understand a phenomenon.

- **Methodology**: The interpretive paradigm is defined as the umbrella term of the qualitative method (Erickson, 1986); also he acknowledges the quantitative method in the interpretive paradigm. In this study, the qualitative method is applied as illustrated in section 3.3.

3.3. Research Method

This section illustrates the methods applied, the rationale behind their selection, and explains different methods and techniques. A considerable number of methods could be applied for data collection. Galliers (1991), defined the term "method" as an application of a position that has a particular technique. The two main methods are quantitative and qualitative. The quantitative method involves a statistical and mathematical approach, while the qualitative method includes observations and interviews. The qualitative method is defined as a method that studies social and cultural phenomena. However, definitions vary; for example, Punch (1998) argued that the quantitative method includes numbers while the qualitative method is solely concerned with words. Chen and Hirschheim (2004), argue that the quantitative method is an object perspective of reality, whereas the qualitative method is the description and deep understanding of a particular

situation underlying the factors.

The qualitative method is defined as a subjective technique that aims to understand, explain and explore the meaning behind the perspectives, behaviours, actions and insights of individuals (Patton, 1990). To investigate a phenomenon, there are a variety of tools that could be utilised to generate qualitative data, such as observations, interviews, documents and interventions (Conboy *et al.,* 2012; Kaplan and Maxwell, 2005; Myers, 1997). According to Kaplan and Maxwell (2005), "Qualitative research typically involves a systematic and detailed study of individuals in natural settings, instead of in settings contrived by the researcher, often using open-ended interviews intended to elicit detailed, in-depth accounts of the interviewee's experiences and perspectives on specific issues, situations, or events" (p. 32).

There are many reasons that could be justified to utilise the qualitative method. Kaplan and Maxwell (2005) pointed out five main reasons for applying qualitative methods in IS:

- To understand how users perceive and evaluate a particular system and what meanings the system has for them;
- To understand the effect of social and organizational context on a system used;
- To investigate causal processes;
- To increase the use of evaluation results;
- To provide a formative evaluation that improves a specific program under development, instead of assessing an existing one.

The qualitative method is applied in this research to understand academic researchers' belief of the way they publish their research outputs; to investigate the influence of social, organizational context on the way they publish (Kaplan and Maxwell, 2005). In Phase 1 in this study, academics' beliefs are investigated to understand what they think about the way they publish their research outputs, why they think that way and how they feel regarding their current situation. In Phase 3, ten academics' and ten audiences' beliefs are investigated

to understand their view regarding the short videos.

3.4.   Using Theories in IS

Previous sections have explained that "interpretivist" is the paradigm of this study, whereas this section illustrates the use of theories in the IS discipline and the type of theory that has been selected in this study. Theories have been applied in IS research for many different purposes. Gregor (2006) classified theories in IS in five categories: analysis, explanation, prediction, explanation and predication, and design theory (Table 3.2). In this study, theory is applied by adapting a research framework based on communication theories to explain what, how, why, when, and where IS academics disseminate their research outcomes beyond academia.

Table 3-2: Theory Types in Information Systems (source: Gregor, 2006)

Theory Type	Distinguishing Attributes
I. Analysis	Says what is. The theory does not extend beyond analysis and description. No causal relationships among phenomena are specified and no predictions are made.
II. Explanation	Says what is, how, why, when, and where. The theory provides explanations but does not aim to predict with any precision. There are no testable propositions.
III. Prediction	Says what is and what will be. The theory provides predictions and has testable propositions but does not have well-developed justificatory causal explanations.
IV. Explanation and prediction (EP)	Says what is, how, why, when, where, and what will be. Provides predictions and has both testable propositions and causal explanations.
V. Design and action	Says how to do something. The theory gives explicit prescriptions (e.g., methods, techniques, principles of form and function) for constructing an artifact.

Under an analytical lens, by using a theory, this research gained a rich understanding regarding the phenomenon investigated. Gregor (2006) indicated that using a theory in interpretive research would help to gain a rich understanding of empirical data by illuminating them through a specific lens. Additionally, it has been argued that theories in interpretive research could be used as "an initial guide to design and data collection, as part of an iterative process of data collection and analysis, or as a final product of the research" (Walsham, 1995, p. 76). Walsham (2006) analysed the role of theories in four published papers and indicated three imperative points:

- **First**: Theories are chosen from a diverse selection of literature (e.g. innovation literature); they are chosen in different phases of the research.

- **Second**: Theories are applied in a lighter or tighter way and each has their own justification.

- **Third**: Theories are selected subjectively.

As discussed above, this study has applied a combination theory after data collection to gain a rich explanation of the phenomenon using an analytical lens technique. (Refer to section 2.10 to view the research framework.) The theory was selected after reading and rereading the data as part of thematic analysis technique (refer to section 3.8.2) and the communication theory was the appropriate theory that spoke to the data (Walsham, 2006).

As emphasised in section 2.4, IS researchers are struggling to disseminate and communicate their research outputs (i.e. academic articles and conference proceedings) to audiences/stakeholders beyond academia. Lang (2003) applied Shannon's and Weaver's (1949) communication model to analyse and explain the academic research dissemination as cited earlier in section 2.4. Chapter 4 of the current study illustrates the well-known communication theories and processes, such as Harold Lasswell's (1948) communication process and David Berlo's (1960) process of communication. Also, the extended research framework applied in this study is demonstrated.

3.5. The Research Framework within this Study

This section initially illustrates how the research framework explains the data collected in phase 1. The following points are an overview of the communication model within this study (Figure 3.1):

- The "source" is any academic of Information System and Computing Department who have published peer-reviewed papers.

- The "message" is whichever academic publication the papers are published in (more specifically, the outputs of academic research and conference proceedings). As discussed in sections 2.4 and 2.5, this component is identified within the IS domain as an issue for academics to disseminate/communicate their research outputs beyond academia.

- The "channels" are the academic journals and conferences that disseminate the IS research outputs in specific academic channels, such as the *Information System Research Journal* (refer to sections 2.4 and 2.5). Also, any other online or offline channels that have been used by academics to disseminate their research outputs beyond the academic community.

- The "receiver" is the potential audience of academics beyond academia.
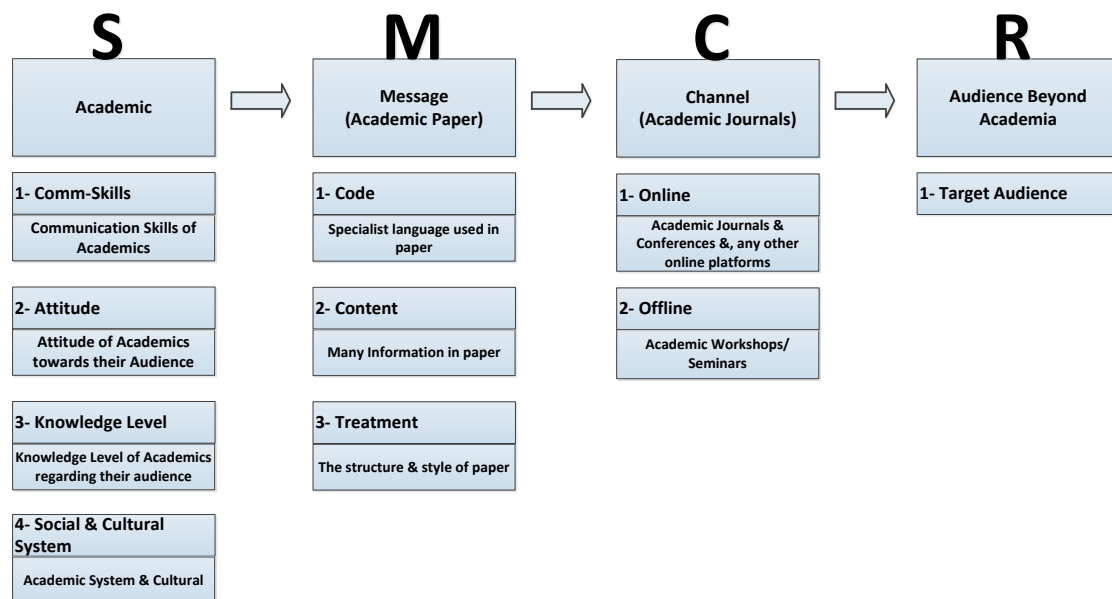
Key: S = Source, M = Message, C = Channel, R = Receiver.

Figure 3.1: Adapting Berlo's model to this study.

3.5.1. The selection of this the research framework

As mentioned in section 3.4, this study is using theory/model for explanation purposes, which guided the data analysis as it spoke to the data (Walsham, 2006). Berlo's (1960) communication model offered a rich explanatory power of this communication process. It included social contexts where this model starts and ends with a person or people. Additionally, Berlo's model considered the social and cultural system that affects both the source and the receiver within the entire communication process. This model revealed insights of what academics believe in the way they disseminate their research outputs beyond academia.

At the individual level, Berlo's (1960) model helped to explain the academics' communication skills, which they practice to disseminate and communicate beyond academia. It also contributed the insights on how the social and cultural system affects academics' selections of channels and words to disseminate their work beyond the academic community. This communication model, in particular, has been praised by communication scholars that appreciate this model among other communication models. They acknowledge that the relationship between sender and receiver, including their social context, affects the entire communication process (Byron, 2008).

3.6.   Research Design

This study contains three phases as cycles where the outcomes of one phase are inputs into the following phase. Each phase has different steps as required. Each phase is named based on its aim. The three phases are listed below.

3.6.1. Phase 1: Investigation (refer to Chapter 4)

The aim of this phase is to understand the way academics disseminate and communicate their academic publications to the potential audience beyond academia. This phase is divided into five steps (Figure 3.2):

> **Problem awareness**:

In this study, the literature has been reviewed to gain a clear understanding of the barriers that limited IS researchers in the dissemination of their research outputs to audiences beyond academia. The research problem is based on the IS literature review; that is, the relevant IS academic research to IS audiences (e.g. practitioners), and the lack of mutual understanding between IS researchers and their target audience beyond academia; particularly, practitioners (refer to sections 2.4 and 2.5 for more details). Through a review of the IS literature, the researcher decided to investigate this problem from the IS academic perspective. This decision needs to consider five main areas in the IS literature to be identified and analysed. They are:

- Different IS research topics. This assisted in understanding the topics that IS researchers were investigating and their context of study (e.g. business context).

- The dimensions of relevant research to practice and the potential audience beyond the academic community. This assisted in understanding the concepts of research relevance to practice in the IS domain.

- The barriers that limit academics in disseminating their research outputs beyond academia. This assisted in understanding what limits academics from disseminating and communicating their research outputs beyond academia.

- The relationship between IS academics and IS audiences, particularly practitioners. This assisted in understanding the nature of both IS academics and IS research consumers or users (e.g. practitioners).

- The actions that have been taken or recommended to improve the relevant research to practice and the potential audience beyond academia (refer to section 2.7 for more detail). This assisted in understanding how IS scholars approached this issue and the solutions that have been applied to improve the relevancy of IS research to the potential audiences. The outcome of this phase was the determination of the problem.
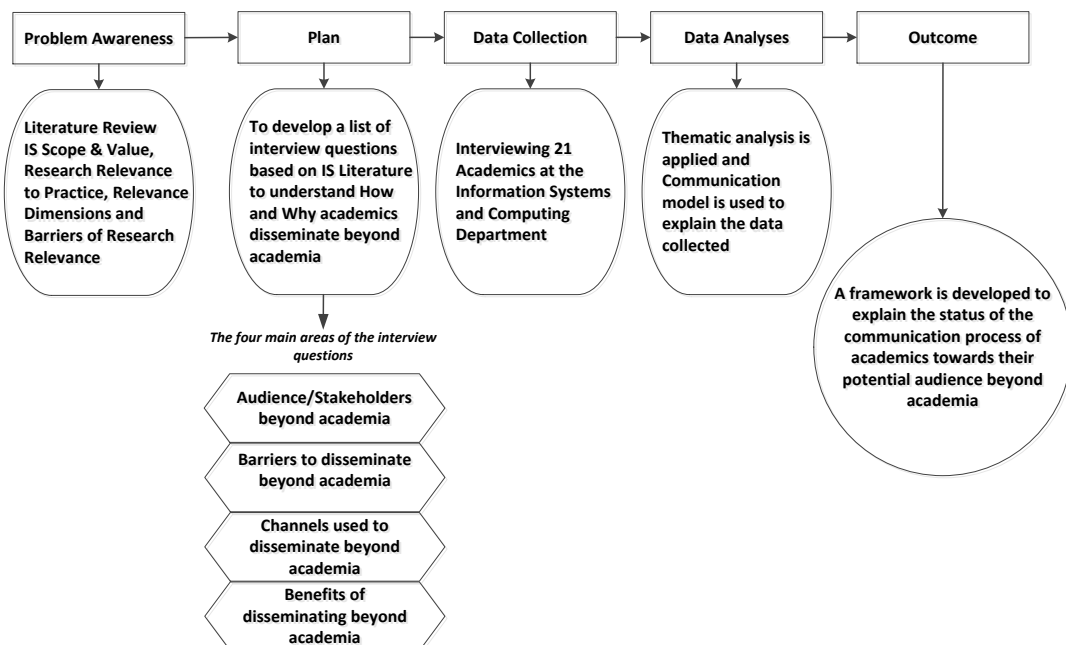
Figure 3.2: The Phase 1 Process.

➢ **Plan**:

In Phase 1, interview meetings were planned to understand why and how academic researchers disseminate and communicate their research outputs to their potential intended audience beyond academia. The emails were drafted, ready to be sent, to academics in the Information Systems and Computing Department at Brunel University (called the Computer Science Department since the mid of 2014). Moreover, all academics in the Information Systems and Computing Department were sent an email invitation, including the academics of CS research topics who shared the same concerns of research dissemination.

➢ **Data collection**:

The invitational emails were sent to all academics in Information Systems and Computing Department (i.e. CS since mid of 2014), to arrange and organize interview meetings. The interviews took place, and were recorded and transcribed. A total of 21 out of 41 academics at the Information Systems and Computing Department responded, which was 52.5 per cent of the total number of academics (refer to section 4.1 for more details). All participants were asked to specify their academic discipline based on their research area.

Each interview took 40–60 minutes, which was the maximum time done, and took place in each participant's office. It was very difficult to have the participants to take part in this study and to manage the interview meetings based on their academic schedules. The reasons were many and varied; for example, some academics said, "I am not interested", and others said, "I have loads of academic duties".

➢ **Data analysis**:

The 21 interviews were transcribed by the researcher which took around 3 moths (refer to Appendix F).The research framework adapted in this study was applied to analyse and explain the data collected from academics as mentioned earlier. It has been reported that theories could be applied to analyse and explain the data that have been collected (Walsham, 2006; Gregor, 2006). Thematic analysis was applied to analyse and to construct the participants' answers (refer to section 3.8.2 for more detail).

➢ **Outcome**:

The findings of the interview questions were analysed and constructed as themes within the theoretical framework introduced in section 2.10. Three themes emerged as barriers for academics to disseminate and communicate beyond academia (refer to Chapter 4). The outcome of Phase 1 was the starting point for proposing a method that was developed in an attempt to solve the problem that academics face in terms of disseminating and communicating their research outputs beyond academia (refer to Chapter 4).

3.6.2. Phase 2: Development (refer to section 5.3 Chapter 5)

This phase aimed to create a solution (i.e. Video production) based on the outcomes of Phase 1 as explained below. This phase is divided according to Dawkins and Wynd, (2010) and Compesi, (2007) video production consists of three main stages as follows:

➢ **Preproduction**:

This stage is critical to the entire success of a video production. The initial idea for the subject and the process of video production are determined and developed. This phase ensures that the production phase operates smoothly. In this study, phase 2 (the preproduction stage) a short video of an academic paper was proposed to overcome two elements: message (i.e. structure and academic language), and channels (i.e. dissemination effectiveness). Short videos were suggested as a multimedia platform that could present and summarise an academic paper based on the facts that practitioners do not read academic papers (refer to sections 2.4 and 2.5); and academics' answers that audience beyond academia do not read academic papers (refer to section 4.7).

Chapter 3: Methodology
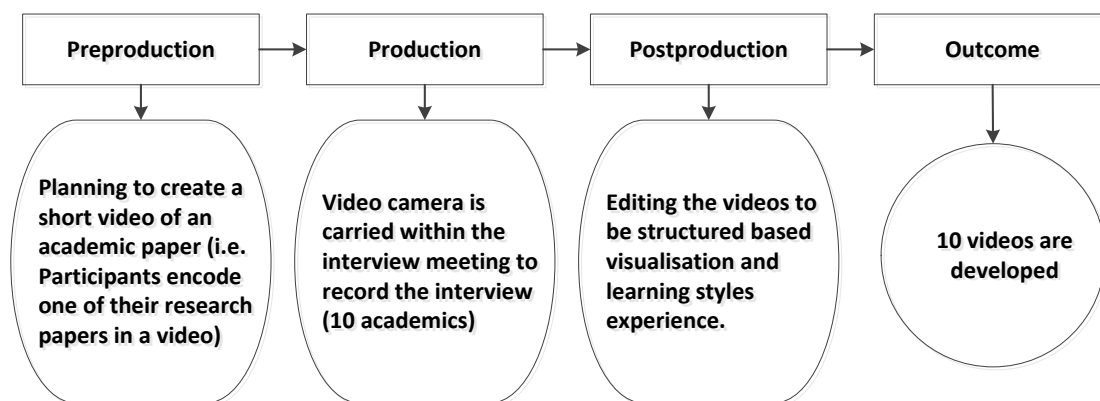
Figure 3.3: The Phase 2 Process

➢ **Production**:

This stage is where the actual activities were conducted such as, filming and recording. In this study, production step, the interview questions were asked to academics, as listed below:

- What is the title of the paper you selected?
- Who is the audience for this paper? (Keen, 1991)
- What story are you trying to tell the reader? (Paul, 2007)
- What will the readers know after reading your story that they did not know before reading the story? (Paul, 2007)
- Why should anyone believe you? (Paul, 2007; Keen, 1991)
- Why should anyone care about the story being told? (Paul, 2007)

The above questions were based on Paul's, (2007) guidelines on writing a clear academic paper; and Keen (1991) who emphasised two critical elements that academic authors should be aware of: the audience and the rationale of their research claims. Additionally, there were questions based on Table 2-9 in page 24 (refer to Appendix M). These questions were asked to extract the relevant information that interests to the potential audience of a paper. Also, some of these questions were used to structure the short videos, which did not replace the academic articles. In fact, the short videos were tools to more widely disseminate and communicate the research outputs.

Eight academics that participated in Phase 1 agreed to participate in Phase 2, and five more academics were sent an email inviting them to participate as well, but

only two accepted, which gave a total of ten. They were sent an email that explained what form their participation would take (refer to Appendix G), which included them being filmed. Unfortunately, many of them did not like that idea, so five were filmed and five were audio recorded (refer to Table 3.3). Similarly, as mentioned in Phase 1, it was difficult to have academies to be filmed and those who are audio recorded did not want to be filmed for some reasons. The participants were asked to answer in simple English and to avoid academic jargon as much as they could. Each interviewee was filmed or audio recorded for 30 minutes maximum, as raw data.

Table 3-3: Academic participants of Phase 2

Participants	Paper title	Film/audio
P1	From boundary spanning to creolization: A study of Chinese software and services outsourcing vendors	Film
P2	A framework for deriving semantic Web services	Film
P3	Video summarisation: A conceptual framework and survey of the state of the art	Film
P4	Why people keep coming back to Facebook	Film
P5	A mutation in NRL is associated with autosomal dominant retinitis pigmentosa	Audio
P6	Development and validation of "AutoRf": Software for the automated analysis of radiation-induced foci	Audio
P7	Modelling an ontology on accessible evacuation routes for emergencies	Audio
P8	A systematic literature review of fault prediction performance in software engineering	Film
P9	Microblogging as a mechanism for human-robot interaction	Audio
P10	Is it all lost? A study of inactive open source projects	Audio

➢ **Postproduction**:

This stage involves editing all materials recorded in the production phase such as footages and sounds. Dawkins and Wynd, (2010) indicate that postproduction "is where the raw footage and sound is edited into a finished production and where titles, music, voice-overs and any special effects are added. It is everything you do after filming". In this study, the recorded videos and audios were individually edited as follows:

- Each film and each audio were transformed into short video which represents a specific academic paper.
- The films and audios were played and carefully watched and listened to so that answers to the related sections could be determined. This was repeated several times to select the clearest answers.
- The films and audios were edited and reviewed several times by the researcher and a video designer to test them.

The full process of postproduction step of the short videos is described in more detail in section 5.3.

➢ **Outcome**:

The final products (i.e. ten short videos) were developed and ready for evaluation.

3.6.3. Phase 3: Evaluation (refer to Chapter 5)

This phase aimed to evaluate the proposed solution (i.e. videos) in the previous Phase 2 (i.e. outcome of Phase 2). This phase is broken down as follows:

➢ **Plan**:

The final short videos were ready to be evaluated by two different groups: (1) the academics that were filmed or audio recorded; (2) the potential audience of each short video. Both the academics and their potential audiences beyond academia were interviewed using the semi-structured technique to understand the rationale behind their answers (refer to section 3.8.1 for more detail regarding the selection of the semi-structured technique).

Chapter 3: Methodology
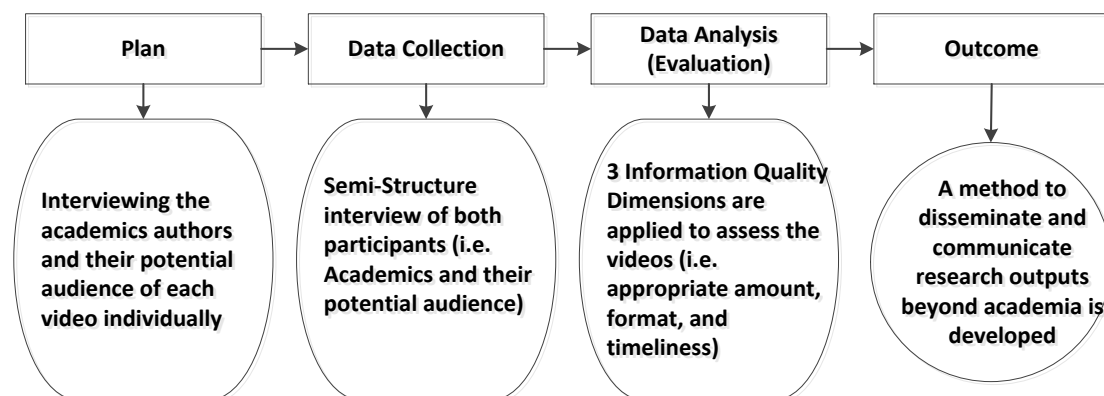
Figure 3.4: The Phase 3 Process.

> ➢ **Data collection**:

Each short video was watched by its own academic author and the academic authors were asked questions related to IQ dimensions; namely, the amount of information, the format and the timeliness. As mentioned in section 2.3.1, relevance dimensions are important to make academic research more relevant to practice. IQ dimensions are valid and measured by many IS scholars (i.e. Lee *et al*., 2002). In this phase, the three IQ dimensions covered most of the IS relevance dimensions (refer to section 5.4.2) as suggested by Benbasat and Zmud (1999) and other IS scholars; for example, Kazanchi and Munkvold (2001). As highlighted in section 2.11, this research focussed on the accessible dimension introduced by Benbasat and Zmud (1999); that is, the academic paper should be understood by the IS audience.

Interviews took place in this phase and feedback was obtained from the academic authors and the potential audience of each video. Both groups were interviewed individually with varying duration times from 25 to 30 minutes as the maximum time. Each academic author watched his/her short video and answered the interview questions (refer to Appendix I). The potential audience was offered the choice of any one of the short videos that he/she believed was related to his/her work. The potential audience only selected five videos (refer to Chapter 5 for more details). The interviews took place at a time and place appropriate for the participants.

➢ **Data analysis**:

The 20 interviews were transcribed and took around 3 moths for each group (refer to Appendix L). In this step, all the interview meetings were analysed. The two groups were invited to take part in this phase. The groups were ten academic authors and ten potential audiences of the short videos. At this stage, a thematic analysis technique was applied to construct data based on the participants' answers (refer to section 3.8.2). The full results of this phase are stated in sections 5.5.

➢ **Outcome**

The final method was designed to disseminate and communicate research outputs beyond the academic community.

3.7. Data Collection Strategy

3.7.1. Instrument

In terms of the qualitative method, there are many tools that could have been used to generate data. Each tool had a different aim and its own strengths and weaknesses. Interviews had to be arranged, organised and led by the researcher. Four types of interviews were applied to achieve the aim of this study, and are listed below.

• **Structured interview:**

This type of interview is formatted in a complete script of questions prepared in advance where the researchers (the interviewers) are not committed to conducting the interviews by themselves. That is because the list of questions is the same for each participant (interviewee). In other words, the researcher asks the same question in the same order to each participant without making any comment on their answers (Myers and Newman, 2007; Oates, 2006). This interview technique was not appropriate to achieve the aim of this study. This study applied qualitative method where, the structured interview technique is more useful for the quantitative method.

• **Semi-structured interview:**

This type of interview is formatted in an incomplete script of some questions prepared in advance. The researcher or one of the research team is committed to

conducting the interview with improvisation. The researcher is allowed to ask further questions if the participant raises any interesting points that add value to the research study (Myers and Newman, 2007; Oates, 2006). This semi-structured interview was seen as the most appropriate technique to achieve the aim of this study.

In this study, the semi-structured interview was applied in the investigation phase (Phase 1) to understand in detail why academic researchers publish their research outputs the way they do (refer to section 3.6.1). In the evaluation phase (Phase 3) the semi-structured interview was followed to understand in-depth how both academics and the potential audience of each video view the video and its content (refer to section 3.6.3). Both participants (i.e. academic authors and the potential audience) in Phase 3 explained why and how the short videos are or are not appropriate for the dissemination of research outputs (refer to section 5.5). In both Phase 1 and Phase 3, some interesting points were raised by the participants, where the researcher in this type of interview was allowed to ask further questions to obtain more in-depth information regarding the topic that was investigated.

- **Unstructured interview:**

This type of interview starts with a topic introduced by the researcher and the participant talks unconstrainedly about the given topic. New concerns and issues might be discovered by applying this type of interviews (Oates, 2006). This technique requires an experienced researcher to gain the most benefit from its use.

- **Group interview:**

This type of interview can be structured or unstructured with two or more participants interviewed at the same time. Also, there can be more than one researcher doing the interview at the same time (Myers and Newman, 2007).

3.7.2. Sample strategy

The qualitative method literature shows that sampling is a complicated issue and there are overlapping sampling types (Coyne, 1997). The qualitative method is well known for its small sample size, according to Marshall (1996), and there are three approaches, as listed below.

- **Convenience sampling:**

In qualitative research, this type of sampling includes the selection of the easiest accessible subjects, but it may end with less intellectual credibility and poor quality of data. In fact, there are many qualitative studies that apply convenience sampling; however, it is important to carefully select a sampling type that is well justified (Marshall, 1996).

- **Judgement sampling:**

Judgement is the most common sampling technique in qualitative research and is well-known as purposeful sampling. In this type of sampling, the researcher seeks to select the productive sample to answer his/her research question. Also, a framework of variables can be adopted and may influence the researcher's contribution, depending on the practical knowledge of the researcher, the evidence from the field itself and the available literature. This sampling is seen as the most appropriate technique to achieve the aim of this study (refer to the phases below for the justifications).

- **Theoretical sampling:**

In qualitative research, the theoretical sampling technique is essential for interpretive theory building, which is based on a data, and researchers select a new sample to evaluate this theory (Marshall, 1996). Also, it is known as the main strategy of grounded theory (Glaser and Strauss, 2009); however, it also can be applied in interpretive investigations (Marshall, 1996).

Table 3-4: Sampling of the three Phases

Phase	Date	Period	Number & type of participants
1	2013 (Jan-Oct)	10	21 academics
2	2014 (Feb-Aug)	8	10 academics
3	2016 (Jan-Mar)	3	10 academics
3	2016 (May-Aug)	3	10 potential audience

As stated earlier, in section 3.6, this research is divided into three phases (refer to Table 3.4). In all phases, the researcher applied judgement sampling as follows:

- **Phase 1:**

As the problem emerged from the IS literature (refer to section 2.11), the samples are the academics across the Information Systems and Computing Department at Brunel University (i.e. CS now); in particular, the academics that have had articles published in academic journals or at conferences.

- **Phase 2:**

The sampling in this phase was based on the academics that agreed in Phase 1 to participate in Phase 2. Also, an email was sent to five more academics to participate in this phase and only two agreed.

- **Phase 3:**

In this phase, the samples were the academics that participated in Phase 2 to evaluate their videos. In addition, the audience of each short video was selected based on the potential audience of each video, which was identified by the academics.

3.8. Data Analysis Strategy

3.8.1. Interview analysis technique

There are three different techniques to develop themes (Boyatzis, 1998), as follows:

- **Theory driven:**

In this technique, the researcher begins by creating his/her own hypothesis or theory and articulate evidence that supports that theory. This is a preferable approach to many different disciplines, because it offers a more natural approach of interpreting a phenomenon rather than an abstract concept and the learning styles such as videos. This particular technique is usually utilised in social sciences.

- **Prior research driven:**

In this technique, to construct themes, the researcher has to rely on the findings of the previous researchers. This is an effective approach as long as the

researcher is building themes based on prior research findings. This technique offers factors that assist in creating codes of themes.

- **Data driven:**

In this technique, the research has to interpret the raw information directly, after the data have been collected. The researcher has to construct the data into themes and formulate a framework based on his/her own interpretation of the meanings of the raw data.

To achieve the aim of this study, the theory driven and data driven techniques have been followed in Phase 1 and Phase 3. Regarding Phase 1, as stated in section 3.5, Berlo's communication model was applied to analyse the data collected (theory driven); and regarding Phase 3, Information Quality assessment was used to evaluate the short videos developed. The reason to follow the theory driven technique is to explain the data collected as illustrated in section 3.4 by Walsham (2006) and Gregor (2006). The data driven technique is applied to extract themes that the communication model and Information Quality assessment have not considered.

3.8.2. Thematic analysis

Considering the use of theory driven and data driven techniques, thematic analysis steps were applied in this study to gain rich insights of the data collected (Braun and Clarke, 2006). The six steps developed by Braun and Clarke (2006) were applied as follows (refer to Table 3.5).

- **Familiarising yourself with your data:**

The first step was to read and re-read the data to search for patterns and ideas. In Phase 1, the 21 academics' interview records were transcribed by the researcher himself who had prior knowledge of the data, as he was the interviewer. Also, in Phase 3 the interview data of the ten academics and the ten potential audiences was read and re-read to search for themes and ideas (note that Phase 2 was the video development).

- **Generating initial codes:**

In Phase 1 and Phase 3, initial codes were created and listed. The supervisor and the researcher reviewed these codes three times for rigour purposes.

- **Searching for themes:**

In this stage, the researcher searched for codes that were related to each theme, which resulted in a new theme that emerged through this phase (i.e. feedback).

Table 3-5: Phases of Thematic Analysis (source: Braun and Clarke, 2006)

Phase	Description of the process
1. Familiarizing yourself with your data:	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes:	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code.
3. Searching for themes:	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes:	Checking if the themes work in relation to the coded extracts (Level 1) and the entire data set (Level 2), generating a thematic 'map' of the analysis.
5. Defining and naming themes:	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report:	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

- **Reviewing themes:**

The researcher and his supervisor reviewed whether the themes were appropriate for the codes and the entire data.

- **Defining and naming:**

The researcher and his supervisor refined the constructed themes three times for rigour purposes. The final themes were shown to three qualitative experts for validation purposes.

- **Producing the report:**

The final report of the analysis was written as a chapter (see Chapter 4).

In addition, there were three steps implemented for themes rigour purposes (i.e. these steps applied to Phase 1 and Phase 3). After the researcher transcribed the 21 interviews and uploaded them onto the Nvivo program, coding of the data began and the initial themes were created. The researcher was involved in a two-day Nvivo training session to be able to utilise the program (software app) properly. The first and second steps involved the researcher's supervisor and the researcher in a brainstorming session to frame the initial codes and themes. The relevance of codes to each theme was discussed based on the communication model adapted in this study, as illustrated in section 2.10. The third step involved three experts in the qualitative method who individually reviewed the process.

As mentioned in section 3.7.1, the interview questions were asked in a semi-structured technique to understand more regarding how the participants believed the way they disseminated to and communicated with their intended or a wider audience (refer to Appendix E).

3.9.   Conclusion

This chapter has described the interpretive paradigm as the approach of this study. Also, the qualitative method and the use of theory in this study have been explained. Moreover, the research phases were described in detail.

CHAPTER 4

4. Findings and Analysis

4.1. Introduction

As stated in section 3.5, the communication process model was adapted to explain how and why participants disseminated and communicated their research outputs beyond academia. The previous chapter illustrated the theoretical model of this study and explained how the adapted model is applied for the purpose of this study. This chapter represents the first phase of this study (refer to section 3.6.1), where the research framework guides the data analysis and this helps in understanding the status communication process of the participants towards their potential audiences/stakeholders beyond academic communities.

Table 4-1: Demographic profile

N	Position	Years of work	Department
8	Lecturer	6–20	Information Systems and Computing
5	S-Lecturer	8–20	
3	Reader	13–23	
5	Professor	13–24	
Total of 21 academics			

Table 4.1 shows the number of academics involved in this study with their academic detail, as stated in section 3.5.1. Additionally, it shows the demographic profile of the Information Systems and Computing Department.

Concerning publications produced by academic researchers, the interview questions focused on the following areas as highlighted in section 2.11:

❖ The potential audiences/stakeholders of the academic researchers beyond academia;

❖ The barriers that demotivate academic researchers to disseminate to and communicate with audience/stakeholders beyond the academic community;

❖ The current dissemination methods and channels used by academic researchers individually;

❖ The benefits that might be gained by disseminating academic publications beyond academia (to people other than academics) for both the academic researcher and the intended or wider audiences/stakeholders.

The data collected were scrutinised based on the research framework introduced in section 2.10 and explained within this study in section 3.5. The following sections are the themes that emerged as outcomes of the analyses. Each theme is explained based on the academic participants' answers.

4.2.   The Target Audience/Stakeholders beyond Academia

Many of those who were interviewed had papers published in academic publications that benefitted audiences/stakeholders beyond academia (i.e. practitioners, the general public, the private sector, charities, patients and industries) where these audiences are part of society. RCUK claims that societies could be, for instance, industries, companies and the public (RCUK, 2013). In the response to the question, "Besides the academic audience, who are the other groups or people that could benefit from your research publications?" many academic participants believed that their publications could be beneficial to audiences/stakeholders beyond academia. For example, P13 (Participant #13) indicated that managers and decision makers in the business sector could benefit from his publications. P10 indicated that societies and Website designers might benefit from his publications. Website designers could be, for instance, employees in companies or just individual designers who are interested in Website design. Below is what participants P13 and P10 said.

"With that type of work, umm, it's more oriented at business management I suppose, managers within business and people who are able to make decisions about how things should be done in business – that side of the work. There is also some other work; I would say it's more oriented towards societies actually, and humanitarian in its nature like aid agencies". P13

Chapter 4: Findings and Analysis

"Communication companies, design companies, multimedia companies, multimedia content creator and Website designers". P10

Table 4-2: Participants' Research Area and their Intended Audiences/Stakeholders

Participants	Research area	Audiences/Stakeholders
P1	Outsourcing and offshoring	Vendors
P2	Pervasive informatics, big data intelligence and semantic technology for modelling	All companies of different sizes both profit and non-profit, including SMEs and R&Ds. Private and public sectors
P3	Technology for healthcare services	Broadcast companies, health professionals, occupational therapists, haematologists and consultants in the field. Government and local councils
P4	E-learning, e-government, online social media, multimedia and ICT topics	
P5	Biological sciences, computation biology, computing	Doctors, clinicians and patients
P6	Applying novel computer science techniques to solving practical problems in academia and industry	Industries in general might be SMEs or any organizations
P7	Human–computer interaction	Website designers, government, SMEs, large companies
P8	Software engineering, prediction of fault-prone code and detection & analysis of bad smells in code	Software industries, software engineering companies
P9	E-learning and e-government	Website designers, government and SMEs
P10	Multimedia quality and how one builds end-to-end communication systems incorporating user perceptual requirements	Communication companies, multimedia companies, design companies, and lay public (i.e. online social media users)
P11	Marketing, market research, strategy, financial supply chain management and building Internet client bases	General public, company level and SMEs; the contact point is the global treasury and they look at how money moves
P12	Semantic Web technologies and its applications to life sciences.	Software industries and the lay public by *Scientific American Journal*

P13	Intelligent information management, bid data and data mining	Business management, manager within business and decision makers in businesses. Humanitarian in its nature (e.g. aid agencies)
P14	E-learning and e-government	Website designers, government and SMEs
P15	Specification based testing and model based testing including testing systems	Research groups, large companies (i.e. Microsoft)
P16	Information systems development	Large organizations, private and public sectors and government.
P17	Computing, business systems biology, manufacturing and healthcare	National health services, aircraft logistics firms, SMEs, Consultants in industries, and multinational companies
P18	Artificial intelligence	Clinicians directly and public who have eye disease could indirectly benefit from my work
P19	Care delivery, including social science approaches, economic evaluation and business methods, simulation and modelling, systems thinking, interests in the underpinning technologies, particularly information systems.	Healthcare service and NHS
P20	Cost modelling and prediction, software engineering	Software industries and programmers
P21	Data mining, machine, learning, artificial intelligence, Bayesian networks, big data, biomedical informatics, eco informatics	Clinicians directly and public who have eye disease could indirectly benefit from my work, and farmers

Most participants indicated that besides the academic audience, their target audiences/stakeholders were beyond academia. Table 4.2 shows these different audiences/stakeholders based on the participants' research areas. Academic participants believed that their research outputs had some beneficial content to many different people as their research topics – to some extent – were related to people's lives. Table 4.2 also shows the multi-disciplines of many participants according to their publications' topics and their research areas.

Chapter 4: Findings and Analysis

4.3.   Message (Academic Structure and Language)

As highlighted in section 4.2, all participants were targeting audiences/stakeholders beyond academia. This section illustrates what academics believe regarding academic publications, particularly, academic papers and conference proceedings. In response to the question, "Do you use the same structure/language that is used in academia?" many IS participants indicated that the structure of academic writing was not appropriate to audiences/stakeholders beyond academia. More than two-thirds of the participants who were interviewed indicated that journal articles were written in a non-friendly style for audiences/stakeholders beyond academia.

"It is too abstract, disconnected from the reality, and, secondly, it is written up in a way that is not accessible to most people. Because in an academic piece of work you have to justify every word that you say and it is just a style where you need to be much more direct". P19

"First of all, the structure and the way of the academic writing are professional, and academic researchers have to do it in order to be recognised by your peers. That's how it is". P4

Importantly, the predominant answer of the academic participants was that audiences/stakeholders beyond academia, whatever their background was, they were neither interested in nor read academic journal articles. The irrelevant information and complex terminologies used in academic articles were mentioned as barriers to audiences/stakeholders beyond academia. All participants emphasised that many sections in academic articles were not relevant to audiences/stakeholders beyond academia. Academic participants considered that literature, methodology and discussion by default were written in most academic journals in a style that was an obstacle to audiences beyond academia. There were many parts of academic articles that did not make sense to audiences beyond academia who they are not interested in academic discussions or going through detail, such as statistics.

"The language we used academically is laden with you know, umm, associations to theories and methodologies, whereas, in academia, people will understand that they know where you're coming from". P1

"Well, I use traditional academic outlets that make it difficult to contact with people in industries". P16

The previous participants' quotes indicate that academic language is an esoteric language based on the research discipline. Theories and methodologies make communication difficult with people in industries and the general public who are interested in the research outputs. In addition, some IS participants believed that even practitioners and professionals who had academic degrees would not understand academic writing because it is very specific.

In contrast, one individual participant indicated that the same academic language and terminologies were used with a different structure, because the industrial people should be specialists in that area.

"Yes, because the people in the industry are specialists in the area. However, the structure will be changed". P16

Moreover, many participants indicated that the structure of academic articles is difficult to follow. For example, there are some companies that employ a person who summarises the academic literature, because most business people only read short summaries and the specific information that is important to their business. Other interviewees indicated that they would never write in the same style for an academic audience as they would for other audiences/stakeholders beyond academia. One of the participants indicated that as an academic writer it was important to be careful in terms of relevant information and terminology when writing to audiences/stakeholders beyond academia. Moreover, those audiences/stakeholders did not understand how academics write and the format in which the academic researchers disseminate their work. Few participants had some free time out of their schedule to shorten their research outputs to provide a summary to audiences/stakeholders beyond academia. Also, they attempted to disseminate their research summaries online to reach out to audiences beyond

academia who were interested in the research area.

"There is an academic style of writing which is singly inappropriate for industrial audiences". P17

The terms used in the academic research outputs are meant to be specific to a certain degree. Each research area has its own terminologies that researchers use in academic writing. Without doubt this creates some difficulties in disseminating academic research beyond academia. A lot of participants may need to make many adjustments on their research articles to make the information more readable and accessible for audiences beyond academia. For example, one of the participants published a paper in the area of bioinformatics; the audience was patients who would benefit from it. However, they will not understand the biochemistry and medical terminologies used in that academic article.

"Some patients might be able to benefit but they would have to be clued up on the medical terms. The terms that I used in the biochemistry and medical biology are quite specialist terms, so I would imagine some of them could benefit". P5

Table 4-3: The Barriers of an Academic paper to outreach Audience/Stakeholders Beyond Academia

Barriers	Description
Academic format and style	Unfriendly structure of a paper in academic journals and conference proceedings
Academic language and terminologies	Complex esoteric language and specialist terminologies used in an academic paper
Irrelevant information	Insignificant sections included in an academic paper (i.e. literature review and methodology)

Table 4.3 shows the significant points that have been highlighted by the majority of the participants as barriers of an academic paper to communicate with audiences/stakeholders beyond academic communities. The barriers are academic structure, academic language and terminology, and irrelevant

information in an academic paper that limits academics from reaching other communities.

4.4. Channel (Dissemination Effectiveness)

Channel is an important element that transfers the message to the receiver. As stated in section 3.5, the academic channels in this study are academic journals and conferences where the papers are published. This element is divided in two sections based on the interviewees answers regarding the other channels used rather than academic ones.

4.4.1. Online channels

Half of the participants disseminated their research outputs through non-academic online channels (i.e. online press, personal Websites and social media) to reach their audiences/stakeholders beyond academia more widely. Some of these online channels were more effective.

"I have been interviewed by various media organizations, by the BBC, by various radio stations and by magazines". P10

P10 was interviewed by several online press and online radio channels to talk about his research in the area of design and multimedia, which showed that these channels noticed the value of disseminating his research outputs widely. Disseminating through different channels may increase the potential of outreaching to more audiences/stakeholders beyond academia who are interested in the research area. (Refer to section 4.8. for details regarding effective communication of those who are interviewed by online press and different channels). However, P10 and many participants were not making a personal effort to disseminate their research outputs through online channels unless they were invited by online press or were involved in a research project. In contrast, one-third of the participants were making a personal effort to disseminate their work this way, but with few successes.

"In fact, I just get in contact with one person from a company by using social networks for example LinkedIn and I get in touch with many people". P7

Apparently, P7 is using social networks to outreach to the intended audiences/stakeholders and people who are interested in his research area beyond academia. This seems to lead the academic researcher to communicate with the practitioners regarding his research outputs.

The majority of the academics are not making a personal effort to use online channels to disseminate their research outputs. Academics only disseminate in three aspects (1) when academics are invited to an online interview press; (2) academics who are high profiled in academia "better reputation" (i.e. professors and to some extent readers); and (3) academies who are involved in research projects or collaborative work with industries. Accordingly, it seems that participants are neither active nor encouraged to make a personal effort to outreach to audiences/stakeholders beyond academia through different online channels. (Refer to sections 5.8.1, 5.8.2 and 5.8.3 for more details regarding the rationale behind it.)

4.4.2. Offline channels

One-third of the participants have made a personal effort to disseminate their research outputs through offline channels to outreach to audiences/stakeholders beyond academia; for example, in workshops, meetings with industries, newsletters, research projects and reports. However, few of them have been successful. In fact, the few participants who have successfully disseminated their research outputs through those channels believe that offline channels are effective to outreach their target audiences/stakeholders beyond academia. Hence, these participants were able to explain more about their research outputs to their target audiences/stakeholders. The following quotes are what some participants believe regarding offline channels for disseminating their research outputs beyond academia.

"I do talk to people in the industry; for example, I get them to come in and do guest lectures. I talk with them on what my research is about and what my ideas are. I have done the whole going out to companies and say 'are you interested in coming? Let's discuss this other blah blah blah'. I think this is a long, hard slog and the

actual payoff is so minimal that actually it really is, you know … at the moment I just don't have the energy". P9

P9 visits industries or/and invites people from industries to present what his research outputs are about and how they will benefit the industry. To outreach by these channels illustrates that participant P9 could not reach his target audiences/stakeholders beyond academia through academic channels (i.e. academic journals and conference proceedings). Participants P16, P17 and P8 confirm what participant P9 said.

"I reach only the academics but the industries partially and that is through face-to-face meeting". P16

"I organise interesting one-day workshops which usually include different people that helped me get a reputation for doing these things that were good and interesting". P17

"I discuss with companies on a one-to-one basis, so I'm always looking for industrial collaborators and I'm trying to do it on a very low level. Also, it is interesting to talk about my research to anybody in the industry". P8

The dominant activity of this one-third of participants was that they made more effort to outreach to their target audiences/stakeholders through offline channels rather than just disseminating through off/online academic channels (i.e. academic workshops and seminars, journal articles and conference proceedings). Apparently, participants have been trying to reach audiences/stakeholders beyond academia who are interested in what they have done through meetings with industrial people or inviting them to visit the university. The research outputs of the participants are relevant to industries and companies in both the private and public sectors and have some benefits (e.g. financial returns).

Academic position and years of experience have played an effective role for those few participants who have been successfully using different offline channels. This study shows that high-profile academics (i.e. professors and readers) were

usually invited to speak to organizations that were interested in their research area and knowledge.

However, the majority of the participants were not making a personal effort to use different offline channels unless they were invited to provide a speech in professional or industrial workshops. Those who had been invited were high profiled academics with a "better reputation" (i.e. professors and, to some extent, readers). Also, participants who were involved in research projects or collaboration work with various industries. Accordingly, the majority of the participants were less active and not encouraged to disseminate to audiences/stakeholders beyond academia. (Refer to sections 5.8.1, 5.8.2, and 5.8.3 for more details.)

4.5. Source's Communication Skills (Comm-Skills)

Many participants indicated that they were struggling to disseminate to their target audiences/stakeholders beyond academia due to the barriers they have been experiencing through their academic environment. All participants disseminated their research outputs both online and offline by different Comm-Skills, which include the writing style itself or the way of talking. For instance, when writing for a trade journal, the writing style is the Comm-Skill, not the journal; likewise, when giving a speech, the way of speaking is the Comm-Skill, not the actual speech or the place. In response to the question of the different Comm-Skills performed for disseminating their research outputs, the answers are noted below.

Almost half of the interviewees answered "yes" as they use other Comm-Skills to disseminate their research outputs. However, few of them have successfully made a personal effort to use other Comm-Skills, such as talking to non-academic communities, writing research summaries and creating presentation slides to disseminate/communicate their research outputs to audiences/stakeholders beyond the academic community.

"I do talk to people in the industry; for example, I get them to come in and do guest lectures. I talk with them on what my research is about and what my ideas are. I have done the whole going out to companies and say 'are you interested in coming?

Let's discuss this other blah blah blah'. I think this is a long, hard slog and the actual payoff is so minimal that actually it really is, you know … at the moment I just don't have the energy". P9

"I wrote reports that were for a particular community, and I also did non-academic presentations but it was more for that [particular community] audience". P1

"I discuss with companies on a one-to-one basis, so I'm always looking for industrial collaborators and I'm trying to do it on a very low level. Also, it is interesting to talk about my research to anybody in the industry". P8

"I mainly talk to the clinicians. I go to see them and discuss it with people in control". P18

These four quotes indicate that some participants have attempted to adapt some Comm-Skills. For example, P9 talks to people in the industry to explain his research area or ideas in a persuasive way. P1 writes reports that are appropriate to a specific audience. Both P9 and P1 do not indicate any real return for performing these Comm-Skills. The successful academic is the one who receives feedback or any comments regarding her/his research (refer to section 5.9.1 for the feedback types); however, they are very few.

P8 discusses some of her research outputs and other related ideas with industries, which indicates the Comm-Skills that were used to disseminate/communicate her research outputs to a target audience beyond academia. Similarly, P18 talks to the target audience regarding his research outputs to gain valuable feedback, which is discussed in section 5.9. The rest of the participants write research projects reports, which are compulsory for funded research projects; others do not write or speak for any other communities than academia. Thus none of those people have made a personal effort to perform other Comm-Skills due to the social and cultural system of academia, which will be discussed in section 5.8.

4.6. Source's Attitude

As illustrated in section 2.10.1, attitude has three different positions that affect the source communication behaviour. In this set of data, only one position

appeared: the attitude towards the receiver. The following section explains this position.

4.6.1. Attitude towards receiver

Some participants indicated that different structures and writing styles are required to disseminate research outputs beyond academia. Also, some participants indicated that the writing style of academic papers made it difficult for to reach an audience beyond academia.

"I wouldn't use the same language because you have to look at the audience, so if you are communicating your work to a company, they don't care about research methods or the academic side of things; they want to know what you did and what the results were and how they can use it". P14

The format and language used in academic papers appear as barriers for academics to disseminate their research outputs beyond academia. One of the participants indicated a different view of disseminating beyond academia as shown below.

"Most academics are in China aren't they? They are always going that way. I was looking at the citations in some of the papers and get blocks of these Chinese, Japanese, or Asian Thai languages, and by taking one of these papers you can see which countries are more interested in, and that shows where are they from. I think there is something which makes sense to make Chinese version up and easy for them to read and most important it is easy for them to cite. I'm sure that's going to come next; it's going to be citations in the American world". P11

P11 believed that translating papers into other languages based on the paper's citations was important. In other words, if a paper was highly cited in a certain country then a translation of that paper would be recommended for that country. For instance, China is one of the most interesting countries for academia around the world. Chinese researchers cite English papers as the English language is the dominant language in the academic world. P11 considered that if papers had a Chinese language version it would make it easier for Chinese researchers to read and cite them.

Some of the participants understood that audiences beyond the academic community should be approached with a different writing style. P7 indicated that it was helpful to summarise research papers in a way that might be of interest to industries. However, P8 indicated that it was difficult to write for audiences beyond academia, and this showed how the academic environment was isolating some academics by the pressure on producing academic papers for promotion purposes (refer to section 4.8.1). Below are examples of what some participants had to say about this:

"I think it would be interesting to industries if we could summarise our papers; for example, identifying the main achievements or topics in very clear language and some data of the market". P7

"If I give a seminar, for example, I will describe the nature of the problem or the conceptual level of the solution and ideas, but not go into detail, then people go to the papers". P15

"It is totally different. It's quite hard at first to do that, I think, isn't it? And to have a completely different voice". P8

These quotes indicate that different Comm-Skills are needed for the participants in order to disseminate and communicate successfully. The participants' attitude above indicates that academics do have a positive attitude towards their target audiences; however, there are still barriers to disseminate/communicate their research outputs to non-academic communities.

4.7. Knowledge Level

This component highlighted the knowledge of the participants towards their target audience. The level of knowledge that participants have regarding their area was not investigated as it was a sensitive point during the interviews. The participants were not knowledgeable about how much their target audiences understood and where they looked for information. However, the participants were confident that usually their target audience do not read the academic papers.

"People in the general public and industry will be completely lost. You've got to adopt much simpler terms and, umm, normal language – let's put it that way – to communicate with the general public" P1

"I don't believe that many people in the industry read academic journals". P9

"In fact, I don't publish things that they read, and I don't even know what they read". P16

"Some patients might be able to benefit but they would have to be clued up on the medical terms, and the terms that I used in the biochemistry and the medical biology they are quite specialist terms, so I would imagine some of them could benefit". P5

"Because they don't understand it, there is an academic style of writing which is singly inappropriate for industrial audiences". P17

As stated above, many participants know that audiences beyond the academic community do not read their academic publications. Participants P1 and P16 were quite sure that audiences beyond academia do not read their papers due to the academic language used in these papers. P11 indicated that companies were seeking for direct solutions to implement (see below).

"Ok that's a nice interesting theory that comes out of it, but when you go and see a company they will say 'ok yeah yeah yeah that gives a strategy for the problem we've got'. They don't want to discuss in detail the research and statistics, or if the discussion comes out of it they want only to look at what to do about it". P11

4.8. Social and Cultural System (Academic System)

As highlighted in section 4.5, the majority of the participants do not perform other Comm-Skills due to the social and cultural system. This element includes three barriers which emerged and negatively affected the majority of the participants to individually disseminate their research outputs beyond academic communities. As mentioned in section 4.3 by most participants, academic publications are unreachable to most audiences/stakeholders beyond academia (i.e. practitioners, general public, industries, and small and medium-sized enterprises (SMEs). The majority of the participants had faced barriers to

making a personal effort to disseminate their research outputs by performing different Comm-Skills through online/offline channels rather than academic Comm-Skills and channels. Most of those who were interviewed were targeting audiences/stakeholders beyond academia, particularly practitioners, general public, charities and industries.

"So there is no mechanism there to support that extra activity in lots of ways whether it is overhead time and recognition of your efforts". P3

"It is self-perpetuating and I've purely written to tick a box to get a publication. They won't be read by anybody else other than academics and that's really saddens me because that's not what we should be about". P5

Predominantly, many participants believed that most of the readers of their academic publication outputs were academic researchers. However, the majority of the participants believed that very few audiences/stakeholders beyond academia – especially large industries – were reading their academic publications that had been published in academic journals or academic conferences proceedings. Also, the majority of the participants indicated that academic papers and conference proceedings were difficult to read by audiences/stakeholders beyond academia due to the academic writing style (refer to section 4.3 for more details). Participants highlighted that they were not encouraged enough by the university to outreach to audiences/stakeholders beyond academia by using different online/offline channels. (Refer to sections 4.8.1., 4.8.2. and 4.8.3. for more details.)

There are three main barriers as subthemes that have been highlighted by the academic participants: lack of incentives, lack of time and prioritization, and lack of support. These barriers have a negative influence on academic participants' dissemination activities to outreach beyond the academic community. The three subthemes are discussed in detail below.

4.8.1. Lack of incentives

This subtheme is a significant aspect and has a negative effect on disseminating academic research outputs through other channels other than academic (i.e.

online and offline channels). Lack of incentives is correlated to time and prioritisation. This section will focus on this subtheme itself more than its influence. Many participants indicated that using other channels other than academic to disseminate their research outputs was not counted as promotion criteria and was not rewarded as an achievement. For example, using online channels, such as YouTube and Twitter, or offline channels, such as workshops and public seminars for dissemination purposes, are not recognised by the university.

In fact, participants were mainly focusing more on producing papers for publication due to their career advancement potential. Many participants believed that they were in an academic set-up, they were expected to output articles only in academic journals. Other participants believed that being part of the academic faculty their job was to teach, to do research and to publish. This reflects exactly the academic policy assessment of academic activities. Some participants were disappointed with the unclear recognition of the efforts they had made in terms of outreaching by various online and offline channels. Below are some of the participants' perceptions regarding these barriers:

"Because it's hard enough to find time to write journals about anything else and kind of like my answer above, there is no motivator to kind of do anything else really. There is no sort of feedback". P9

"I probably do not do enough but I'm not sure the system is set up to encourage that unless you want to be a really well-known name in a field". P3

"If I publish in the real world – probably online resources – but it has to be somehow recognised by my management. It is recognised now but in such a minimal sense that it isn't worth my effort". P4

Some participants did not have a clear view whether public engagement or outreach programmes were counted in their career advancement and encouraged by the university policy assessment. Participants P5, P10 and P17 indicated that to make an extra effort requires a return of such rewards and recognition to obtain value on the effort they make.

"But the major, major thing is that the university does not give any credit for any other publications other than journals and conference proceedings. They see academic publications as the only credible way of disseminating our research and they put no value on our work, for example public engagements and serving society". P5

"I find the time but, is it going to be recognised as anything? If is there no recognition then of course this is a waste of time because I invest time and I get nothing out of it, so the return of the investment cost me zero". P10

"The problem is far too much and the reward in the academic system for doing stuff that's beneficial to academia and that where you get promoted which is really annoying". P17

Also, some participants indicated that the Research Excellence Framework (REF) was an imperative assessment system mainly for academic articles. Participants believed that almost all of their effort went into the production of academic articles. It seems that REF was shaping the participants' dissemination activities. One individual participant was seeking a short-term reward for any dissemination activities that reached audiences beyond academia.

"And even if I use other channels, it does not count in academia and I'm not rewarded for it. But it counts in the long run so if you do this over ten years, you will get networks with companies and you get more research out of it, and impact cares for the REF. In the short term you don't get any rewards in academia". P16

Also, P8 indicated that academic incentives do not encourage those types of dissemination activities. However, this situation is starting to change as many applications to research councils require a demonstration section of research impact.

"I guess we kind of all chase these publications don't we? The kind of academic publications where a lot of our effort goes into it because that is how we are rewarded and how the system is set up to reward us for doing that, so that is kind of an indirect barrier. That's how our careers are structured and how academia is

structured. There is not a lot of incentive to do a lot of these things, but having said that, it is changing because you know when you apply for funding – certainly from EPSRC – you have to really demonstrate that you can have an impact, you can't just make that up". P8

Table 4-4: Aspects of Lack of Incentives

Dominant participants' view	
Lack of incentives	**Explanations**
Academic promotion	Dissemination activities are poorly encouraged in the promotion criteria policy
Academic recognition	Dissemination activities are not clearly recognised by the university environment
Academic rewards	Dissemination activities are neither rewarded tangibly nor rewarded intangibly
REF assessment	Dissemination activities are not assessed by REF

REF = Research Excellence Framework

Table 4.4 shows the three most common aspects (academic promotion, academic recognition and academic rewards) that have a lack of incentives, which were highlighted by the participants as barriers to disseminate their research outputs to audiences/stakeholders beyond academia.

4.8.2. Lack of time and prioritization

Apparently, it is difficult for academic participants to perform extra activities to disseminate their research outputs to audiences/stakeholders beyond academia. Many participants believed that time and prioritisation were significant issues that constrained them from disseminating their research outputs widely. Most participants who were interviewed indicated different duties and skills that they had to perform in their academic careers (e.g. teaching, conducting research and publishing). Also there were some skills that the academics had to learn, such as networking, time management and presentations. On top of these duties and skills, the majority of the participants found it hard to disseminate their research outputs beyond academia by using channels other than the academic ones.

Chapter 4: Findings and Analysis

"Yeah, well the problem for me in particular, I suppose, is many of those priorities I have no control over, so I had a meeting with the Vice Chancellor this morning and there was transmission to change program meeting up all the day so I have to go. So there is an element of ... there are some things I can't control". P13

"We have, as academics, different duties and skills; for example, teaching and networking etc. ... In fact, to have that kind of dissemination on top of our duties is not going to be attractive to academics". P4

"Time is very, very, very important and I have not got the time to do that. I don't have enough time, don't have the inclination, and what is the benefit to me?" P18

"For me the barriers are mainly time because it's all about relationship management". P17

Notably, from these four quotes, it is clear that the academic workload has taken all the time from of the participant's schedule. In addition, prioritisation of academic activities was a prominent aspect that the participants indicated; their prioritisation of academic activities was based on the benefits that have been gained from the activity itself (i.e. career advancement). Some believed that sitting down to adjust research papers in order to be appropriate for audiences/stakeholders beyond academia was time consuming before even thinking about disseminating them via different channels. The additional activities to disseminate beyond academia (i.e. the utilisation of different online/offline channels) require extra time and energy while participants are busy performing their academic duties.

Moreover, very few participants believed that there was time to disseminate beyond academia, and it was not a priority for them. In fact, those who deprioritised research output dissemination beyond academia justified their statement by questioning "what is the return on disseminating beyond academia?" They do not receive any career value for undertaking the extra activities necessary to disseminate their research outputs beyond academia.

4.8.3. Lack of support

Lack of support is related to and influences other subthemes and themes. In response to the question, "Apart from journals and conference proceedings, do you use any other channels to disseminate your research findings?" just over half of those interviewed believed that they needed support from the university. In addition, they were not aware of the importance of disseminating through other online channels (e.g. YouTube, Twitter and other social media). The participants were not properly aware of the other online channels and did not perceive any value to use them.

"I just don't know them very well, since it is a barrier and I'm not massively convinced of its value". P15

P15 focused more on academic online channels rather than using other online channels due to the lack of awareness regarding their value. Many participants did not know where their research could be disseminated in online channels other than academic ones. Some participants believed that the university or the academic institution should train them on how to use other online channels for research dissemination and outreach purposes. For instance, they should set up a training session about interview skills in the press, and other sessions about the skills of using social media for research dissemination. Below are excerpts of what some participants have to say concerning lack of support:

"I think, I don't know if it is a barrier, but it's the knowledge… If I want to distribute my work outside academic circles I wouldn't know where to start, where to go to do that, you know. To academics, you can publish in journals have you? But where to go to publicize your work to companies or to external places outside of academia? I think the barrier is the knowledge of how to disseminate that information". P14

"Well, I think none of us really understands the impact of information or information technology on the way that we work". P1

Another participant indicated that training in online/offline dissemination activities beyond academia was needed.

"I just don't know them very well, since there is a barrier there, and I'm not massively convinced of its value". P15

"I disseminated anyway. You mentioned social media – I could use it but there is a lack of training and issues of reliability". P10

"For me it is only psychological. It is very difficult to talk in public. I get very stressed even if something related to me goes to press, so you need to be trained for it". P12

Two other participants mentioned that they would be delighted to disseminate beyond academia if there was financial and logistical support.

"I could quite happily setup a blog or a Website but again it's all cost money which is not available". P5

"I need a good impact (support) from the university or research institutions to communicate". P7

Predominantly, most participants believed that lack of support was an important aspect that obstructed them from disseminating beyond academia. Training sessions of different online/offline research dissemination and financial support were strongly highlighted as critical obstacles.

"I haven't really explored a lot of those things, and because I'm kind of against tweeting and things like that". P8

This participant did not like using Twitter and any tools that were similar to it. This is a really critical point as P8 is a faculty member of the CS Department. However, other participants intentionally would use different online tools, including social media, after overcoming the issues they stated in section 5.8. P18 as a software developer, puts a different emphasis on this:

"A lot of the barriers for disseminating results and talking about them, I think, is non-disclosure agreement data protection for starters; and certainly with the work I do in software engineering and IT companies, because they certainly do not want

other people to know about the quality of their software systems in too much detail". P18

As a computer scientist, P18 believed that confidentiality agreement data protection was important for IT companies – especially those who had just started their business and most of them do not want other IT companies or people to know about their software systems in detail.

Table 4-5: Barriers by an Academic Position Perspective

Academic position	Barrier aspect
Professors and Readers	Lack of time and prioritisation (academic duties) and lack of support (i.e. lack of awareness of dissemination)
Lecturers and Senior Lecturers	Lack of incentives (i.e. not promoted, not recognised and not rewarded); time and prioritisation (i.e. academic duties are prioritised); and lack of support (i.e. lack of awareness, no financial support by the university)

Table 4.5 shows the barrier aspects that have been claimed by each academic position of the IS and CS participants. Two-thirds of the professors and readers shared the same concern; that is, lack of awareness of disseminating their research outputs beyond academia. Also, half of the professors and readers indicated the lack of time where the priority goes to their academic duties as compulsory activities for their academic careers. In addition, a few of the professors and readers were more into teaching or showed no interest in research dissemination. The lack of incentives was emphasised by most of the participants, except the professors. The majority of the readers, the senior lecturers and the lecturers indicated that the academic promotion system and the REF assessment led them to publish more academic papers due to the high credit that academic papers have in academic promotion criteria. Also, they highlighted that there is an unclear mechanism regarding the personal effort of extra activities in terms of research dissemination.

"There has to be a clear mechanism to create people to use social media and there has to be, also, clear rewards and incentives for people do that. At the moment some academics are tired putting a lot of effort in and not getting rewards or recognition for that effort". P10

"I can't reach the public sector and industries because you need extra effort to reach them and that does not mean anything for your own career at the moment". P4

"Like I said this insistent race for the REF… you know, that narrows you vision to one thing only …. if I don't do this, these publications for the REF I'm toast. So, it means that you concentrate your energies there". P1

However, lecturers and senior lecturers did not emphasise the lack of incentives as a major barrier. This might be due to the academic position differences as professors and readers are more experienced and have a higher profile, whereas lecturers and senior lecturers are seeking external and internal rewards and academic promotion.

4.9. Benefits of Disseminating Beyond Academia

The academic participants were asked, "What are the benefits that could be obtained from disseminating your research findings to other audiences/stakeholders beyond academia for academic researchers and audiences/stakeholders beyond academia?" Many participants indicated that disseminating research outputs beyond academia had benefits for both academic researchers and audiences/stakeholders beyond academia (e.g. practitioners). The participants believed that many benefits will be obtained when they disseminate through different online and offline channels to other audiences/stakeholders beyond academia. They had many different research outputs that were beneficial to audiences/stakeholders beyond academia. For example, some outputs of participants' research could benefit patients, social media online users, designers, SMEs, and industrial employees. This theme includes two subthemes that represent benefits to both academic researchers and different audiences/stakeholders by disseminating research outputs widely. The following sections illustrate the two subthemes in detail.

4.9.1. Research evaluation and Research impact

Most participants indicated that there were many benefits that could be obtained when they disseminate their research outputs beyond academia. Occasionally, some participants had experienced different benefits (feedback from the target audiences/stakeholders). This subtheme focuses on what participants believe could be beneficial for them. Most participants illustrated that many benefits could be obtained, such as financial benefits and motivational support from industries or UK funding bodies. In addition, the dissemination of research outputs beyond academia also increases academics' networks widely enabling them to communicate with audiences/stakeholders who might be interested in what the participants do. They indicated that disseminating their research outputs to the target audiences/stakeholders (e.g. industry and patients) would allow them to identify more problems properly. Hence, many participants are industry oriented in terms of research outputs.

"I certainly engage with industry then try to actually identify problems that were really industry's problems. Because we don't really engage enough with industry, we work in problems we think are problematic and sometimes that doesn't actually tally with what industry thinks are their problems. So sometimes kind of identifying which problems are going to engage industry is a major issue". P8

"I would say yes, because it [disseminating beyond academia] will broaden my network. So I will reach people who are not necessarily academic but they are quite practice-based, and they will be able to communicate back to me about things that relate to my research but I do not know anything about". P1

P8 who researches in the area of software engineering, illustrated that what researchers thought was a problematic for industries sometimes does not match with what industries think are their problems. In other words, disseminating what academic researchers do directly to industries will clearly identify the problems that industries have, which, in this case, would be software. This will lead to a better understanding of how industries operate. Accordingly, participants will then be able to tackle the problem based on real life situations of industries and to conduct appropriate research. Moreover, outreaching to the

target audiences/stakeholders would allow the participants to evaluate the research they have done and obtain feedback regarding the research outputs.

"Maybe get better understanding of how industry works, how decisions are made and how technologies are adopted in industry or setting". P10

"Then I will have discussions and I would like to think that they find some interesting value in some of the results, and I certainty value getting insights into the nature of the real problems from them". P15

"Also it is a good opportunity for me to apply my results in an industrial context to see that I transport my results from an academic environment to the real world. When we develop a new technology the evaluation is usually undertaken under fixed experimental conditions". P10

One individual participant indicated that disseminating beyond academia would lead to work with research collaborators. Collaborators might be industries, research institutions and government projects. Other participants indicated that disseminating widely will enable them to acquire new ideas by receiving feedback from users or beneficiaries of the research outputs. Also, audiences/stakeholders could explain something in real life that researchers did not know before. In some situations, researchers might have industry support (i.e. funding).

"So it's about me getting that kind of feedback which is worth or not the research I do, if it is having any kind of ripple effect". P9

"As an academic, for me it is collaborators, predominantly, and also you get umm. I think collaborators is the main one, but you're actually doing research in the future, or you do some work with them or you get some data of them or there's some small relationship". P2

"So I get new ideas from that kind of interaction and I will see new paths for the research and because it is practice-based people will come to me and say 'Doctor, that is an interesting topic' … you know, describe something in their life and what's happening, which is related to my research then I will say, 'yeah, I never thought of

it'. I think in that way that how I would see the benefit that you get wider network people to talk to and communicate with and it can only benefit you and your research, and maybe find other directions in terms of research". P1

Two other participants were satisfied by disseminating their research beyond academia. They believed that they would be satisfied if there is a demonstrable contribution to society based on the research they did. To have an impact on society will lead them to have a better reputation and being well known in the area.

"Well, I mean that basically just links into my motivation for doing the work I do, which is to try and contribute something to society, to try improving citizens' quality of life more generally. So I think the benefits for me is knowing that I'm making a positive impact". P3

"I might find other benefits to doing research, it's just personal gratification and a personal interest in the subject area, and an interest in disseminating knowledge and getting their name known and things like that". P1

P3 and P1 viewed having a real impact on society as being self-satisfaction for them. To have a positive impact on society will motivate them to disseminate their work more widely. Many participants believed that by disseminating beyond academia, they would eventually obtain financial and motivational support from different organizations that have common research interests. Interaction as a benefit was an important aspect that would enhance their research more in the right direction and would lead to having a real impact on peoples' lives. Impact was described during the interviews indirectly. Those who were interviewed believed that disseminating their research outputs beyond academia would have a beneficial impact on them and their careers. As illustrated previously, collaboration, a better reputation, financial benefits and many other benefits are what the participants believed would be the return once they disseminated beyond academia.
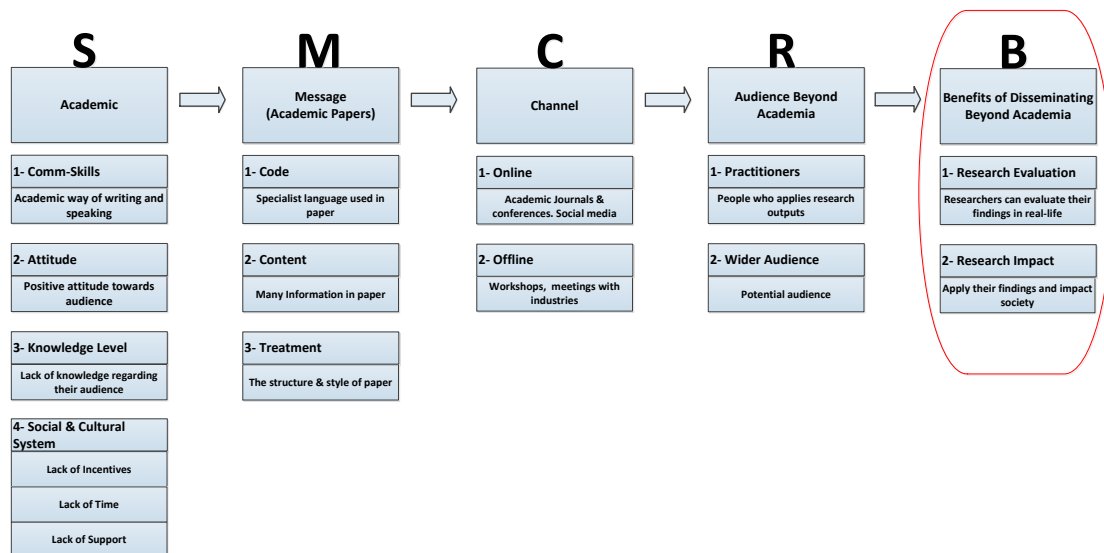
Figure 4.1: The adapted Berlo's communication model within this study

Figure 4.1 shows that participants do not have a clear mechanism to communicate with audiences beyond academia. Considering audience beyond the academic community, participants of the Information System and Computing Department were concerned with three major issues: (1) the message (i.e. academic structure and language of research papers); (2) channel (i.e. academic journals and conferences); and (3) social and cultural system (i.e. lack of incentives, lack of time, and lack of support). Message and channel are critical elements that affect the entire communication process between academics and their potential audiences beyond academia. In particular, social and cultural systems affect the way academics shape the message and their selection of channel.

In relation to the adapted communication model introduced earlier in section 2.10.4 a new theme has been emerged in this study as presented in Figure 4.1. The theme named Benefits (B) as the academics claimed that disseminating beyond the academic community would bring them many different benefits such as, new ideas and evaluating their research outputs. These benefits are subject to reaching a particular audience (i.e. target audience of a paper) and receiving a feedback from them. Additionally, these benefits are considered as a feedback of a successful communication between two ends. The next chapter will introduce and evaluate a method which can help academics to receive feedback from their target audience beyond the academic community.

4.10. Conclusion

This chapter has analysed the Phase 1 data through the research framework proposed in section 2.10.4. It has also highlighted the most important elements that limit academics from disseminating and communicating beyond the academic community. The next chapter covers Phase 2 and Phase 3, where the solution to overcome two barriers (message and channel) is developed and evaluated.

CHAPTER 5

5. Development and Evaluation

5.1. Introduction

As illustrated in Chapter 4, participants claimed three elements as barriers (i.e. message, channels, and social and cultural systems) that limited them from disseminating to and communicating with audiences beyond the academic community. In this chapter, a solution is proposed and evaluated to overcome two of the three elements highlighted by participants: message (academic structure and language of an academic paper) and channels (dissemination effectiveness). The other three elements are policy related (i.e. lack of incentives, lack of time, and lack of support), which will be discussed in Chapter 6. Phase 2 and 3 are discussed here in Chapter 5, where the dissemination of academic papers is the focus. It is organised as follows. First, the concept of building the solution is described. Second, the solution considers designing a message based on an academic paper and uses one of the media tools (i.e. videos) to structure and disseminate the message (i.e. research outputs). Third, the short videos (i.e. solution) are evaluated by two groups (1) the academic authors of the videos themselves; and (2) the potential audiences/stakeholders of each short video. The proposed solution attempts to create an effective communication process and a closer relationship between academics and their target audiences/stakeholders beyond the academic community.

5.2. Communication Processes of Information

According to Dennis *et al.* (2008), individuals have to be aware of two important elements: information transmission and information processing. Individuals need to know how to disseminate their information (information transmission) and not only understand the information they transmit, but also process that information to understand how the receiver interprets it (information processing) (Dennis *et al.,* 2008). Importantly, individuals need to obtain the same understanding regarding the information and the meaning shared to result in successful communication (Miranda and Saunders, 2003; Rogers, 1986). The next sections illustrate information processing and transmission with their

dissemination styles and techniques.

5.2.1. Information processing

In this section information processing is explained and highlighted to understand how individuals process information when they receive it. In psychology literature, information processing demonstrates cognitive learning, which includes receiving, extracting, processing and remembering information that is stored in the short-term memory (Hamilton and Nowak, 2005). However, in terms of long-term memory, individuals create a connection between stimulus and previous knowledge (Hamilton and Nowak, 2005).

Miller (1956) emphasised that encoding and retrieval are imperative elements of cognitive information processing. They inspire learners to disseminate and adapt new information through processing, storing and retrieving information for future use (Bovy, 1981). All these elements occur when an individual receives information.

Many educational scholars have indicated that individuals have different learning processes based on the communication channel, such as media (Coldevin, 2003). For example, some people better understand through listening than watching, and vice versa. According to Maclnnis and Price (1987) individuals relate to two types of information processing. First, is imagery processing or symbol processing, which offers multi-sensory involvement; for instance, smell, taste, touch and sight sensations in working memory. Second, is discursive processing or language-oriented processing, which is an abstract level where sensory involvements are excluded (Maclnnis and Price, 1987).

5.2.2. Information transmission (different styles of presenting information)

The dissemination of information from different media provides multiple reinforcing channels; the media channels offer various learning styles (Coldevin, 2003). Different media offer a particular technique to structure a message (Dennis *et al.,* 2008). These channels involve more senses that allow the demonstration and reinforcement messages in several styles/ways (Lie and Mandler, 2009). According to Scott (1994) visual information appears as a direct

influential cognitive element and offers representation that elaborates in actions, concepts and metaphors. The human brain decodes image components concurrently, whereas a linear decoding of language takes more time to be processed (Mehrabian, 1981). A study by Mehrabian (1981) shows that visual information has more benefits compared with text. As discussed previously in sections 2.4 and 4.7, potential audiences, such as IS practitioners and SME managers, do not read academic articles (textual style) for various reasons, which were discussed in section 4.3, such as academic writing, structure, and terminology of research outputs. Also, practitioners and managers seek relevant, summarised information related to their interests and needs.

Learning style studies indicate the use of images to contextualise reality in videos assists in decreasing the number of literate people. As Lie and Mandler (2009) argued, visualisation enables communicators to portray complicated messages, meanings and different opinions – which audiences would otherwise find difficult to understand – such as videos, which are a useful tool to increase awareness of such topic. For instance, a study in the School of Management at the University of Minnesota indicated that presenters who included visual elements (e.g. pictures) were 43 per cent effective in persuading the audience to perform desirable actions than presenters that did not include visual elements (Vogel *et al.,* 1986).

According to Levie and Lentz (1982) visuals cognitively accelerate and increase comprehension, retention and levels of communication. The use of visual indications aid people in attracting attention and increasing the potential that the audience will remember the message (Levie and Lentz, 1982).

5.3. Solution Development (Phase 2)

As explained in section 3.7.2, the development of the proposed solution was conceptualised based on two main sources:

- Literature:

Sections 2.4 and 2.5 discussed that most IS practitioners do not read academic papers, section 2.7 discussed that IS academics can be more relevant to a potential audience, and section 5.2.2 discussed the experiences of learning styles

(i.e. videos) in education and the dissemination of research findings within the research process.

- The findings of Phase 1:

Academic participants in Phase 1 indicated how their audience beyond the academic community would receive research outputs (refer to section 4.7). Most of the academic participants did not really know how audiences beyond academia would receive their research outputs. However, academics are sure that their target audiences beyond academia tend to seek a summarised and brief amount of information that only reflects the research outputs and fulfils their needs.

5.3.1. Content and design of the short videos

As stated earlier in section 3.6.2 that this study applied the three stages of Dawkins and Wynd's (2010), techniques to produce a short video. The first two stages (i.e. Preproduction and Production) have been explained in section 3.6.2. This current section illustrates the process of the third stage which is Postproduction. Before starting to explain the editing process there are three different levels which have to be in consideration while the editing process (Dancyger, 2014), as follows:

- **Technical level:**

Primarily, this level is to learn how the edit suite functions. Also, represents the ability to select and use the appropriate technological tool to combine two or more clips together. This level allows editors to create structure which has a specific meaning.

- **Craft level:**

This level represents the ability to select two or more clips that are joined together to deliver meanings which are not presented with one clip.

- **Art level:**

This level represents the ability of the editor to form particular emotions within the audience. Also, the combination of two or more shots can present meanings to the next level such as insights, excitement, or shock.

In this study the previous three levels of editing are taken in consideration while editing the clips.

Chapter 5: Development and Evaluation
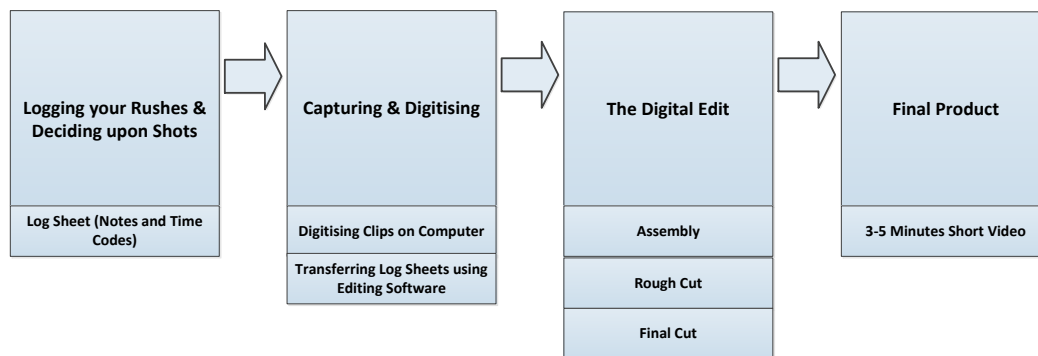
Figure 5.1: The Postproduction steps of the short videos.

As shown in Figure 5.1 the postproduction has three steps to edit video clips (Dawkins and Wynd, 2010). The three steps are explained within this study as follows:

- **Logging your Rushes and Deciding upon Shots:**

This step is the process of watching carefully at your clips/footage and writing notes for each shot on a log sheet (i.e. timecode of a shot/footage). Also, the editor is attempting to decide what is appropriate for the finished production. This type of process is time consuming however, if this step has been done accurately, the editor will save time at the editing step (Dawkins and Wynd, 2010). In this study, after filming/audio recording participants individually, the materials were uploaded. The researcher played each clip to carefully select the appropriate shorts and record its time code with notes based on the questions that were asked, as listed in section 3.6.2 and Appendix M.

The focus was carefully on the findings and the novelty of what the participants were saying regarding their research papers. The minutes of the clearest answers were determined; for example, why should anyone believe you? This question was answered from minutes 10.55 to 12.45. Each recording has a document that indicated a list of the answers by minutes (refer to Appendix H). This step was repeated many times for the ten videos to ensure that the clearest answers were extracted. Additionally, considering the power of visualisation as discussed in section 5.2.2, the researcher subscribed with a provider of images and video clip to be able to download pictures and video clips and used them based on the title/topic of each film/audio record.

- **Capturing and Digitising**

The editor at this step has to transfer only the shots that have been selected at the logging step (i.e. log sheet). The process of this step is operating through editing software packages such as Final Cut Pro. All clips should be digitalised on the computer; this will be completed by the editing software. According to Dawkins and Wynd (2010), the editor should consider 8 points when digitising the clips/footage (Table 5.1). At this step the researcher had selected and followed the instructions of how to use the editing software (i.e. Final Cut Pro) with the help of a video editor. Also, the editing process had considered the 8 techniques of digitising.

Table 5-1: The Techniques of Digitising Clips

• Digitise only the material that you need; use your storyboard as your guide but do not be afraid to deviate from the storyboard if it improves the video.
• Make sure that you save your clips to your assigned folder and that they are always saved to the same folder.
• Ensure that your clips are slightly longer than you need by setting an earlier in-point and later out-point: it allows for much more flexibility in the editing process.
• Clearly and logically label each clip. You can use your storyboard as a guide. Do not just let them default (i.e. Untitled 1, Untitled 2Untitled 3, etc.). If you do, it means that you have to open up each clip to view it before placing it on the timeline, which is unnecessarily time-consuming.
• Ensure that you save your project periodically, in care the software crashes.
• Do not forget that your video will be made up of other elements and so this may include sound and music clips, graphics and other imported materials.
• Save the entire project again before shutting down the computer.

- Keep your source media safe. You may, at any point in the editing process, need it again.

- **The Digital Edit:**

According to Dawkins and Wynd (2010), this is a vital step as the previous steps were and contains three main processes (refer to Figure 5.1):

- **Assembly**: "individual clips are quickly and roughly put together by dragging clips from the clips store or bin on to the timeline in the same order as they appear on the storyboard to determine the basic structure of the video" (Dawkins and Wynd, 2010).
- **Rough Cut**: "the basic structure from the assembly is tightened up by trimming each clip on the timeline and the continuity, pace, effects, and dialogue are more fully developed" (Dawkins and Wynd, 2010).
- **Final Cut**: "this where, as the same suggests, all the elements of the video are crafted into the final video. Colour-correction, sound design and credits are completed" (Dawkins and Wynd, 2010).

The previous three processes were applied while using editing using Final Cut Pro software package. The final products were ready and each was structured as follows:

- ❖ **First section:** This is an introduction slide of the video's aim. It indicates the project name (i.e. "Making academic research easy and accessible") and the subtitle, "A series of video clips of academic research". Every section is seven seconds long; it starts with music and ends just before the participant begins to talk (Figure 5.2).

Figure 5.2: The first section of the video.

❖ **Second section:** This is the title of the article. This slide shows the title of the academic paper (Figure 5.3). Additionally, Figure 5.4 depicts a participant's presence and her details (i.e. name and the research area of expertise).

Figure 5.3: The second section of the video.

Figure 5.4: Example of the participants' presence.

❖ **Third section:** This is the audience of the video. This slide is entitled "The intended audience" with a question below, "Who should watch this video?" Also the authors start to talk about their target audience (Figure 5.5).

Figure 5.5: The third section of the video.

❖ **Fourth section:** This is the story of the article. This slide is entitled "The Story" with a statement below, "A brief summary from the author" (Figure 5.6).
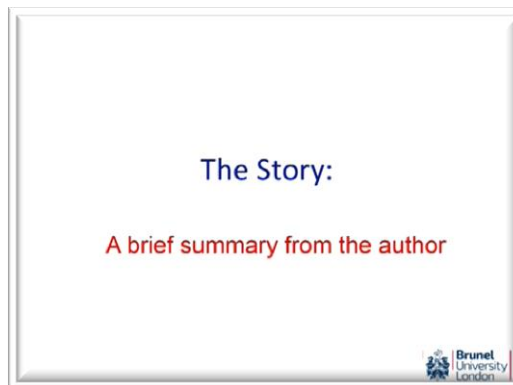
Figure 5.6: The fourth section of the video.

❖ **Fifth section:** This is "What is new for the audience?" This slide is entitled "Novelty" with a question below, "What will you know after reading this paper you did not know before?" (Figure 5.7).
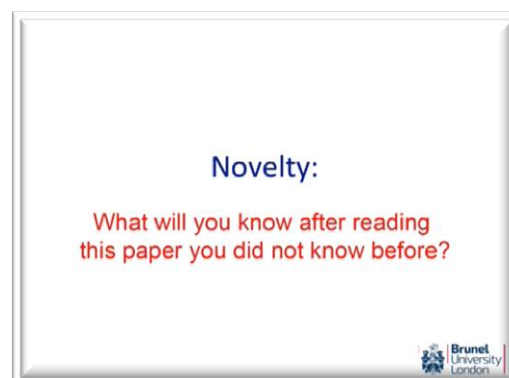
Figure 5.7: The fifth section of the video.

❖ **Sixth section:** These are the facts found in the paper. This slide is entitled "The Facts" with a question below, "Why should you believe what is said in this video?" (Figure 5.8).

Figure 5.8: The sixth section of the video.

❖ **Seventh section:** This is the relevance of the information. This slide is entitled "Relevance" with a question below, "Why should this information be important to you?" (Figure 5.9).
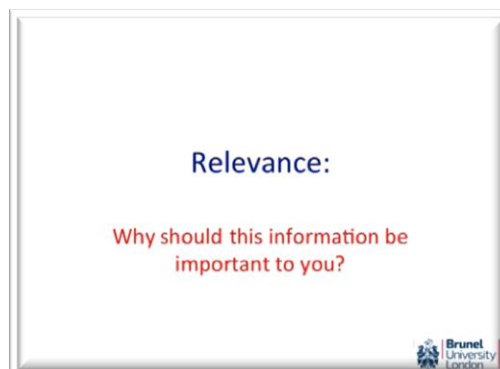
Figure 5.9: The seventh section of the video

❖ **Final section:** This is the link to the original article. This slide is entitled "References" and contains the full reference list of the academic paper (Figure 5.10).
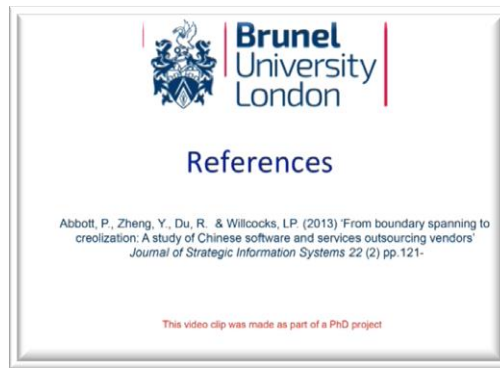
Figure 5.10: The final section of the video.

Table 5-2: The Proposed Solution and Barriers of Phase 1

Message and Channels' Barriers	Proposed Solution Process
Academic language and terminology: Complex esoteric language and specialist terminologies used in an academic paper	Logging your Rushes & Deciding upon Shots **(Message)**
Irrelevant information: Insignificant sections included in an academic paper (i.e. literature review and methodology)	
Academic format: Non-friendly structure of an academic paper due to academic journals and conferences policy	The Digital Edit **(Channel)**

This structure covers the two barriers mentioned in section 5.1, namely message (academic language and structure) and channels (dissemination effectiveness). Table 5.2 shows how the editing techniques in Figure 5.1 overcome the two barriers; and Figure 5.1 depicts the process of extracting relevant information, which is proposed to overcome the barriers mentioned in section 4.3 that academic language and terminology used are too complex for audiences beyond academia to understand, and that there is often irrelevant information provided. Also, the video editing and cutting was presented to overcome the academic structure and format barriers (Table 5.2). The videos as media are a channel to overcome the academic channels, which are journals and conferences (Table 5.2). These videos can be sent online through emails or uploaded to the Internet (e.g. YouTube). However, this phase considers the process of extracting relevant information from a research paper as the message, and the use of video as the

dissemination channel (media) to structure and form the information extracted. The next section illustrates the evaluation of the videos developed.

5.4. Evaluation (Phase 3)

As explained in section 5.3.1 the proposed method went through different processes to be conceptualised and developed. This section illustrates the process of evaluating the model (i.e. videos). In section 2.3.1, dimensions of relevance were proposed by Benbasat and Zmud (1999) to make research papers more relevant to IS audiences, and IS practitioners in particular. Section 2.11 reported the importance of investigating and identifying the research area of academics and their potential audiences to be able to apply Benbasat's and Zmud's (1999) notion of relevance. Consequently, this was identified by participants through Phase 3 as stated in section 5.3.1: each video showed the potential audience and the story of the research paper. In this Phase 3, to measure the relevancy of the short videos, Information Quality (IQ) dimensions are applied which covers Benbasat's and Zmud's (1999) proposal of relevance. As mentioned in section 3.6.3, IQ dimensions were validated as measurements to assess information quality (Lee *et al.,* 2002). The next sections explain the IQ and its dimensions and how these dimensions conceptually cover Benbasat's and Zmud's (1999) notion of relevance.

5.4.1. Information quality (IQ) dimensions

Many researchers have given the customer a critical role in measuring the product/service quality (e.g. Juran, 1988). Crosbys (1992) indicated that "the only absolutely essential management characteristic of the twenty-first century will be to acquire the ability to run an organization that deliberately gives its customers exactly what they have been led to expect and does it with pleasant efficiency" (p. 16-17). However, it is difficult to assess a quality of a product due to each person's thought, which every person defines quality as s/he believes (Crosbys, 1996). Quality is defined as fitness in use that indicates quality as a customer perception, where this is almost a customer satisfaction (Juran, 1988). Quality is considered as the cost of value that meets the consumers' requirements or needs (Juran, 1988) due to the relation between monetary values and quality values.

According to Lee *et al.* (2002), IQ dimensions are classified into four categories: (1) intrinsic IQ, which considers that information has quality in its own right; (2) contextual IQ, which indicates that IQ should be considered within the context of the particular situation at hand, including being relevant, timely, complete and with appropriate amount of information to provide a value; (3) representational IQ, which is when computer systems should present information in a way that is easy to understand, interpret and manipulate, and is consistent, and concise; and (4) accessibility IQ focuses on computer systems that offer storage of information that can be accessed. IQ dimensions measure the quality outputs of a system, such as government Websites (Wangpipatwong *et al.,* 2005).

Kahn *et al.* (2002) enhanced Strong and Wang's (1997) IQ model, which considered information as physical products and services. The IQ/product and service performance (PSP) model is grouped into four quadrants:

- Sound information includes free-of-error, concise representation, completeness, and consistent representation as IQ dimensions for product quality.

- Useful information includes the appropriate amount of information, relevance, understandability, interpretability, and objectibility as IQ dimensions for product quality.

- Dependable information includes timeliness and security as IQ dimensions for service quality.

- Usable information includes believability, accessibility, ease of operation, and reputation for service quality.

The above quadrants and their IQ dimensions distinguish one service from another. According to Kahn *et al.* (2002), IQ dimensions are evaluated only from the user's perspective depending on the decision or the task in hand. They indicate that customers/users have to access authentic, reputable and beneficial information. Similarity, Benbasat's and Zmud's (1999) dimensions of relevance indicated that research should be useful for, and accessible to, IS audience (e.g. IS practitioners and professionals). In other words, the IS audience must view a research paper as interesting, current, applicable and accessible (i.e. in terms of

being understood by IS practitioners); thus IS research consumers or users are the critical element that decides whether or not a paper is relevant. (Refer to Table 5.3 for Benbasat's and Zmud's dimensions of relevance.)

These dimensions have been improved and consider information as products and services that are delivered to consumers (e.g. practitioners). Lee *et al.* (2002) developed a methodology for information quality assessment which is named AIM quality or (AIMQ). AIMQ involved the IQ/PSP model to form a foundation for IQ benchmarking and measures. The AMIQ methodology has been evaluated and resulting with a valid set of IQ assessments (IQA). The IQ contains a set of dimensions that assess and measures the IQ of a particular context regarding information as products and services that are delivered to consumers, such as managers.

Table 5-3: Benbasat's and Zmud's (1999) Dimensions of Relevance and Information Quality (IQ)

Benbasat's & Zmud's (1999) Dimensions	IQ Dimensions
Current: Does IS research focus on the current technologies and business problems?	**Timeliness**: information is up to date for the task at hand
Accessible: Are IS research articles able to be understood (in terms of tone, style, structure and semantics) by IS professionals?	**Format**: The degree to which information is presented in a way that is understandable in easy way and interpretable to the user and thus aids in the completion of a task

5.4.2. The IQ dimensions applied in this study

Table 5.3 shows Benbasat's and Zmud's dimensions and their definitions plus the IQ dimensions that match these definitions. The IQ dimensions are defined slightly differently based on the context of a particular study. For example, Lee *et al.* (2002) indicates understandability as a dimension itself; in contrast, others consider format dimension to include understandability and readability (e.g. Nelson *et al.,* 2005; Gallagher, 1974). To achieve the aim of this phase 3, the three IQ dimensions were applied (i.e. appropriate amount of information, format, and timeliness) regarding only two dimensions of Benbasat and Zmud's (1999) notion of relevance: current and accessible dimensions as shown below.

- **Appropriate amount of information:**

This dimension measures whether the information provided is too much or too little. According to Pipino *et al.* (2002) the balance of data should be considered between the number of data units provided and the number of data units needed. This dimension assesses to what degree the information is sufficient and adequate (Lee *et al.,* 2002). Delivering the exact amount of information to customers/receivers is a critical process. This IQ dimension was applied to assess whether or not the amount of information provided in the video was appropriate. The length of the video will be discussed later in this Chapter.

- **Format: (accessible: tone, style, structure and semantics)**

This dimension has been defined by many researchers as the presentation of the information provided to the consumer (Miller, 1996); it should be in a useful format and be clear (Doll and Torkzadeh, 1988). A format can be defined as the display and layout design of the output contents (Bailey and Pearson, 1983). Gallagher (1974) refers to format as readable, orderly, logical, clear and simple information.

Nelson *et al.* (2005) extend the format dimension to include the degree to which information is presented in a way that is understandable and interpretable to the user and thus aids in the completion of a task. They measured the information outputs of a system within the data warehouse context. However, with regard to the aim of this phase, the format refers to the presentation of the information and to what degree the information is clear, readable, orderly, understandable, simple, well-formatted and well-designed from the output contents. This IQ dimension reflects the accessible dimension of Benbasat and Zmud's notion of relevance within all its aspects: tone, style, structure and semantics (Table 5.2).

- **Timeliness: (current)**

According to Doll and Torkzadeh (1988), timeliness is a critical dimension that refers to whether the information provided is up to date. Kahn *et al.* (2002) regard timeliness as the degree to which the data is up-to-date with regard to the task used. Lee *et al.* (2002) indicated that timeliness refers to whether the information is current, timely and up-to-date for the work at hand. Being current refers to timeliness, which includes the age of the data and how long an item is

valid (Ballou and Pazer, 1995).This IQ dimension reflects Benebasat and Zmud's (1999) dimension (i.e. interesting), which indicates that the research paper should be addressing problems and challenges concerns IS practitioners. In this phase 3, timeliness refers to the up-to-date information that is interesting to the audiences beyond the academic community.

5.5.   Evaluation of the Videos

As mentioned in section 3.6.3, two groups of participants evaluated the videos. The first group was the academic authors of the videos; the second was the potential audience of each video. Both groups were informed that the images and video clips presented were examples that might not match the title exactly. As discussed in sections 5.4.1 and 5.4.2, customers are the only people that can assess information quality. However, in this phase, academics were involved in an effort to discover their opinions and beliefs about how their target audiences beyond the academic community would receive the videos. The next sections illustrate the findings of each group and a brief discussion of the results.

Table 5-4: Demographic Information of Academic Participants of Phase 3

No.	Position	Department
7	Lecturer	Information Systems and Computing
2	S-Lecturer	
1	Professor	
Total: 10 participants		

5.5.1. Academics (authors of video)

As highlighted in section 3.6.3, the authors of each video were interviewed to gain feedback regarding their videos. The structure applied in all videos is described in section 5.3.1. The ten academic participants involved (Table 5.4) were asked to comment on the three IQ dimensions mentioned in section 5.4.2.

Table 5-5: Academic Videos

Participants	Video title	Audience
PA1	A study of Chinese software and services outsourcing vendors	Outsourcing venders

PA2	A framework for deriving semantic Web services	All companies of different sizes profits and non-profits and R&Ds
PA3	Video summarisation: A conceptual framework and survey of the state of the art	Broadcasting companies such as Sky
PA4	Why people keep coming back to Facebook	Website designers, SMEs, and lay public
PA5	A mutation in NRL is associated with autosomal dominant retinitis pigmentosa	Doctors, clinicians, and patients
PA6	Development and validation of "AutoRf" software for the automated analysis of radiation-induced foci	Biologists
PA7	Modelling an ontology on accessible evacuation routes for emergencies	Website designers, government, SMEs, large companies
PA8	A systematic literature review of fault prediction performance in software engineering	Software industries, software engineering companies
PA9	Microblogging as a mechanism for human-robot interaction	Application developers, social media data analysts
PA10	Is it all lost? A study of inactive open source projects	Software developer and decision makers

PA = (academic author of the video); R&D = research and development; SMEs = small and medium-sized enterprises.

Eight participants held the same code as shown in Chapter 4 with the letter "A" add after "P" (e.g. P1 = PA1); and two, who did not participate in phase 1, do not have the "A" added (i.e. P33 and P44) see Table 5.5. The next sections show the data analysis of the 3 video assessment (refer to Figure 5.11).

Appropriate Amount of Information
Format
Timeliness

Figure 5.11: The three main themes of the Video assessment.

Appropriate amount of information

Many participants who were interviewed explained that they were not sure whether the information provided in the videos was an appropriate amount for their target audience beyond academia. Some participants indicated that the information provided was at a high level that presented the idea about their papers. Others said that the main points of their papers were covered in the video. The answers varied depending on the topic or/and discipline. Below are what some participants said.

"For an industrial audience, I think it probably gives them a good insight into it. I think the only bits that are missing probably are, you know, watching it again. I think some of the things I talk about, it would be quite good to see examples, you know. I didn't talk about them in the paper; you know, if I took you to a figure in the paper and I talked about interpreting the semantics and you give them an example what do I mean by semantics? What is this interpretation process? Maybe that would have been a little more helpful …"PA2

"It depends on what your target is. What do you want to achieve by getting people to watch the video? If you're trying to get people to be interested in looking at it in more detail, then I think it just about has enough to whet someone's appetite. But it probably could have a little bit more detail …" PA3

"It's enough information, yes, because it splits; it brings out the essential information about the paper in very simple terms, and you know each time you bring out some bit of information about the paper you put the associated question there. I think anybody could follow that, I would think". PA1

As quoted above, PA2 believed that the information provided in the video presented good insights of the paper; however, it lacked some examples to explain some terms. PA3 believed that the judging of whether the information is an appropriate amount depended on what the author sought to achieve. For example, if the author aimed to draw attention and make the audience interested then the information presented in the video was enough, although it was missing

some information. PA1 indicated that the video presented the main information of the paper and anybody could easily follow the video.

The participants almost had the same beliefs with different rationales. PA10 indicated that it was confusing to judge whether the amount of information provided was enough, due to the general and specific claims presented in the video. However, PA10 believed that the video was drawing attention to the audience beyond academia who would read the paper after watching the video. PA8 believed that the information was too high-level for the practitioners. There was too little information to explain the concepts of the paper to the audience, but there was a desire to have an attractive video. PA9 indicated that the information was an appropriate amount and all essential points were there.

"So I'm not sure whether or not, coming from the external point of view, I will need more details to understanding what it's actually all about in here. Because some of the claims are very broad, some of the claims are quite strong, so if I was interested, I would definitely go and read the paper because I said something which is kind of quite strong in a sense. It's like saying, look, you can save some money if you do that, and if I was a manager, I was like, hmm, that's interesting, is it all true though? Would I trust that guy? So we need to see the numbers. I mentioned numbers but I would need to see the numbers if I was managing". PA10

"I think if you go, I mean the audience for that paper is, you know, I'd love practitioners to be able to pick it up and I know that they have picked it up. And for them, they won't know a lot about the very detailed concepts and so you really have to introduce some of the high-level stuff, otherwise they're never going to be able to access the detailed stuff. But the future researchers in this area are going to know half, you know all the preamble; they're going to know all of that, and they just want to get to the nitty gritty, what were the recall values when naïve bears was used with eclipsed data or whatever, but you can't just dive into that level of detail!" PA8

"Yeah, I think that the main ideas are there, yeah, I wouldn't … all the main points are covered. I think that anyone that would listen to the audio and also look at the video, he or she will get the idea of this research". PA9

The academic participants had varying beliefs regarding the amount of information provided in their videos. These different beliefs might refer to their personal experiences.

<div align="center">

Format: (accessible: tone, style, structure and semantics)

</div>

This theme indicated the participants' beliefs regarding the way the videos were presented, clearly and understandably. The participants emphasised the format as an imperative element to achieve a comprehensive understanding of the information given in the video. They highlighted that the pictures and video clips used should be carefully selected. Some criticised the pictures as not matching the title of their paper; whereas some were excited to watch the videos as they were. The participants pointed out the format, including structure, language, images, video clips and music used in the video.

"Yeah, I like the way that you segmented the sections out and that you had clear textural cues to say what section we're going to address and when, so I really like that, it was very nicely, clearly structured. And in some ways it was almost like an interview, you know, you ask the question and you get the answer, so yeah, it was good". PA3

"Yeah, it's hard to judge myself, so I think I would say I'd like to see a bit of the author but I, it doesn't have to be three minutes, it could be 5 per cent of the author, you know maybe doing the intro and then it goes into more of the … And then if the graphics are very related to the paper, I think that probably would be better on …" PA2

"So, but the questions that are being asked, they are being asked in a very simple way, I'm not a marketer, I'm going to say what my paper is about in the way I understand it and what I think is a simple way. So my, what do you call it, the way that I have … delivered that is the way I would probably teach maybe first year under graduates or second-year under graduates, if I was to tell them about my paper, that's probably how I would do it, so …" PA1

PA3 believed that the video was professional and structured in an organised way. He was interested in the sequential flow of the video. PA1 believed that the

information was presented in a simple language and that the information was presented in the best way as she understood it the way it was. However, regarding images and video clips, PA1 indicated that the images and video clips used did not match the title of the paper. This might lead to misunderstanding the video itself (refer to PA1 quote below).

"Video, the pictures are about manufacturing outsourcing, whereas my topic is about software and services outsourcing, so it's a different kind of outsourcing. The images that should be there really are about, with people sitting in front of computers and doing things, and the large software parks that they have and whatnot; those are all the sorts of images and … images about the different, the big cities that they've built around outsourcing, those are probably what should be highlighted here". PA1

PA4 believed that the questions confused the audience and was not sure whether it was an appropriate idea for the author to be shown in the video. Many different viewpoints might refer to the teaching perspective, to the research perspective, or to personal experience:

"So I think that's good, it's good to keep the question. I'm not sure in your slides where you have the question. You can make the questions a bit more to your face or maybe not". PA4

The participants were quite sensitive with the format and images provided in the videos. For instance, PA6 indicated that the short video and images presented were not the same people who had really done the research. In fact, PA6's short video involved images, as explained in section 5.3.1. Other participants indicated that the video was presented in an understandable way to lay people as her audience was patients. PA9 emphasised the coherent structure that was easy to follow to understand the story of the paper.

"But I think also they would be annoyed by some of the images that you've put in there. I immediately know they are not images of the actual sales that were counted. A member of the general public may not know that, you know they see something … So, for example, where you have the ones about the county, and you have different circles around them …" PA6

121

"I think because it gets the story across in a way that's not too complex. You see, for me, anyway, I mean I, you have to talk to lay people, which you're going to do, but for me it gets the story across succinctly and in a way that hopefully lay people can understand it". PA5

"I think that the story kind of flows, you know, I don't, I think it's easy to follow the story through the, you know, what a … you know you have the questions, you know, and then you have the short answers by me. I think it's quite easy to follow". PA9

Many participants positively commented on the format and how the images, video clips and questions for each section could help audiences to understand the message of their papers. However, few participants were concerned about the format of the videos that were developed (i.e. PA1 and PA6).

Timeliness: (current)

Timeliness varies based on the time an audience needs certain information. For example, to set up a company there are many things to be concerned with, but the information is already out of date for other companies that already exist in the market. Many participants believed that the information provided in the videos was current; because of two main reasons first is the increase of papers' citations and second is the demand of market.

"The citation number of my paper has only increased in recent years, it hasn't decreased. And the type of work that's being sent there has diversified and the issues are still there, those cultural issues we talk about in that paper are still there. So I think it's still very much relevant, yes". PA1

"Because the paper's from a while ago, it's about, what is it, 2007 or something like that, so it's not that current. But the field of study is still quite current, so the paper gets, still gets cited, so it's still a paper that gets citations, so it's, some of the ideas are still current but it's, it's not where my thinking is now". PA2

"Given that the model presented in the paper still stands and this, and you know the challenges that it highlights are still, are still relevant, then I would say yes, yeah". PA3

The participants believed that some topics were up to date in terms of the concepts of the paper. Others thought that the process of publishing a paper made it out of date. PA8 indicated that the information provided was in advance; the problems had not been solved yet, which showed the solutions for future issues.

"I mean it's now, it is getting, you know, it's no longer a new discovery anymore; this paper's, you know, a while old now. But the sort of concepts that it's getting over is very relevant". PA5

"Of course I would say partially yes. Why partially? Because, of course, the problem is that when you publish your research in a journal, it takes like … So I started the research, this research, in 2012 and it took almost three years to publish the final paper because, of course, I started the research, you know, doing the evaluation, designing the study and then writing the paper and then waited for reviews and got published. So now that we're talking about this research, actually in 2016 I'm presenting research results that are actually from 2012 and I'm currently working on, already on something much more updated, … but, I think it is you know because you know this is of general interest really, it's about emergencies". PA7

"None of these issues have been solved, so what we're talking about is building a foundation for improving things in the future, none of that has been done, so it's as, just as current now as it was when the paper was published, it's very current". PA8

All these beliefs and indications were based on the research topic itself. For example, PA10 presented a seminar about the same topic of his video; he found that experts were still asking questions about the topic. Also, PA8 indicated that the paper was still novel and practitioners were able to obtain benefits from it. Thus, the timeliness or being up-to-date referred to the research topic itself or,

as mentioned earlier in this section, the audiences (e.g. consumers or users) are the ones who judge whether or not the research is current for them.

5.5.2. Potential audience

As discussed in section 3.6.3, it is hard to interview the potential audience as they are mostly practitioners in industries or in business companies. As shown in Table 5.6 the participants in this section were five practitioners and five Facebook users. The reasoning behind this category of participants was that research is not only of practical relevance. The potential audience participants were asked to comment on the three IQ dimensions: the appropriate amount of information, the format and the timeliness. The researcher had the chance to ask how practitioners sought information and what their beliefs were about academia.

Table 5-6: Potential Audience Participants of Phase 3

Code	Position	Ex	Video presented	Video title
(Prac-1)	Data Scientist in Public Sector	9	PA3 video	Video summarisation
(Prac-2)	Channel Manager in Business Sector (SME)	8	PA1 video	A study of Chinese software and services outsourcing vendors
(Prac-3)	Application development Manager in Bank sector (Head quarter)	15	PA8 video	A systematic literature review of fault prediction performance in software engineering
(Prac-4)	Programmer in Business Sector (SME)	1	PA8 video	A systematic literature review of fault prediction performance in software engineering
(Prac-5)	Programmer in Business Sector (SME)	3	PA10 video	Is it all lost? A study of inactive open source projects
(Prac-6)	Web designer (Individual)	4	PA4 video	Why people keep coming back to Facebook
(Prac-7)	Web designer (Individual)	6	PA4 video	Why people keep coming back to Facebook
(Prac-8)	Salesman (SME)	8	PA4 video	Why people keep coming back to Facebook
(User-9)	Student	6	PA4 video	Why people keep coming back to Facebook
(User-10)	Student	10	PA4 video	Why people keep coming back to Facebook
Total: 10 potential audience				**Total: 5 videos**

Ex = experience; Prac = practitioners; SME = small and medium-sized enterprises.

The potential audience was shown the titles of all the videos so they could select the video of their interest to watch. Some practitioners were meant to be just

users or the general public to find out the value of awareness and information dissemination, such as Facebook users. The next sections illustrate the themes that analysed from the interview data (refer to Figure 5.12).

Appropriate Amount of Information
Format
Timeliness

Seeking Information
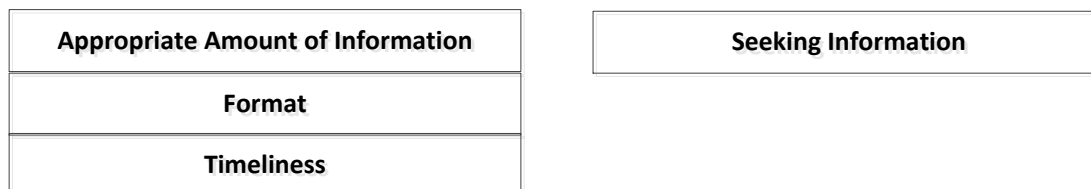
Figure 5.12: The four main themes of the Video assessment.

Appropriate amount of information

Many participants considered that the amount of information provided in the videos was almost the right amount; however, the information did not meet the potential audience's needs. For example, Prac-1 (Practitioner 1) indicated that the information provided was just an overview of the paper. However, the minority highlighted that the information was too much, due to the level of irrelevant information provided.

"Yeah, because she explains very important things: how to globalise the company, how to have market expansion". Prac-2

"Well I would say that it's, it's an overview, so it doesn't tell you exactly what you need to do and all that. So it needs to … we need to go that next step to actually look at, OK, so yeah there is, this is possible, so it's a possibility that we can explore and then now we need to look at how we can go ahead to do that". Prac-1

"No, not really, the point here is that she …. The video presents general information about what she did but doesn't tell the main points that influence the users and how". Prac-6

The potential audience was seeking more information to meet their needs. Prac-1, who watched the PA3 video "Video summarisation", illustrated that the information provided in the video was not sufficient for her needs; the information was missing the next step of how to do things. Prac-6, who watched the PA4 video "Facebook users' retention", indicated that the information did not provide the main factors that influenced the users' retention. In contrast, User-10

125

believed that the information was too much and should have one section to explain the main points. Prac-2, who watched the PA1 video "Outsourcing vendors", believed that the information provided was enough and sufficient for his needs. All these beliefs and opinions were based on the topics and the audience's needs. The needs could be either practice or awareness.

Moreover, the potential audience was critical about the information provided in the videos. They believed that the videos were missing a crucial part of the information. For instance, Prac-3, who watched the PA8 video "Fault prediction models", believed the information was sufficient to start with; however, it lacked important information that would have met his needs. Prac-5 indicated that examples of how these things were done would have been helpful.

"It's enough to get me started but what I was expecting from when you showed me the title was I would have something by the end of it to go and apply in my job. What she mentioned was absolutely correct and I'm, ideally you need it and we would love to have that, but where is that, I have to go and find the thing. That video, that information is not there". Prac-3

"It's just like an introduction and there should be some example of where they have used some kind of bits and pieces and made it into a new software". Prac-5

Pract-3 indicated that academic researchers do all the work (almost 90 per cent) and leave out the most important part (the 10 per cent), the implementation phase or how to do things.

"I think the work that, for example, Tracy has done and you have done maybe, I saw your name there … So if that prediction is already there, I think what currently we are doing in research is we're leaving it to say maybe 80, 90 per cent done and that last 10 per cent application we're leaving it to industry. Coming back to my point, where we don't have industry to support it, where you can actually build something to prove it, show evidence, and then apply it somehow, that part I think is missing, and if we can close that gap … In some cases it's there, yeah, like car manufacturers, jet engines and …" Prac-3

It is obvious from the above quotes that the practitioners believed that the information provided in the videos lacked information except Prac-2, which could be because of his experience in the work field. User-10 indicated that there was too much information for his needs. Each of those who were interviewed was influenced by his/her information needs. For example, some practitioners need practical information and other need information to support them in decision making.

Format: (accessible: tone, style, structure and semantics)

The format was a critical dimension that included understandability and readability, and other aspects as mentioned in section 5.4.2. The format affected the entire understanding of the information provided in each video. Some participants indicated the positive view that pictures, graphics, music, and video clips involved in the videos assisted their understanding of the message of the paper. However, many participants believed that the format lacked some sections; for example, an introduction section that would indicate the content of the video.

"I think it's clear, especially the questions are how you ask questions, so the audience understand where they are. So it starts with who needs this information, why you need this information, and how it will help you. So you are doing step by step, not just putting all the video, all the information together". Prac-2

"Yeah, I think it's a good flow, so it kind of … is pretty similar to the question that I would have as I'm watching, the questions were pretty much similar to what I would have in my head, but maybe not as many". Prac-1

Prac-2 indicated that the segmented video was based on questions that helped them to follow and understand what points were explained. Prac-1 believed that the questions were almost the same that she had in mind but not as many as she had. Prac-2 believed that the PA1 video had two types of audience and it could have been presented differently for both the technical audience and the people who work in marketing. Prac-1 indicated that if the PA3 video used advanced technical words, the IT professionals would not understand it clearly; however, the actual video was easy to comprehend.

127

"So maybe to someone who works technically or someone who works in business and marketing … you can just separate it for the audience for technical, this is for you, audience for business, this is for you, more specific …" Prac-2

"It's not too technical, so it's not filled with technical jargon, but then again, for an IT professional, they would not be, you know, unfamiliar with technical jargon, but say if it is a bit more advanced, even the IT professional may be not be familiar. But this is simple enough to understand, so …" Prac-1

Others who watched the PA4 video, "Why people keep coming back to Facebook", indicated that the video was well-formatted; however, there were extra sections that did not meet their needs. In fact, these viewpoints of Prac-7 and User-9 might refer to their interests and needs of their own work or knowledge.

"Well, I think it's formatted in a nice way but I didn't like some questions, for example, why should I believe you?" Pract-7

"It is ok, easy to follow and … to understand but some parts I do not understand … for example, theories she talked about … I don't need to know all this information". User-9

The potential audience indicated that the format was not well formatted due to some missing sections and they expected a different format. The potential audience did not emphasise images, video clips, and music; however, they focused on the sections themselves and what they contained. Prac-3 believed that the video consisted of unnecessary and unordered sections; for example, evidence and how it can be done. Prac-5 indicated that the format could be good if there was a section that introduced what would be presented in the video and the main important points.

"It was a bit jumpy and a bit short. When I say jumpy it means that it didn't have any structure in terms of say, this is the problem currently the industry is facing, everyone is facing, so it was there but it wasn't right at the beginning. Then this is what we are proposing, this is the solution, this is how you do it. So I think the whole video was

about we've done a paper, we've done an analysis, there are no numbers, there are no facts, it's all, maybe it's in the paper but in the video it wasn't there". Prac-3

"Yeah, it was … so OK, when you can say that that … that the part now you only have is only how is missing from this, then that part, yeah, of course". Prac-3

"The title is clear but this is not just about this video. Whenever I have watched a video or any tutorial or even a presentation, what is the most important thing is you need to address like what are you going to talk about in the entire picture, of the entire time frame, it's not just that topic you are just generalised and topic, but what points are you going to call, like we open a book, there is an index, we have a detailed description of what all things are we going to cover, so that was missing". Prac-5

From the analysis above, there were differences between all potential audiences. Some potential audiences followed the flow of the video and some believed it was well formatted and organised, and some indicated that it was missing a critical section (the "how to" part). Other potential audiences explained that the format/structure of the videos did not meet their needs. The potential audiences anticipated different formats/structures that necessarily involved a section of how to do the things that had been presented in the video.

Timeliness: (current)

Some participants believed that the information provided in the videos was futuristic research. Some believed the information might or might not be current based on their needs. They indicated almost the same viewpoints regarding timeliness. The potential audience believed that the academic research could be old.

"… because it's changed every year, every day, so rather than just focusing on an academic, it's fixed data, so maybe it's very old, it's not up to date, this is the point also. But if you are interacting with the people, you will learn exactly what you, what you need and … in the exact time". Prac-2

"I don't think so, because, there is no clear evidence". Prac-7

"I am not sure, I mean it could be current and useful, but there are no examples".
Prac-5

"Well, it is good to know but I don't know if this is new". User-10

Other potential audiences indicated that it could be up to date due to their needs.
Prac-1 and Prac-4 believed that if the information provided could be applied in a
similar context or new for their knowledge then it would be current for their
needs.

"Yes, it is current because, say, for instance, if I'm working on a machine learning
project and now I know, OK, there is an extra bit that I can do for my machine
learning, then yes, it is current, so yes". Prac-1

"Yeah, because actually for me this is the first time I hear about something about
fault prediction performance …" Prac-4

Prac-1 and Prac-3 illustrated that academic research is mostly advanced. They
believed that academic research was futuristic and was working on topics that
industry has not used yet. Furthermore, they indicated that research was novel
and new but will show an impact in the years ahead.

"I think academic research is to do with a lot of … futuristic, it's about … it's a lot to
do with a futuristic approach, so meaning what is possible, the possibilities that are
out there. I think that when you're working, yes, maybe in a few years you will reach
there, but at the moment when you're at work, when you're doing something, you
haven't really reached that academic level of research. So in terms of, say, data
science, so whatever I'm doing right now is say what … if I'm studying, I'm not at PhD
level, so … I'm at a Masters level, but for someone at a PhD level, they are doing
something that is a bit more advanced than what is actually out there in the
industry". Prac-1

"I think they, they are working on something new, but before industry starts using it,
they wait or it is a natural gap. I give you a very good example … of Agile, yeah, it
was, they started discussing late, like late 90s or early 90s and now pretty much

everywhere in the industry it's being used, but it took a while. It wasn't like it wasn't good, it was good, but people didn't have experience with it, didn't know how to use it and now they're using it". Prac-3

As quoted above, some potential audiences were not sure whether or not the information provided was current for their needs due to missing information (i.e. examples and evidence). Others believed that the information provided was current based on their needs.

Seeking information

Most participants did not seek academic literature for their work or needs. Mostly, participants sought online information using search engines (Google in particular) and avoided academic information. Participants indicated that if any academic paper appeared through their Google search they did not read it. They believed that academic papers were time consuming for them to obtain their needs and they did not seek academic papers for every day-to-day activity. They indicated that other online/offline sources were quicker and presented in an easy to understand way.

"So blogs, blogs tends to have good explanations, and forums. So you know if I'm stuck with something, I would probably go into Stackable Flow to look for, if the … if the topic has been discussed before, and if it hasn't, then I will post my own question and other professionals will help me with the answer". Prac-1

"To be honest, I look for information from the real world, for example, if you have products, you will go back to academic literature and know the history of what they are, what research they have. But if you are working as a business, so you need to learn from the market, from the people that are working, rather than just talking about analysis or about research because you are dealing with real things. So the experience will come from just interacting with the people, interacting with the market, interacting what the market needs, because it's changing every year, every day, so rather than just focusing on academic research, it's fixed data, so maybe it's very old, it's not up to date, this is the point also. But, if you are interacting with the people, you will learn exactly what you need and in the exact time". Prac-2

"Nothing specific, so you know what I will do is I'll use key words, look for, you know, look at the Google search based on the key words, and then sometimes they will have good Websites, you know, some online news about Facebook or friends' posts on Facebook". User-10

The previous quotes show that participants of videos do not seek academic papers and they even avoid them. Prac-2 indicated that seeking information from real life was more useful; for example, asking people who were in the same position he currently holds, colleagues, or on the Internet. User-10 indicated seeking information about Facebook randomly by using the Google search engine. There is no specific way to seek information about Facebook; it could be through blogs, YouTube or Websites recommended by friends. Prac-1 illustrated that online blogs and forums presented clear explanations regarding her needs. Prac-1 sought help by writing a question that professionals answered with a clear explanation.

Different opinions of the participants rely on their particular needs; for instance, User-10 was a Facebook user who sought information about Facebook and he did not have a particular approach to seek the information needed. While the other two participants – Prac-2 and Prac-1 – sought information from professional blogs and/or other sources, such as the online news market. Prac-2 indicated that referring the market to academic research did not help to understand the needs of the market.

Many participants of the videos did not seek academic papers either online or offline.

"What we do normally is, let's say we face a problem, a new problem that we haven't solved before, we'll go and research, we'll go and find, Google it, and Google will come back and say a person has already solved that problem, and that problem, solution could come from academia, it can come from another company or like a third party products and we're selling a solution, who will take the cheapest, most efficient solution? And mostly, I would say 90 per cent of the time, it's not going to come from academia. Because when we start looking into Google and we see

132

research paper and then academic stuff, we don't read, we look for a solution, a code or a component or product that we can use straight away. But that's based on my personal experience… What will happen, if I'm looking for a solution to a problem or a new thing to do, I will never go and look into Google Scholar, I will look into Google". Prac-3

"Because it's easily available to find from Websites and Stack Exchange and things like that". Prac-5

"Like sometimes, when I read some things for … I feel like in the abstract that's what I need, but when I read it, like it's OK, he's talking about my point but he's not like, like in deep, he's not talking in deep … They don't like … like give me the solution in a specific description". Prac-4

As stated above, academic papers were not sought by the practitioners. For example, Prac-3 indicated that he would never approach Google scholar when searching for solutions, codes or products. The practitioners were seeking quick and immediate solutions that could be used at the same time. Prac-4 sometimes approached academic papers. He was attracted by the abstracts and read the entire paper; however, the paper did not meet his needs because the sections which described the solutions were not included. Prac-3 sought information that met his needs through available Websites, such as Stack Exchange where question are asked and answered.

Most of the participants were not seeking information from academia, except Prac-4, due to his academic background and/or the short period of time he had been a practitioner. Most participants sought information that provided quick answers and described solutions. This sort of information was found on other Websites, such as blogs and third parties, which provided quick solutions. Each of the participants had their need met mostly through online channels, such as YouTube and professional Websites.

5.6.   Comparison of Academics' and Audiences' Views

This section highlights the differences between what academics think about the information they provided in the videos and what their potential audience actually believed of those videos (refer to Table 5.7). Also, it illustrates the critical IQ dimensions of each group.

Table 5-7: A summary of the vital viewpoints of both participants

IQ dimension	Academics	Potential Audience
Appropriate Amount of Information	The information provided in the video to some extent is appropriate	The important information was not presented in the videos
Format	Easy to follow and understand	The format lacks some critical information needed (i.e. How to apply things presented)
Timeliness	Some issues of previous academic papers are still existed in the real-life	Depends on practitioners' own practical needs

5.6.1. Appropriate amount of information

This IQ dimension is critical and shows how academics and their potential audience assess the information delivered in the video. The academics were not sure what information was needed for their target audience. Some academics believed that most of the critical points of their paper were covered for their potential audience. The academics indicated that the information provided should depend on the needs of the potential audience (e.g. the information provided could attract an audience). However, the potential audience, which was mostly made up of practitioners, could be an audience that needed information to be aware of various matters, or an audience that needed information that explained how to do a particular task. In fact, most of the practitioners believed that the incorrect amount of information was provided and that important information was missing.

Some academics indicated that the videos were clear in presenting the main ideas of the papers. They were aware that their potential audience needed more information; however, they did not know the type of information needed. The

potential audience indicated that the information was introductory and did not meet their needs.

Thus, the different viewpoints of each group indicated ineffective communication between academics and their potential audience, which resulted in a weak mutual understanding. This shows that academics have less knowledge regarding the information needs of their potential audience beyond academia. Obviously, there is lack of communication and interaction between academics and their potential audience beyond academia. The potential audience do not seek academic information and they tend to avoid academic papers while searching online for the information they need.

5.6.2. Format (accessible: tone, style, structure and semantics)

Both academics and their potential audience had different views regarding the format of the videos. Some academics indicated that structure, language, images and video clips used in the videos were important elements that affected the entire understanding of the information provided in the videos. They stated that the videos were easy to follow for everyone, including their potential audience. However, there were some images and video clips that might have confused the potential audience; some indicated that the videos were structured in simple ways that could be followed, especially the questions within each section, and others indicated that the videos had additional sections that were not needed.

Other academics indicated some concerns regarding the images, music and video clips used in the videos. The practitioners highlighted that the videos were lacking some important sections; for example, an introduction of the video content. In fact, a section on how to do things was the most relevant missing section for the practitioners. Thus, academics and their potential audience had different concerns based on their information needs. The format of the videos needs more modifications based on both viewpoints.

5.6.3. Timeliness (current)

In this IQ dimension, the academics were sure that the information they presented in the videos was current and their potential audience could still benefit from it. Some of the academics referred to the timeliness of their research

topics and others referred to the recent citations of the paper, or to their personal experiences and readings. However, the answers of the potential audience showed that each individual had particular needs of information. For example, a paper that presented technology could be implemented in a company that needs this specific technology, and the same technology might be implemented in other companies already.

Some of the academics believed that their work was old but the concept was current and the issue still existed. Others indicated that timeliness relied on the topic itself where the topic was still under research. Moreover, one academic illustrated that the research presented was futuristic and could be used in the future. The answers of the potential audience (mostly practitioners) depended on their own practical needs. Some of the practitioners who were employed, believed that academic research achieved 90 per cent of the work but missed the important part of how to do things, which indicated whether or not the information provided was current.
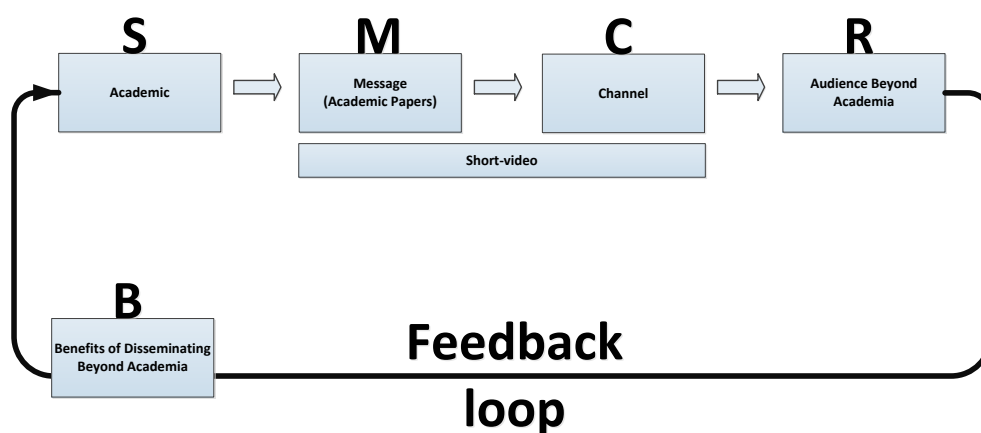
Figure 5.13: The adapted Berlo's model. A feedback loop of a successful communication

As shown above in Figure 5.13, the feedback loop is emerged through the video communication process. The short video developed made the message of the papers more accessible in terms of being understood by audience beyond academia. The benefits that occur from reaching target audience beyond the academic community are depending on the aim of the entire communication. As stated in section 5.5.2, the first benefit is that audiences are enthusiastic to discuss the message of the video by trying contact the original author of the video.

136

The feedback loop is an important element of the entire commutation process which enables a vital communication process between two ends. This feedback loop communication element extents on Berlo's model by highlighting that feedback can influence the elements of the entire communication process particularly, message and channel. This element (i.e. feedback loop) leads to an iterative communication process between the two ends of a given communication which result in a successful communication.

5.7.   Conclusion

This chapter first developed a solution in terms of a method based on the findings and challenges identified in Chapter 4 and then evaluated the method from both perspectives of the academics and the potential audience. While the solution model involved the two critical elements (1) message (i.e. research papers) and (2) channels (i.e. academic journals), it also represented the process of extracting relevant information from research papers into media/videos. The evaluation of the results revealed that the created videos captured valuable insights from both ends of the entire communication process.

CHAPTER 6

6. Discussion

6.1. Introduction

This chapter is based on the literature review and the results of this study. As discussed in Chapter 2 academics are struggling to make their research relevant to practice. The focus of this study is the dissemination and communication of research outputs to audiences/stakeholders beyond academia. Indeed, the findings of this study revealed that scholars from various areas of IS were experiencing difficulty with disseminating and communicating their research outputs to potential audiences/stakeholders beyond the academic community. This chapter discusses the views of both the academics and the potential audiences/stakeholders beyond academia. In addition, the research framework (see Figure 2.8 in page 46) and the proposed solution (see section 5.3.1) are discussed within the results of this study. This chapter is organised as follows: section 6.2 discusses the findings of this study (i.e. the target audiences/stakeholders, the barriers to disseminating research outputs beyond academia, the channels used by academics and the benefits of disseminating beyond the academic community); section 6.3 details the proposed solution and its assessment dimensions; and finally, section 6.4 illustrates the importance of this study.

6.2. The Findings of this Study

The findings of this study suggest that academics need to understand the entire communication process between them and their target audience. They must consider the critical role each element of communication plays in such a communication process from the sender (i.e. the academic) to the receiver (i.e. the potential audience) and back to the sender through the feedback loop. This study differentiates itself from literature relevant to IS research in that it investigated this phenomenon from the communication process perspective, which included an empirical study. The research framework (i.e. Berlo's communication model) provided clear insights and explanations of the academics' dissemination process beyond the academic community. The

approach of using a communication model helped this study to take a step further than prior IS research studies and illustrated the critical elements of the entire process of distributing and communicating research outputs beyond the academic community.

6.2.1. Target audiences and stakeholders

The author's findings suggest that there are many different audiences/stakeholders beyond academia that could benefit from this research. Such audiences/stakeholders are related to a particular topic of research. For example, potential audiences/stakeholders beyond academia include the government, SMEs, for-profit and non-profit companies and medical professions. Each group was identified based on the research area, such as computational biology, big data and business management (see Table 4.2 in section 4.2). These findings confirm the discussion in section 2.6, which highlighted the diversity of audiences and stakeholder groups within IS research areas (Looney *et al.,* 2014; Lnanamaki *et al.,* 2011; Khzanachi & Munkvold, 2001). Therefore, stakeholders beyond academia within different contexts can, to some extent, benefit from this type of research.

The findings of this study reveal that academics do not know the process of how their potential audiences/stakeholders beyond academia seek information or the way they understand information (see section 5.7). As mentioned in the literature, it has been argued that university intellectuals are isolated from industries and audiences beyond academia (e.g. Lang, 2003). The lack of interaction between academics and practitioners is claimed to be a critical element that makes research irrelevant to practitioners (Lanamaki *et al.,* 2011). This indicates that academics need to investigate the comprehension process of their potential audiences beyond academia to communicate successfully. These findings contribute to the debate of research relevancy issues by providing empirical results concerning academics' perspectives of their potential audience.

Additionally, potential audiences/stakeholders of this study seek information; they avoid obtaining and reading scholarly articles perhaps because of seemingly irrelevant information and the academic style of research papers. These findings

confirm the claim of Pearson *et al.* (2005) and others, that audiences/stakeholders beyond academia, particularly practitioners, do not read academic papers (section 2.4). While the findings of this work confirm the abovementioned studies, it expands on them by illustrating that potential audiences/stakeholders also believe that academics research topics of future interest (section 5.5.2), and this finding contributes to the field.

As illustrated in section 2.10, Berlo's communication model depicts the importance of the relationship between the sender and the receiver. Additionally, Berlo emphasises that the two ends cannot be separated in a communication process where the receiver is the most important element. The findings of this study suggest that academics need to understand the process of how their target audience receives and understands information and academic research. These findings also contradict Berlo's claim that the receiver is the most important element of the communication process by suggesting that potential audiences/stakeholders beyond academia have limited influence on academics to write their research findings in other styles than their academic papers. The limited influence is due to the social and cultural system that appears in this study as barriers to disseminate research outputs beyond academia (section 4.8). These findings do not mean the receiver is unimportant; rather, they show that academic policy is the element that most influences scholars' dissemination behaviour. With that as the background, the next section discusses barriers to dissemination.

6.2.2. Barriers to disseminate research outputs beyond academia

The findings of this research also illustrate that academic policy, to some extent, is an obstacle for academics to disseminate and communicate their research outputs beyond the academic community. The author's findings suggest that academics are not given incentives by their university to distribute and communicate their research outputs beyond academia. The academic institution does not consider other dissemination or communication activities, such as social networks (e.g. LinkedIn). In addition, promotion criteria contain unclear mechanisms regarding whether they include other dissemination activities. Additionally, this author's findings reveal that scholars are occupied by academic

duties (i.e. teaching, research and administrative tasks); thus, they cannot perform extra activities to disseminate or communicate their research outputs beyond academia.

Regardless of the recent changes to REF assessments, the REF is yet another of the concerns that reinforces academics' need to focus on producing high-quality papers; indeed, the use of varying dissemination activities is not assessed by the REF. These findings support Lanamaki *et al.*'s (2011) suggestions that higher education or academic institutions need to recognise all outlets and channels that effectively circulate research outputs used by academic researchers. Academic institutions also need to encourage researchers to conduct outreach to share their research outputs with their target audience (Lanamaki *et al.,* 2011; Lang, 2003; Moody, 2000; Westfall, 1999).

Surprisingly, the findings of this study extend beyond the above studies by demonstrating that scholars receive no support from their university to distribute their research outputs beyond academia. The findings indicate that academics require training on how to publicise their work through effective channels and how to use technological tools for dissemination purposes. This can be explained with the reality that university policies strongly influence the way that scholars disseminate and communicate their research outputs beyond academia. According to this research, many academics are enthusiastic about disseminating and communicating their work beyond the usual realm, subject to rewards and incentives.

The findings of this research indicate that the social and cultural system is the most influential element of Berlo's communication model within this study. It is institutional policy that universities' academics teach and publish papers in high-ranked journals. Changes that encourage these people to disseminate and communicate their research outputs beyond academia might influence the academics' selection of dissemination channels and the way they write for potential audiences beyond academia.

6.2.3. Channels (dissemination effectiveness)

Regarding this topic, the author' findings suggest that few researchers successfully disseminate their research outputs through non-academic online and offline channels. For example, academics tend to do workshops and seminars for non-academic audiences to distribute their research outputs widely; however, few academics have been successful. This study's findings indicate that the use of non-academic offline channels rather than academic channels, such as workshops, are effective for a few academics to circulate and communicate their research outputs because they are unfamiliar with various effective online dissemination channels.

These findings confirm Fry *et al.*'s (2009) conclusions that academic researchers in the UK are inactive users of online channels and technological Web 2.0 tools, such as online social media. Academics need to take advantage of using online channels to disseminate and communicate their research outputs widely (Fry *et al.,* 2009; Lang, 2003; Ho, 2000). While these findings confirm the previous studies', it expands on them by illustrating that academics are limited in terms of communication skills, and they are unfamiliar with online channels such as Web 2.0 technology (see sections 4.4 and 4.5). The pressure of the REF and the academic institution to produce high-quality papers might be the reason behind scholars' limited communication skills.

One reason that perhaps explains this issue is that academics are strongly influenced by academic policy (i.e. University and REF), which motivates them to distribute their work through academic journals, as mentioned in section 6.2.2. This does not mean the academic value of work should be decreased or peer-reviewed papers replaced; instead, effective dissemination channels and communication skills should be included in academic policy.

These findings suggest that the timeline of the traditional review process of academic papers needs to be reduced to keep research up to date. As mentioned previously, the traditional review process takes a long time before actual publication (Rosemann & Recker, 2009; Lang, 2003; Kock *et al.,* 2002). These findings confirm and extend previous studies by demonstrating that the

potential audience of this study believes that academic papers might contain outdated or futuristic research topics, which can be explained by the long review process of academic papers, especially in the field of technology. This might be the critical reason to accept that some academic papers are not timely for potential audiences beyond the academic community.

In addition, academic channels require a particular style and language. As mentioned in section 2.5, practitioners find academic papers difficult to understand due to the esoteric language and the academic style used by researchers (Tax, 2014; Finch, 2012; Gill, 2008; Pearson *et al.,* 2005; Lang, 2003; Senn, 1998). My findings confirm the previous studies and expand on them by illustrating that scholars are aware of their potential audience beyond academia, but they do not know the ways their potential audience seeks and understands information.

As Berlo's communication model highlighted, the channel is a critical element of the communication process, which affects the fidelity of the message and the entire communication process. The results of this study suggest that the entire communication process is influenced by the channel selection of the academics. Academics need to address the potential channels that their target audience uses. In this study, it is clear that academic policy affects the researchers' selection of channels.

6.2.4. Benefits of disseminating research beyond academia (feedback)

The findings suggest that researchers receive feedback while disseminating and communicating their research outputs to audiences beyond the academic community. For example, the communication allows academics to identify industries' real issues. In addition, clear communication with the target audience provides a better understanding of how an industry works and how decisions are made. Moreover, it allows academics to evaluate their outputs in real-life situations to address significant elements of research.

The findings of this study reveal that researchers appreciate the feedback of their potential audience beyond academia. They also believe that reaching an audience beyond academia enables them to have a positive impact on society and

143

increases their reputation in their research field. The research impact is one of the benefits that has been highlighted by academics as a valuable advantage reflecting on their career advancement. Academics are keen to publicise their research outputs to a target audience beyond academia, subject to the barriers discussed in section 6.2.2, which show that the academic promotion system needs to be reviewed and that a clear mechanism regarding academic promotions and rewards for career advancement be established.

As mentioned in section 2.7, academics should create a closer relationship with practitioners with collaborative work to make their research more relevant to practice (Lanamaki *et al.,* 2011; Benbasat & Zmud, 1999; Senn, 1998; Robey & Markus, 1998). The findings of this work expand on these studies by demonstrating that researchers are aware of the benefits of reaching a target audience beyond the academic community. Additionally, scholars strongly believe divergent audiences could benefit from their work, including the government and, simultaneously, the business sector. Accordingly, scholars are more likely to increase their communication skills for outreach beyond academia.

This study extends Berlo's model by illustrating the significance of the feedback loop, which generates benefits for academics and their research field. Moreover, it illustrates the different online and offline channels through which that feedback loop can occur. The feedback loop is a critical element of this study's communication process, in which the evaluation and impact of research is captured. However the impact is not necessarily practical. As discussed in section 2.8, that impact can be defined as awareness so the audience will be aware of research outputs.

6.3. Additional Dissemination Methods of Academic Papers (Videos)

As stated in section 5.4.2, information quality dimensions are applied to answer Benbasat and Zmud's accessible dimension of a research paper (i.e. research papers are understood by practitioners in terms of tone, style, structure and semantics). The information quality dimensions applied in this study illustrate

the ability to indicate both participants' (i.e. academics' and the potential audience's) viewpoints of the videos developed as the solution of this study.

As the focus of this study is on the dissemination of research papers to non-academics, the author created a video that represents a research paper that is easy for a non-academic audience to understand to disseminate research outputs more widely. The three IQ dimensions that were applied (i.e. appropriate amount of information, format and timeliness) indicate the varying views of both participants.

The author indicated earlier that the appropriate amount of information dimension demonstrates that it is important to consider the balance between the information provided and the information needed (Pipion *et al.,* 2002). The findings of this study show that it is a complicated process to balance the information provided in the video and the information needed by the potential audience beyond academia due to the different information needs of the practitioners. It also appears that academics and their potential audience have diverging views regarding the amount of information provided in the video.

The practitioners did not consider the information provided as being appropriate for their needs because of missing information, including the prescription of how to do things or how to apply the solution to their task. Meanwhile, the academics believed the amount of information provided in the videos was appropriate to attract their potential audience beyond academia to seek the source or its author. This fact can be explained by videos leading to better communication between researchers and their potential audience beyond academia, particularly practitioners, to gain the potential benefits discussed in section 6.2.4.

The format dimension also indicates that the content of the videos helps the potential audience beyond the academic community to better understand the message of an academic paper through a combination of words, images, video clips and music. These findings confirm Scott's (1994) claim that visual information provides a direct cognitive impact that allows individuals to receive information with better understanding regarding actions, concepts and

metaphors. The findings also confirm Mehrabian's (1981) results: that the human brain receives images and visual information concurrently.

This study contributes to its field by demonstrating that potential audiences beyond academia understand the content of videos, with some comments regarding the number of sections (section 5.5.2). Thus, academics could perform other activities, such as using online platforms to enable their research outputs to be understood by potential audiences beyond academia, which can be activated subject to the university promotion system. In other words, academics would find it desirable to perform other activities to propagate and communicate their research outputs if institutions recognised these activities as part of their promotion system.

The timeliness dimension is an important part of a research paper because these findings suggest that some topics are useful to audiences beyond academia. Moreover, findings suggest that audiences are assessors of whether the academic paper's outputs are germane to their needs. These findings support Khazanchi and Munkvold's (2001) suggestion, that the time frame of an academic paper is critical, which means a paper that is relevant in a particular time frame could be less relevant over time. Such results support Khan *et al.*'s (2002) claim that the quality of a product or service is only assessed by the perception of a user that relies on their needs (section 5.4.1). The short videos are considered as information products that represent specific information regarding one academic paper, and the potential audience is the only assessor of these videos regarding understanding and the value of the information in meeting their needs.

The above critical aspects help to answer the research question: How can IS researchers better disseminate and communicate their research outputs to potential audiences beyond academia? The audiences/stakeholders in this study appear as a vital element that academics should consider when distributing or communicating their research outputs. The academics' awareness of target audience/stakeholder characteristics influences the way they write or speak to the audience beyond the academic community. Additionally, the target audiences/stakeholders impact academics' selection of online and offline

channels to deliver their research outputs to them. In the light of Berlo's communication model, the receiver element in this work (i.e. audiences/stakeholders) has less influence on the source's (i.e. academic) selection of channel (i.e. online and offline) and how the source shapes the message to the receiver.

Another critical element that emerged in this study is the academic promotion system, which strongly directs academics' selections of online and offline channels, such as academic journals and conference proceedings. Academics are concerned with their career advancement, which highly recognises duties such as research, teaching and administrative work. Considering Berlo's communication model, the social and cultural system (i.e. academic policy) is the most influential element of the source's selection of channels and how the source shapes the message to the receiver. This element can persuade academics to consider audiences/stakeholders beyond the academic community as a critical element when distributing and communicating their work beyond academia. Such a factor could positively influence academics' communication skills and increase their awareness of different online dissemination activities, such as writing blog posts and creating videos.

6.4.   Conclusion

This chapter discussed the critical findings of this study and demonstrated the similarities and differences compared with previous studies.

CHAPTER 7

7. Conclusion

7.1. Introduction

This chapter concludes the overall research undertaken and summaries the critical aspects of this study. This study investigated how and why academics disseminate and communicate their research outputs beyond the academic community. It illustrated a method for academics to disseminate and communicate research outputs to a non-academic audience. This chapter is organized as follows: section 7.2 reflects the objectives of this study; section 7.3 demonstrates the contribution of this study to the communication model and to knowledge; section 7.4 illustrates why this study is important; section 7.5 determines the limitations; and section 7.6 explains the future work recommended as a result of this study.

7.2. Research Summary

This study has investigated the dissemination of research outputs from a communication perspective. It aims to develop an effective communication method to improve the dissemination of IS research to potential audiences beyond academia. Four objectives were listed applied to achieve the purpose of the study as follows:

Objective 1:

This study in Chapter 2 described the definition of the IS discipline and its diverse research topics. The dimensions of relevance were also illustrated within the IS domain. Moreover, the barriers that limit IS academics to disseminate and communicate beyond academia were scrutinised. For example, section 2.4 described the challenges that academics faced to communicate with the audience beyond the academic community through academic papers. Chapter 2 also, provided suggestions of how to be more relevant to practice and to an audience beyond academia. Then, the importance of communication and its elements were illustrated. Based on the literature, the gap was framed in four aspects that were investigated.

Chapter 7: Conclusion

Objective 2:

This study in Chapter 4 scrutinised the interview data from a communication perspective using the research framework introduced in section 2.10. The academics highlighted three main barriers that limit them to disseminate and communicate their research outputs beyond academia. These barriers were the message (i.e. structure and academic language), channel (i.e. dissemination effectiveness), and social and the cultural system (i.e. lack of incentives, lack of time and lack of support). Moreover, the academics also highlighted the dynamic role of feedback in their communication with the audience beyond academia.

Objective 3:

In this study Chapter 5 presented how the short videos (i.e. method of disseminating and communicating research outputs beyond academia) were developed. Communication processes of information were described with its two elements namely, information processing and information transmission. The short videos were developed based on the literature in Chapter 2 and the experience of learning styles. Then, the development of the dissemination method was described in detail.

Objective 4:

In Chapter 5 the developed short videos were evaluated by two groups which were academics (i.e. the authors of the short videos) and the potential audience of the short videos. Three Information Quality assessments were used to evaluate the short videos (i.e. appropriate amount of information, format, and timeliness). Moreover, the differences viewpoints of academics and their potential audience were discussed.

The achievement of the above objectives led to answering the research question: How can IS researchers better disseminate and communicate their research outputs to potential audiences beyond academia? Academics must consider their target audience as the critical element of the entire communication process. The audience information seeking behaviour is the vital element which affects the way academics treat a message and what channel academics must select to deliver their message to the target audience beyond academia successfully.

7.3.   Contributions

This study adapted Berlo's model of communication to the modern IS context. This adaptation has extended Berlo's communication model by demonstrating a feedback loop (Figure 7.1) as a critical element of the communication process. This feedback loop enables communication between the sender and receiver to be an iterative process (refer to Chapter 6 for more detail). The feedback loop affects the way a sender processes messages and his/her selection of channels to ensure the message is clearly delivered to the receiver through an appropriate channel.
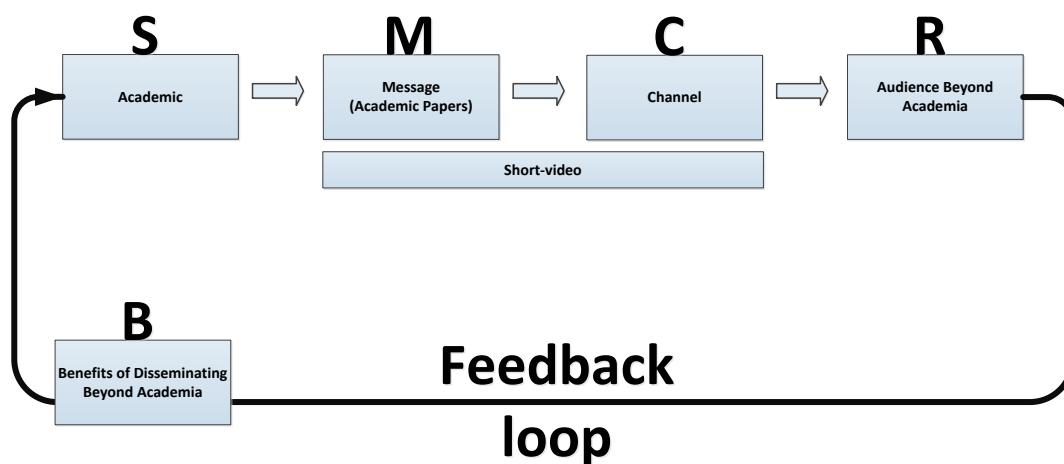
Figure 7.1: A method to disseminate and communicate research outputs beyond academia

Based on Berlo's (1960) communication process, this study has highlighted a list of vital elements that should be considered when disseminating and communicating research outputs to non-academics. At an institution level, the social and cultural system must be a supportive element to help academics to disseminate their research outputs beyond academia. At an individual level, academics must discover how their potential audience beyond academia understands information. Moreover, academics must know the preferable channels that their potential audiences use.

This study provides new empirical evidence (see Table 2.1 Section 2.4) of the use of videos for the dissemination of research. The findings of this study are based on empirical data that represents academics and their potential audience's viewpoint regarding the dissemination of academic research outputs. Particularly, the dissemination of research outputs beyond academia from the

academics' perspective. A method was developed to produce a short video that represents and summarizes a particular academic research paper. Ten short videos were developed where each short video represents a specific academic paper. Five videos were evaluated empirically by academics (i.e. the author of each video) and their potential audience beyond the academic community, such as the practitioners.

Additionally, this study contributes to the field by providing an explanation of how academics disseminate their research outputs to a non-academic audience from a communication perspective. It provides the viewpoint of the potential audience beyond academia regarding the information needed from academic research, and each non-academic community has its specific information needs.

This study also shows the differences between academics and their potential audience beyond the academic community regarding what information needs to be presented in short videos. The potential audience beyond academia demonstrated the way they seek information and how they would like to receive information from academic research papers.

7.4.   Why this Study is Important

This study provides empirical data concerning the academics' and their potential audience's perspectives, which expand on the research's relevance. The dissemination of research outputs is explained in depth by providing an understanding of the significant elements of the entire process of communication when disseminating beyond the academic community. Particularly, this study investigated the distribution of research outputs from a communication perspective that maps the entire communication process of academics when disseminating their research outputs.

This study has attempted to create a solution to make a dynamic communication process between academics and their potential audience beyond the academic community. The developed short videos and their assessment dimensions provide critical insights into how to shape a message (i.e. research outputs) to audiences beyond academia, and to consider the selection of channels as an important element of delivering a message.

7.5. Limitations

This study has been limited by several aspects that should be acknowledged.

First, this study was mostly focused on academics and how they communicate their research outputs beyond academia. However, it may be possible to focus on both academics and their target audience to gain a better understanding of the entire communication process. Additionally, another possible limitation might be that the data of this study was generated from a single academic department, the generalisability of findings to other academic departments or contexts may be limited.

Second, the sample size of both academics and potential audience was a limitation in this study as follow:

- **Academic**: it was difficult to arrange interview meetings with academics due to their academic duties, which resulted in delaying the interviews at least once. The academics were representing a single academic department in the United Kingdom; thus, the results cannot be generalized. Moreover, academics did not want to participate because of the topic and many did not want to be filmed. There were difficulties in arranging interview meetings for phases 1, 2 and 3 for many different reasons, which varied from one academic to the other, such as duties of their academic career that filled their time schedule.

- **Potential audience**: it was difficult to find a potential audience for each short video due to the different communities of the potential audience. In addition, the assessment of the short videos was varying based on potential audience context (e.g. business sector). The short videos were self-selected by the audience during the evaluation phase. It would be better to launch the videos online (e.g. YouTube) to reach wider audience by applying quantitative methods. Also, YouTube allows users to comment under each video which helps to analyse these comments for better understanding the viewpoint of wider potential audiences.

Third, the short video development needed an experienced video developer to produce more professional-style videos. It could be possible to involve a

professional video editor to produce a better short video of an academic paper. Also, the researcher can attend training courses to be able to edit and produce a short video.

It may be possible to apply quantitative methods and tools such as survey; this method can collect more data and increase the sample size. Online surveys can reach both academics and potential audiences to gain a wider view of this study. Also, it may be better to adapt information-seeking behaviour theory for the potential audience of academics to gain a better understanding of how they seek for information and understand it.

7.6.   Future Work

This study investigated the barriers that sustain the gap between academics and their potential audience beyond the academic community. It also created a solution to build better communication between the two ends. Future research can build upon the findings of this work by investigating the communication skills of academics and the channels used to disseminate and communicate their research outputs beyond academia. In addition, further work is needed to better understand the communication process between academics and the audience of academic research beyond academia. Another possible research area would be to investigate how the feedback loop of such communication could dynamically improve the understanding between academics and their non-academic audience. Researchers could build upon the findings of this study by expanding the communication models to develop a solid basis of communication between the two ends.

Future work could also investigate the way that the potential audience (e.g. practitioners) of academic research seek information by applying different methods and theories, such as information-seeking behaviour. Furthermore, researchers could build upon the findings of this study by expanding on the practical videos that were developed.

More research is required to investigate how the academic system and career advancement could encourage academics to disseminate and communicate their

research outputs wisely. It would be interesting to compare videos with other online channels, such as Twitter and other platforms.

REFERENCES

Adler, R.B. and Rodman, G.R. (2006) *Understanding human communication.* Oxford University Press.

Afridi, M.J. and Farooq, M. (2011) 'OG-miner: An intelligent health tool for achieving millennium development goals (MDGs) in m-health environments', *System Sciences (HICSS), 2011 44th Hawaii International Conference on.* IEEE, 1-10.

Agarwal, R. and Lucas Jr, H.C. (2005) 'The information systems identity crisis: Focusing on high-visibility and high-impact research', *MIS quarterly,* , pp. 381-398.

Alter, S. (2008) 'Defining information systems as work systems: implications for the IS field', *European Journal of Information Systems,* 17(5), pp. 448-469.

Alter, S. (2001) 'Recognizing the relevance of IS research and broadening the appeal and applicability of future publications', .

Avgerou, C., Siemer, J. and Bjørn-Andersen, N. (1999) 'The academic field of information systems in Europe', *European Journal of Information Systems,* 8(2), pp. 136-153.

Bailey, J.E. and Pearson, S.W. (1983) 'Development of a tool for measuring and analyzing computer user satisfaction', *Management science,* 29(5), pp. 530-545.

Ballou, D.P. and Pazer, H.L. (1995) 'Designing information systems to optimize the accuracy-timeliness tradeoff', *Information Systems Research,* 6(1), pp. 51-72.

Baskerville, R.L. and Myers, M.D. (2002) 'Information systems as a reference discipline', *Mis Quarterly,* , pp. 1-14.

Bassey, M. (1999) *Case study research in educational settings.* McGraw-Hill Education (UK).

Benbasat, I. and Zmud, R.W. (2003) 'The identity crisis within the IS discipline: Defining and communicating the discipline's core properties', *MIS quarterly,* , pp. 183-194.

Benbasat, I. and Zmud, R.W. (1999) 'Empirical research in information systems: the practice of relevance', *MIS quarterly,* , pp. 3-16.

Berlo, D.K. (1960) 'The process of communication: An introduction to theory and practice'.

Bhattacherjee, A. (2001) 'Understanding and evaluating relevance in IS research', *Communications of the Association for Information Systems,* 6(1), pp. 6.

Bovy, R.C. (1981) 'Successful instructional methods: A cognitive information processing approach', *ECTJ,* 29(4), pp. 203-217.

Boyatzis, R.E. (1998) *Transforming qualitative information: Thematic analysis and code development.* Sage.

Brannen, J. (2002) 'The use of video in research dissemination: Children as experts on their own family lives', *International Journal of Social Research Methodology,* 5(2), pp. 173-180.

Braun, V. and Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative research in psychology,* 3(2), pp. 77-101.

References

Breckler, S.J. and Wiggins, E.C. (1989) 'Affect versus evaluation in the structure of attitudes', *Journal of experimental social psychology,* 25(3), pp. 253-271.

Buckingham, R.A., Hirschheim, R.A., Land, F.F. and Tully, C.J. (1986) 'Information systems curriculum: a basis for course design', *Information systems education: recommendations and implementation.* Cambridge University Press, 14-133.

Buşu, O. (2014) 'Difficulties of unitary understanding of the social communication', *International Letters of Social and Humanistic Sciences (ILSHS),* 19, pp. 8-16.

Byron, K. (2008) 'Carrying too heavy a load? The communication and miscommunication of emotion by email', *Academy of Management Review,* 33(2), pp. 309.

Calloway, L.J. (2011) 'Teaching Sustainability Concepts: Information and Communications Technologies and the United Nations Millennium Development Goals', .

Carvalho, J.A. (2000) 'Information System? Which one do you mean?', in *Information system concepts: an integrated discipline emerging.* Springer, pp. 259-277.

Chandler, D. (1994) 'The transmission model of communication', *University of Wales, Aberystwyth.Online: http://www.aber.ac.uk/media/Documents/short/trans.html,* .

Chen, W. and Hirschheim, R. (2004) 'A paradigmatic and methodological examination of information systems research from 1991 to 2001', *Information systems journal,* 14(3), pp. 197-235.

Chua, W.F. (1986) 'Radical developments in accounting thought', *Accounting review,* , pp. 601-632.

Cobley, P. and Schulz, P.J. (2013) *Theories and models of communication.* Walter de Gruyter.

Coldevin, G. (2003) 'Participatory communication: a key to rural learning systems. Communication for Development', .

Coldevin, G. (2001) 'Participatory communication and adult learning for rural development: Gary Coldevin in collaboration with the communication for development group, food and agriculture organization (fao) of the united nations', *Journal of International Communication,* 7(2), pp. 51-69.

Collins, E. and Hide, B. (2010) 'Use and relevance of Web 2.0 resources for researchers', *Publishing in the Networked World: Transforming the Nature of Communication 14th International Conference on Electronic Publishing.* , 271-289.

Compesi, R. (2015) *Video field production and editing.* CRC Press.

Conboy, K., Fitzgerald, G. and Mathiassen, L. (2012) 'Qualitative methods research in information systems: motivations, themes, and contributions', *European Journal of Information Systems,* 21(2), pp. 113-118.

Cranefield, J. and Yoong, P. (2007) 'To whom Should Information Systems Research Be Relevant: The Case for an Ecological Perspective.', *ECIS.* , 1313-1324.

Crosby, P.B. (1996) *Quality is still free: making quality certain in uncertain times.* McGraw-Hill Companies.

Crosby, P.B. (1992) *Completeness: Quality for the 21st century.* Penguin.

References

Dancyger, K. (2014) *The technique of film and video editing: history, theory, and practice.* CRC Press.

Davenport, T. (1997) 'Storming the Ivory Tower: Universities and companies need to learn to work together better', *CIO-FRAMINGHAM MA-,* 10, pp. 38-41.

Dawkins, S. and Wynd, I. (2009) *Video production: putting theory into practice.* Palgrave Macmillan.

Dennis, A.R. (2001) 'Relevance in information systems research', *Communications of the Association for Information Systems,* 6(1), pp. 10.

Dennis, A.R., Fuller, R.M. and Valacich, J.S. (2008) 'Media, tasks, and communication processes: A theory of media synchronicity', *MIS quarterly,* 32(3), pp. 575-600.

Denzin, N.K. and Lincoln, Y.S. (2011) *The SAGE handbook of qualitative research.* Sage.

Desouza, K.C., El Sawy, O.A., Galliers, R.D., Loebbecke, C. and Watson, R.T. (2006) 'Beyond rigor and relevance towards responsibility and reverberation: Information systems research that really matters', *Communications of the Association for Information Systems,* 17(1), pp. 16.

Dillard, J.P. (1993) 'Persuasion past and present: Attitudes aren't what they used to be', *Communications Monographs,* 60(1), pp. 90-97.

Dobbins, M., Ciliska, D., Cockerill, R., Barnsley, J. and DiCenso, A. (2002) 'A framework for the dissemination and utilization of research for health-care policy and practice', *Worldviews on Evidence‐based Nursing presents the archives of Online Journal of Knowledge Synthesis for Nursing,* 9(1), pp. 149-160.

Doll, W.J. and Torkzadeh, G. (1988) 'The measurement of end-user computing satisfaction', *MIS quarterly,* , pp. 259-274.

Erickson, F. (1985) 'Qualitative Methods in Research on Teaching. Occasional Paper No. 81.', .

Eunson, B. (2012) *Communicating in the 21st Century, Google eBook.* John Wiley & Sons.

Ezenwa, C. and Brooks, L. (2013) 'Using Mobile Technology to Facilitate the Health Agenda in Nigeria: Issues and Opportunities', *Proceedings of the UK Academy for Information Systems Conference.*

Finch, J. (2012) 'Accessibility, sustainability, excellence: how to expand access to research publications. Report of the Working Group on Expanding Access to Published Research Findings', .

Fitzgerald, B. (2003) 'Informing each other: Bridging the gap between researcher and practitioners', .

Fry, J., Oppenheim-DIS, C., Creaser, C., Johnson, W., Summers, M., White-LISU, S., Butters, G., Craven, J., Griffiths, J. and Hartley-CERLIM, D. (2009) 'Communicating knowledge: How and why researchers publish and disseminate their findings', *Supporting paper,* 4.

Gallagher, C.A. (1974) 'Perceptions of the value of a management information system', *Academy of Management Journal,* 17(1), pp. 46-55.

References

Galliers, R. (1991) 'Choosing appropriate information systems research methodologies: a revised taxonomy', *Information Systems Research: Contemporary Approaches and Emergent Traditions.Amsterdam: North Holland,* .

Gallivan, M. and Aryal, A. (2012) 'Under What Conditions is IS Research Relevant to Practice? An Analysis of IS Scholars Who Are Mentioned or Cited Often in Trade Magazines and the General Media', .

Gill, G. (2008) 'The single client resonance model: Beyond rigor and relevance', *Informing Science: International Journal of an Emerging Transdiscipline,* 11, pp. 281-310.

Gill, G. and Bhattacherjee, A. (2009) 'Whom are we informing? Issues and recommendations for MIS research from an informing sciences perspective', *MIS Quarterly,* , pp. 217-235.

Gill, G. and Bhattacherjee, A. (2007) 'The informing sciences at a crossroads: The role of the client', *Informing Science,* 10, pp. 17.

Glaser, B.G. and Strauss, A.L. (2009) *The discovery of grounded theory: Strategies for qualitative research.* Transaction publishers.

Glass, R.L. (1997) 'Revisiting the industry/academe communication chasm', *Communications of the ACM,* 40(6), pp. 11-14.

Gregor, S. (2006) 'The nature of theory in information systems', *MIS quarterly,,* pp. 611-642.

Guba, E.G. (1990) *The paradigm dialog.* Sage Publications.

Haddow, G. (2011) 'Communicating research to practice: The role of professional association publications', *Library and Information Research,* 34(108), pp. 33-44.

Haddow, G. (2010) 'Communicating marketing and advocacy research to practice', *World Library and Information Congress: 76th IFLA General Conference and Assembly.* , 10-15.

Haddow, G. and Klobas, J.E. (2005) 'Communication of research to practice in library and information science: Closing the gap', *Library & Information Science Research,* 26(1), pp. 29-43.

Hamilton, M.A. and Nowak, K.L. (2005) 'Information systems concepts across two decades: An empirical analysis of trends in theory, methods, process, and research domains', *Journal of Communication,* 55(3), pp. 529-553.

Harel, D. (1994) 'Will I be pretty, will I be rich?: some thoughts on theory vs. practice in systems engineering', *Proceedings of the thirteenth ACM SIGACT-SIGMOD-SIGART symposium on Principles of database systems.* ACM, 1-3.

Hassan, N.R. (2014) 'Value of IS research: Is there a crisis?', *Communications of the Association for Information Systems,* 34, pp. 801-816.

Hassan, N.R., Nunamaker Jr, J.F., Benbasat, I., Briggs, R.O. and Mueller, B. (2013) 'Benefitting from IS Research--Who and How? A Panel on the Value of IS Research', .

Heart, T. and Pliskin, N. (2001) 'Making Academic IS Research More Relevant to Industry Via Open-Architecture Models for Career Paths in Academia', *Communications of the Association for Information Systems,* 6(1), pp. 12.

HEFCE, S. and HEFCW, D. (2012) *Assessment framework and guidance on submissions,* .

References

Hidding, G.J. (2012) 'Information Systems as a Professional Discipline: Focus on the Management of Information Technology', *Journal of Organizational Computing and Electronic Commerce,* 22(4), pp. 347-360.

Ho, J.K. (2000) 'Bridging academic research and business practice with the new media', *Information Resources Management Journal,* 13(2), pp. 6.

Jakobson, R., Pomorska, K. and Rudy, S. (1987) *Language in literature.* Harvard University Press.

Juran, J.M. (1988) *Juran on planning for quality.* Free Press New York.

Kahn, B.K., Strong, D.M. and Wang, R.Y. (2002) 'Information quality benchmarks: product and service performance', *Communications of the ACM,* 45(4), pp. 184-192.

Kaplan, B. and Maxwell, J.A. (2005) 'Qualitative research methods for evaluating computer information systems', in *Evaluating the organizational impact of healthcare information systems.* Springer, pp. 30-55.

Kavan, C.B. (1998) 'Profit through knowledge: the application of academic research to information technology organizations', *Information Resources Management Journal (IRMJ),* 11(1), pp. 17-22.

Khazanchi, D. and Munkvold, B.E. (2001) 'Expanding the notion of relevance in IS research: A proposal and some recommendations', *Communications of the Association for Information Systems,* 6(1), pp. 14.

Klein, G., Jiang, J. and Saunders, C. (2006) 'Leading the horse to water', *Communications of the Association for Information Systems,* 18(1), pp. 13.

Kock, N., Gray, P., Hoving, R., Klein, H., Myers, M.D. and Rockart, J. (2002) 'IS research relevance revisited: Subtle accomplishment, unfulfilled promise, or serial hypocrisy?', *Communications of the Association for Information Systems,* 8(1), pp. 23.

Kohli, R. (2001) 'Industry-Academia Interaction: Key to IT Relevance', *Communications of the Association for Information Systems,* 6(1), pp. 15.

Lanamäki, A., Stendal, K. and Thapa, D. (2011) 'Mutual informing between IS Academia and Practice: Insights from KIWISR-5', AIS.

Lang, M. (2003) 'Communicating academic research findings to IS professionals: An analysis of problems', *Informing Science,* 6, pp. 21-29.

Lang, M. (2002) 'On the dissemination of IS research findings into practice', *Proceedings of the Informing Science IT Education Conference.*

Lee, A.S. (1999) 'Rigor and relevance in MIS research: Beyond the approach of positivism alone', *Mis Quarterly,* , pp. 29-33.

Lee, Y.W., Strong, D.M., Kahn, B.K. and Wang, R.Y. (2002) 'AIMQ: a methodology for information quality assessment', *Information & management,* 40(2), pp. 133-146.

Levie, W.H. and Lentz, R. (1982) 'Effects of text illustrations: A review of research', *ECTJ,* 30(4), pp. 195-232.

Lie, R. and Mandler, A. (2009) *Video in development: Filming for rural change.* CTA.

References

Lincoln, Y.S., Lynham, S.A. and Guba, E.G. (2011) 'Paradigmatic controversies, contradictions, and emerging confluences, revisited', *The Sage handbook of qualitative research,* 4, pp. 97-128.

Loebbecke, C., Feeny, D., Weill, P., Jarke, M., Kambil, A. and Filos, E. (2003) 'Different IS Research Communities: Are They Competitors, Complements, or Ignoring Each Other?', *The Communications of the Association for Information Systems,* 11(1), pp. 37.

Lomas, J. (1991) 'Words without action? The production, dissemination, and impact of consensus recommendations', *Annual Review of Public Health,* 12(1), pp. 41-65.

Looney, C.A., Firth, D., Koch, H., Cecez-Kecmanovic, D., Hsieh, J.P., Soh, C., Valacich, J.S. and Whitley, E.A. (2014) 'The credibility crisis in IS: a global stakeholder perspective', *Communications of the Association for Information Systems,* .

MacInnis, D.J. and Price, L.L. (1987) 'The role of imagery in information processing: Review and extensions', *Journal of consumer research,* 13(4), pp. 473-491.

Marshall, M.N. (1996) 'Sampling for qualitative research', *Family practice,* 13(6), pp. 522-525.

McCubbrey, D.J. (2003) 'The IS core-IV: IS research: A third way', *Communications of the Association for Information Systems,* 12(1), pp. 34.

Mehrabian, A. (1981) 'Silent messages: Implicit communication of emotions and attitudes . Belmont, CA: Wadsworth', .

Miller, G.A. (1956) 'The magical number seven, plus or minus two: Some limits on our capacity for processing information.', *Psychological review,* 63(2), pp. 81.

Miller, H. (1996) 'The multiple dimensions of information quality', *Information Systems Management,* 13(2), pp. 79-82.

Mingers, J. (2001) 'Combining IS research methods: towards a pluralist methodology', *Information systems research,* 12(3), pp. 240-259.

Miranda, S.M. and Saunders, C.S. (2003) 'The social construction of meaning: An alternative perspective on information sharing', *Information systems research,* 14(1), pp. 87-106.

Moody, D.L. (2003) 'Using the world wide web to connect research and professional practice: Towards evidence-based practice', *Informing Science,* 6, pp. 31-48.

Moody, D.L. (2000) 'Building links between IS research and professional practice: improving the relevance and impact of IS research', *Proceedings of the twenty first international conference on Information systems.* Association for Information Systems, 351-360.

Myers, M.D. (1997) 'Qualitative research in information systems', *Management Information Systems Quarterly,* 21(2), pp. 241-242.

Myers, M.D. and Newman, M. (2007) 'The qualitative interview in IS research: Examining the craft', *Information and organization,* 17(1), pp. 2-26.

Nelson, R.R., Todd, P.A. and Wixom, B.H. (2005) 'Antecedents of information and system quality: an empirical examination within the context of data warehousing', *Journal of Management Information Systems,* 21(4), pp. 199-235.

References

Oates, B.J. (2011) 'Evidence-based information systems: a decade later.', *ECIS.*

Oates, B.J. (2005) *Researching information systems and computing.* Sage.

Olfman, L. (2001) 'We ARE doing relevant IS research: It's the truth', *Communications of the Association for Information Systems,* 6(1), pp. 19.

Orlikowski, W.J. and Baroudi, J.J. (1991) 'Studying information technology in organizations: Research approaches and assumptions', *Information systems research,* 2(1), pp. 1-28.

O'sullivan, T., Hartley, J., Saunders, D., Montgomery, M. and Fiske, J. (1994) *Key concepts in communication and cultural studies.* Citeseer.

Otto, B. and Österle, H. (2010) 'Relevance through consortium research? findings from an expert interview study', *International Conference on Design Science Research in Information Systems.* Springer, 16-30.

Parker, J. and Van Teijlingen, E. (2012) 'The Research Excellence Framework (REF): Assessing the impact of social work research on society', *Practice,* 24(1), pp. 41-52.

Patton, M.Q. (1990) *Qualitative evaluation and research methods .* SAGE Publications, inc.

Paul, R.J. (2007) 'Changing the challenge: to challenge makes you larger and being challenged makes you small', *European Journal of Information Systems,* 16(4), pp. 299.

Pearson, J.M., Pearson, A. and Shim, J. (2005) 'The Relevancy of Information Systems Research', *Information Resources Management Journal,* 18(3).

Penrose, J.M. (2015) 'Understanding and Using the Relationships Between Business and Professional Communication and Public Relations', *Business and Professional Communication Quarterly,* , pp. 2329490615593370.

Pfeffer, J. (2007) 'A modest proposal: How we might change the process and product of managerial research', *Academy of Management Journal,* 50(6), pp. 1334-1345.

Pike, R. (2000) 'Systems software research is irrelevant', *Talk. CS Colloquium, Columbia University. URL: http://herpolhode. com/rob/utah2000. pdf (visited on 12/09/2010).*

Pipino, L.L., Lee, Y.W. and Wang, R.Y. (2002) 'Data quality assessment', *Communications of the ACM,* 45(4), pp. 211-218.

Procter, R.N., Williams, R. and Stewart, J. (2010) 'If you build it, will they come? How researchers perceive and use Web 2.0', .

Rickenberg, T.A., Koukal, A. and Breitner, M. (2014) 'Building a Better World through Information Systems–An Explorative Survey among Leading IS Researchers', .

Robey, D. and Markus, M.L. (1998) 'Beyond rigor and relevance: producing consumable research about information systems', *Information Resources Management Journal (IRMJ),* 11(1), pp. 7-16.

Rogers, E.M. (1986) *Communication technology.* Simon and Schuster.

Rosemann, M. and Recker, J.C. (2009) 'Rigour versus Relevance Revisited: Evidence from IS Conference Reviewing Practice', Association for Information Systems.

References

Rosemann, M. and Vessey, I. (2008) 'Toward improving the relevance of information systems research to practice: the role of applicability checks', *MIS Quarterly,* , pp. 1-22.

Schwartz-Shea, P. and Yanow, D. (2013) *Interpretive research design: Concepts and processes.* Routledge.

Scott, H.V. (1994) 'A Serious Look at the 4MAT Model.'.

Senn, J. (1998) 'The challenge of relating IS research to practice', *Information Resources Management Journal (IRMJ),* 11(1), pp. 23-28.

Shannon, C. (1948) 'A mathematical theory of communication, bell System technical Journal 27: 379-423 and 623–656', *Mathematical Reviews (MathSciNet): MR10, 133e,* .

Shannon, C.E. and Weaver, W. (1949) 'The mathematical theory of information'.

Steinbach, T.A. and Knight, L.V. (2006) 'The relevance of information systems research: Informing the IS practitioner community; informing ourselves', *Proceedings of the 2006 Informing Science and IT Education Joint Conference.* Citeseer, 287-298.

Straub, D.W., Ang, S. and Evaristo, R. (1994) 'Normative standards for IS research', *ACM SIGMIS Database,* 25(1), pp. 21-34.

Straub, D. and Ang, S. (2011) 'Editor's comments: Rigor and relevance in IS research: Redefining the debate and a call for future research', *MIS quarterly,* 35(1), pp. iii-xi.

Strong, D.M., Lee, Y.W. and Wang, R.Y. (1997) 'Data quality in context', *Communications of the ACM,* 40(5), pp. 103-110.

Tax, N. (2014) 'Analyzing a practitioner perspective on relevance of published empirical research in Requirements Engineering', *arXiv preprint arXiv:1403.1112,* .

Timm, K., Hum, R. and Druckenmiller, M. (2016) 'Using Communication Theory and Strategy to Develop Researcher-Stakeholder Relationships', *Theme (s),* 4.

Tucker, B.P. (2014) 'What the Right Hand is Doing: Academic and Practitioner Perceptions of the Research-Practice Gap in Management Accounting', AAA.

Turner, K.J. (2002) 'Do Information Professionals Use Research Published in LIS Journals?.', .

Utterback, J.M. (1974) 'Innovation in industry and the diffusion of technology', *Science (New York, N.Y.),* 183(4125), pp. 620-626.

Vessey, I. and V Ramesh, R.L. (2002) 'Research in information systems: An empirical study of diversity in the discipline and its journals', *Journal of Management Information Systems,* 19(2), pp. 129-174.

Vogel, D.R., Dickson, G.W. and Lehman, J.A. (1986) 'Persuasion and the role of visual presentation support: The UM/3M study', .

Walsham, G. (2012) 'Are we making a better world with ICTs? Reflections on a future agenda for the IS field', *Journal of Information Technology,* 27(2), pp. 87-93.

Walsham, G. (2006) 'Doing interpretive research', *European journal of information systems,* 15(3), pp. 320-330.

References

Walsham, G. (1995) 'Interpretive case studies in IS research: nature and method', *European Journal of information systems,* 4(2), pp. 74-81.

Walsham, G. (1993) *Interpreting information systems in organizations.* John Wiley & Sons, Inc.

Wangpipatwong, S., Chutimaskul, W. and Papasratorn, B. (2005) 'Factors influencing the adoption of Thai eGovernment websites: information quality and system quality approach', *Proceedings of the Fourth International Conference on eBusiness.* , 19-20.

Watson, H.J. and Huber, M.W. (2000) 'Innovative ways to connect information systems programs to the business community', *Communications of the AIS,* 3(3es), pp. 3.

Watzlawick, P. 'Beavin., J. & Jackson, D.(1967). Pragmatics of human communication', *London: Faber&Faber,* .

Weber, R. (1999) 'The journal review process: A manifesto for change', *Communications of the AIS,* 2(2es), pp. 3.

Westfall, R. (2001) 'Dare to be relevant', *Communications of the Association for Information Systems,* 6(1), pp. 26.

Westfall, R. (1999) 'An IS research relevancy manifesto', *Communications of the AIS,* 2(2es), pp. 5.

Williamson, K. (1999) 'The role of research in professional practice: With reference to the assessment of the information and library needs of older people', *Australasian Public Libraries and Information Services,* 12(4), pp. 145.

Yus, F. (2011) *Cyberpragmatics: Internet-mediated communication in context.* John Benjamins Publishing.

APPENDIX A – ETHICS APPROVAL

This ethics approval was related to Phase 1

School of Information Systems, Computing and Mathematics
David Gilbert, Head of School, Professor of Computing
Martin Shepperd, Head of Information Systems and Computing
Steven Noble, Head of Mathematical Science, Professor of Mathematics

Brunel
UNIVERSITY
L O N D O N

Brunel University, Uxbridge,
Middlesex UB8 3PH, UK
Telephone: +44(0) 1895 274000
Fax: +44(0) 1895 251686
Emails:
Yongmin.Li@brunel.ac.uk
Annette.Payne@brunel.ac.uk
Lampros.Stergioulas@brunel.ac.uk
Zidong.Wang@brunel.ac.uk

Date: 10/01/2014
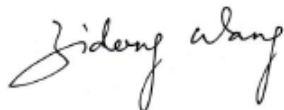
STATEMENT OF ETHICS APPROVAL

Proposer: Faris Alwzinani

Title: Academic knowledge dissemination

The school's research ethics committee has considered the proposal recently submitted by you. Acting under delegated authority, the committee is satisfied that there is no objection on ethical grounds to the proposed study. Approval is given on the understanding that you will adhere to the terms agreed with participants and to inform the committee of any change of plans in relations to the information provided in the application form.

Yours sincerely,

Professor Zidong Wang
Chair of the Research Ethics Committee
SISCM

164

APPENDIX B – ETHICS APPROVAL

This ethics approval was related to Phase 2 and 3

Brunel University London

Brunel University London
Uxbridge UB8 3PH
United Kingdom

www.brunel.ac.uk

06 July 2015

STATEMENT OF ETHICS APPROVAL

Proposer: Faris Alwzinani   Student ID No: 0900141/3

Dear Faris,

Project Title: Dissemination of academic research

Under delegated authority from the College Research Ethics Committee, I have considered the application recently submitted by you. I am satisfied that there is no objection on ethical grounds to the proposed study.

Approval is given on the understanding that you will adhere to the terms agreed with participants and to inform me of any change of plans in relation to the information provided in the application form.

In addition, please provide notification to the College Research Office when the study is complete, if it fails to start or is abandoned.

Yours sincerely,

John Park
College Research Mananger
T +44(0)1895 266057| E john.park@brunel.ac.uk
Brunel University London
College of Engineering, Design and Physical Sciences

APPENDIX C – PARTICIPANTS INFORMATION SHEET

Brunel
UNIVERSITY
L O N D O N

Information Sheet

My name is Faris Alwzinani an international PhD candidate. The project is about the dissemination of academic research beyond the academic community. This topic is important to know whether or not academics are effectively disseminating their research outputs beyond academia. The participants will be asked to answer a list of questions regarding research dissemination and audience beyond academia. In fact, the participants are free to withdraw anytime they want without consequences. The personal details of the participants will be confidential and anonymous.

If you have any concerns or complaints regarding the ethical elements of this project please contact siscm.srec@brunel.ac.uk or Professor Zidong Wang, Tel. No. 01895 266021.

APPENDIX D – CONSENT FORMS

A) This consent form was related to Phases 1 and 3

Consent Form

Please tick as appropriate   **Yes**   **No**

Have you read the Research Participant Information Sheet?   ☐   ☐

Have you had an opportunity to ask questions and   ☐   ☐
discuss this study?

Have you received satisfactory answers to all your questions?   ☐   ☐

Do you understand that you will not be referred to by name in   ☐   ☐
any report concerning the study?

Do you understand that you are free to withdraw   ☐   ☐
From the study at any time and without giving reasons?

Whom have you spoken to?..

Do you agree to take part in this study?   ☐   ☐

Participant's Name......................................
Signature..
Date...

B) This consent form was related to Phase 2

Brunel University London

MODEL PARTICIPANTS CONSENT FORM

	YES	NO
The participant should complete the whole of this sheet him/herself		
Have you read the Research Participant Information Sheet?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Have you received satisfactory answers to all your questions?	☐	☐
Who have you spoken to?		
Do you understand that you will not be referred to by name in any report concerning the study?	☐	☐
Do you understand that you are free to withdraw from the study:		
• Up to 3 months from the date of consent.	☐	☐
• Without having to give a reason for withdrawing?	☐	☐
• (remove if not relevant, adapt if necessary) without affecting your future care?	☐	☐
I agree to my interview being filmed (video clip) and published online for example on YouTube and other online sites.	☐	☐
I agree to the use of non-attributable direct quotes when the study is written up or published.	☐	☐
Do you agree to take part in this study?	☐	☐
Signature of Research Participant:		
Name in capitals: Date:		

APPENDIX E – ACADEMICS INTERVIEW QUESTIONS PHASE 1

Phase 1, Interview Protocol: Academics

Demographic information

- **Position**
A) Lecturer.
B) Senior lecturer.
C) Reader.
D) Professor.
E) Academic researcher

- **How long have you been working in the academic field?**

- **Discipline based on your research publications**

Dissemination information

- **Besides Academics, are there any other groups of people that could benefit from reading your publications?**

- **What are the benefits that could be obtained from disseminating your findings to other audiences than academics? both (academic researcher & audience)**

- **Apart from Journals and Conference Proceedings, do you use any other channel to disseminate your research findings?**

- **Do you use the same format/language than is used in academia?**
Yes. Why?
No. Why?

- **What are the barriers that could stop you from disseminating your findings to other audiences than academics?**

- **Which published paper are you proud of and why?**

- **Have you ever received any emails or calls from people regarding your publications?**

APPENDIX F – EXAMPLE OF ACADEMICS INTERVIEW SCRPIT PHASE 1

- **Faris**

  Besides Academics, are there any other groups of people that could benefit from reading your publications?

- P1

  Yes.

  If you are talking in terms of publications which written in academic journals I do not think general public would ever understand that.

- **Faris**

  I'm not asking whether they understand it or not, I'm asking if they could understand it will they benefit from it.

- P1

  If the papers are written in a way is accessible to general public or there professionals or whoever then there will be benefits for other groups than academics.

- **Faris**

  Who are they? You do not have to name them all

- P1

  Well, let me talk about one piece of research. My colleague and I we did a research on film and television industry and what we looked at was the impact of technology on the way that they work in this industry. We concentrated on the small producers which is in the UK there is a lot of SMEs there independent producers in film and television industry. They are small and quite dependent on the large broadcasters and the large players their industry. We did a study to see, you know bearing in mind that we know that technology has some kind of impact on their work. Because, you in film industry what is happening with technology.

  Basically, from one central point you can control the viewing of a film on many many (semis) that's because of information technology that's never used to happen in the past. However, the industry does not want to actually allow the technology to influence how they do things because it will hurt them in the pocket. So, we were looking at these kinds of issues and we call together set of the stakeholders, we had several meeting with them and we did some interviews. Finally, we came with a report now I have to say in this instance we did not do academic paper as would be the normal root we did a report for the same stakeholders. We called them to meeting to explain this report, now even though we targeted the report for that people they still thought it quite

170

academic. So it was useful to actually explain it to them and we put diagrams sort of showing the new networks ....

It helped us how the audience understood what we were doing. That was a benefit to that group of people even to just bring to light to them here is how you are doing your business and here is how technology has influenced in that way.

I think the type of research that I do, you cannot do information systems without potentially having benefit to group stakeholders and the stakeholders are always involved in your research you don't do anything in the abstract.

- **Faris**

  Apart from the SMEs you mentioned could you name other groups could be your target audience and who going to benefit from your research in all your research you have done?

- **P1**

  Depends on the research so, I've intended to model research on industry sectors so that one (film and television) the stakeholders in that industry will benefit from it. Also managers outsourcing these companies and policy makers will benefit from it. We did a lot of work in china for example so, the policy makers there and the people who create these technology hubs which outsourcing companies work they are interested as well. If you doing something like social media research, it is quite hard to determine who benefits because the community is so big (It could be kids).

- **Faris**

  What are the benefits that could be obtained from disseminating your findings to other audiences than academics? both (academic researcher & audience)

- **P1**

  Well, I think none of us really understand the impact of information or information technology on the way that we work. We just know that there is an impact. The type of research that I do information systems research, that type of research I think it's always help to clarify these problems for people. If their concern with (why is it that when I introduce a system into my organisation it does not work?) you know even to this day of modern technology we have people still do that and ask this question (why is it that when I introduce a system into my organisation it does not work?). I think that affect the smaller organisation more. The more accessible this technology is to them the more likely they are to use it and the prices not too bad they employ it the use it and

then fails. People still do not understand that, some people trust the system then their ID had been stolen so people won't answer these questions. We need to know and understand how they interact with technology and how technology influences their daily daily activates.

I think because of the way that academia has evolved in the last ten twenty years; we are struggling always to meet targets. Frist and foremost, I think in academic is worried about meeting the organisation's' targets. So in our case that will be publications in peer-reviewed journals and for me my immediate concern would be "do piece of research got to get it written up in journal otherwise I'm toast". That is not the best way in my opinion to proceed but the benefit to the academic unfortunately is purely instrumental I think these days. Especially, the low down that lading you up the lecturer and senior lecturer, whatever you trying to progress up with (publications publications). I would suspect that if I was in a more senior position, I mean I think that they got their target as well but I might find other benefits to doing research it just personal gratification and a personal interest in the subject area and an interest in disseminating knowledge and getting their name known and things like that.

- **Faris**

  If you disseminate your work to other audiences rather than academics would you get any benefits?

- **P1**

  I would say yes, because it will broad my network. So I will reach people who are not necessary academic but they quite practice based and they will be able to communicate back to me about things that related to my research but I do not know anything about. So I get new ideas from that kind of interaction and I will see new paths for the research because it is practice based people will come to me and say Dr that is interesting topic dadadada, you know describe something in their life and what's happening which is related to my research then I will see yah I never thought of it. I think in that way that how I would see the benefit that you get wider network people to talk to and communicate with and it could benefit you and your research.

- **Faris**

  Apart from Journals and Conference Proceedings, do you use any other channel to disseminate your findings to the academic community?

- **P1**

  Yes, talks, seminars and presentations at universities

- **Faris**

  Apart from Journals and Conference Proceedings, do you use any other channel to disseminate your findings to groups of people other than academics?

- **P1**

  Yes, reports, the report were for a specific community. Presentations and is not academically presentations but it is more for that audience (specific audience). I'm in LinkedIn but I do not use it as much as I should because I do not have the chance to use it, not even for my students I should use these social media.

- **Faris**

  Do you use the same format/language than is used in academia?

- **P1**

  No.

- **Faris**

  Why?

- **P1**

  The language we used academically is laden with you know um... associations to theories and methodologies where is in academia people will understand that they know where you are coming from um..... People in the general public and industry will be completely lost. You got to adopt much simpler terms and um.... Normal language lets put it that way to communicate with general public.

- **Faris**

  Do you think we as academics still write papers in a way that industries cannot understand?

- **P1**

  I don't think they understand even practitioners and professional who gone through degrees.... It is too specific.

- **Faris**

  What are the barriers that could stop you from disseminating your findings to other audiences than academics?

- **P1**

  Like I said this insistent race for the REF....... you know that narrows you vision to one thing only..... if I don't do this, these publications for the REF I'm toast. So, it means that you concentrate your energies there you know.... And to get a dissemination of your material for the general public as we just mentioned you

173

get to find different channels you get write it in different way you get to invest energy for that. In the end of the day you don't have the energies to do that.

- **Faris**

  Those are not rewarded....

- **P1**

  These wouldn't count precisely

- **Faris**

  In the long term it might count and expanding your networks

- **P1**

  That's a long term vision yeah... in a short term six years ago REF no. if you are working with team of people it might be possible that one of the team members could be focused on media .... The general media and getting your work out but generally we do not work like that... we are toasted as academics to academic outputs and we do not have a media person that we just can turn to and say look I thought this is a nice research can you write it up for me that does not happen... it is all on yourself really.

- **Faris**

  Do you think you reach your audience other than academics?

- **P1**

  Not the much I would like to.

- **Faris**

  Would you like to reach them?

- **P1**

  Yes

- **Faris**

  Do you have any idea how to do so?

- **P1**

  Yeah you need..... perhaps... with the pressure we have, you probably need somebody to help you to do that ..... to disseminate.

- **The initial process of layman vision**

- **P1**

  Intuitively, I prefer the first one, aamm... I will go further than what you have here ok... because I think what could be interesting for the layman to consume is not necessarily paper but something multimedia around that paper,, so for example .. there was a very famous doctor I forgot his name know but he is

pretty famous and he did series user academic as well. So he did a series of programs for BBC ....ammm, bringing to the public all these scientific things about medicine you know,, in a very easily ammm,, an easy way to access it right. Then there was ammm, there have been academically persons who amm,, have managed to do that as well over the ages bring a kind of a I don't know, previously in accessible topic to the screen, they combine it with videos and whatever and in voiceovers and picture from the area that talking about or whatever and that's been of interest to the public.

So that, those persons have gained some.... What you called it ammm,,, some reputation from that. So, I'm thinking that.... I believe that probably be..... if I was a busy industrial person I'm not gonna pick up a paper and read it no matter how accessible he make it you know or magazine or whatever, but I would certainly download something into my iPad or I will look at it in the evening when I get home if it's on a channel like BBC or iTV or something like that. I will look ay it half an hour or a bit. It brings in the multimedia or it is online it brings in the multimedia aspects, it will straight things for me. I think that would be the way to get these messages across especially in my area of research information systems it is directly involved with people, society and business or whatever.

- **Faris**

  Which published paper are you proud of and why?

- **P1**

  Amm, let me think,,, I think I will probably have to say this (), it has a story behind it because I started off with a tiny idea like that ..... Guy was here and Hwi I went to them and I said can I get some money to go to china and do this study it was small idea you know,,, and they did help,, they help me also to get chines students to do the transcriptions and got a little money from Royal academy or something like that. With that little bit of money I went to China and started,,, what happened is over the time it's no (30:45) and I can get more and more money to actually to do this project and we got this really good interaction with a lot of Ummm,,, totally foreign people,, they were completely foreign to us you know,, we got (31:15) from them,, we got greats interaction with the company that we finally stilled on a case study company Ummm,, you know you got feedback from the people that you were interacted with them that what you were doing was valuable to them you know,,,, and then I put was valuable to the academic community.

- Faris

  So you have a paper that you feel you have an impact on your audience and in the same   time were very valuable and recognisable in the academic community?

- P1

  The research itself had an impact on the audience this one is purely academic thou.

APPENDIX G – EMAIL INTERVIEW GUIDANCE FOR ACADEMICS PHASE 2

This email was sent to academics before the video interview to be prepared.

Dear Participant

First of all, I would like to thank you for your valuable contribution in the previous interview.

I am in the experiment phase which requires a short video of an academic researcher talking about his/her research outputs (3 to 5 minutes after editing)

This will not take more than 10-15 minutes, the following questions will be asked during the video interview.

1- Select one of your published papers and please answer the following questions briefly.
- What is the title of your paper article you selected?
- Who is the audience of this paper?
- What story are you trying to tell the reader?
- What will the readers know after reading your story that they did not know before reading the story?
- Why should anyone believe you?
- Why should anyone care about the story being told?
- What is the essence of your paper in one sentence?

Your Sincerely

Faris

APPENDIX H – EXAMPLE OF EXTRACTING AND EDITING VIDEOS
PHASE 2

PA3

- Title

  $00:49 - 00:54 = 00.05$
  (Whole time is = 00.05)

- Who is the audience for this paper?

  $02:20 - 02:55 = 0035$
  Then from $07:28 - 07:30 = 00.02$ and $07:31:02 - 07:33 = 00.02$
  (Whole time is = 00.39)

- What story are you trying to tell the reader?

  $32:51 - 33:20 = 00.29$
  Then from $33:21 - 34:58 = 01.37$
  (Whole time is = 02:06)

- What will the readers know after reading your story that they did not know before reading the story?

  $16:15 - 16:36 = 00.21$
  (Whole time is = 00.21)

- Why should anyone believe you?

  $19:27 - 19:42 = 00.15$ then from $20:20 - 20:58 = 00.38$
  (Whole time is = 00.53)

- Why should anyone care about the story being told?

  $18:39 - 19:02 = 00.21$
  (Whole time is = 00.21)

- What is the essence of your paper in one sentence?

  $30:57 - 31:18 = 00.21$
  (Whole time is = 00.21)

The total video duration is (03:66)

178

APPENDIX I – ACADEMICS INTERVIEW QUESTIONS PHASE 3

Phase 3, Interview Protocol: Academics

Appropriate Amount

- Do you the amount of information provided in the video is neither too much nor too little? Yes/No and why?

Timeliness

- Do you think the information provided in the video is sufficiently current for your work our work? Yes/No and why?

Format

- Do you think the information provided in the video is well formatted? Yes/No why

- Do you think the information provided in the video well laid out? Yes/No why

- Do you think the information provided in the video is clearly presented on the screen? Yes/No why

APPENDIX J – POTENTIAL AUDIENCE INTERVIEW QUESTIONS PHASE 3

Phase 3, Interview Protocol: Potential Audience

First: demographic questions

Age, gender, level of education, occupation, and years of work or job

Second: seeking information

- Do you seek for information from the academic literature?

If Yes Why?

If No, from where do you seek information? How and Why?

Third: evaluation questions

After presenting the appropriate video the below questions are asked

Appropriate Amount

- Do you the amount of information provided in the video is neither too much nor too little? Yes/No and why?

Timeliness

- Do you think the information provided in the video is sufficiently current for your work our work? Yes/No and why?

Format

- Do you think the information provided in the video is well formatted? Yes/No why
- Do you think the information provided in the video well laid out? Yes/No why
- Do you think the information provided in the video is clearly presented on the screen? Yes/No why

APPENDIX K – EXAMPLE OF ACADEMICS INTERVIEW SCRIPT

PHASE 3

- **Faris**

  Appropriate amount, do you think the information provided in the video is neither too much nor too little?

- **AP7**

  Yes, yes, I think it's ? … Mm, that's interesting. I think it's quite right.

- **Faris**

  Why?

- **AP7**

  Because it's, in more or less I think in my case it's like four points, like there were four questions, or five elements, five questions.

- **Faris**

  Yeah, yeah.

- **AP7**

  And they were all the main elements someone wants, might want to know about my research, so

- **Faris**

  So in general?

- **AP7**

  In general, you mix(?), it's not practical …

- **Faris**

  Like any(?) audience for specific for like designers, imagine like in general audiences …

- **AP7**

  I think it's fine because the kinds of questions someone will ask, so yeah.

- **Faris**

  The story?

- **AP7**

  The story, the story.

- **Faris**

  Yeah.

- **AP7**

  It could be a little bit long, I think that can be even cut a little bit short.

- **Faris**

  Shorter, yeah.

- **AP7**

  But the rest is fine, because I think especially as a research … If I'm a researcher and this could be like a video abstract of my research, if I'm a general public, this is more or less like a news report and that is more or less the length. So I think the length is quite right, quite OK …

- **Faris**

  Yeah, so the time length as well is …

181

- **AP7**

  The length, yeah, I said like it's fine, yeah.

- **Faris**

  Yeah. This question I might add it or not I mean like in my analysis.

- **AP7**

  OK.

- **Faris**

  But I always ask it is timelines, do you think the information provided is, in this video is sufficiently current?

- **AP7**

  Oh right, that is very interesting.

- **Faris**

  And why?!

- **AP7**

  Ah ah. So when you see ... current, you mean updates?

- **Faris**

  Updated, yeah, or timely is ...

- **AP7**

  Timely, yeah, yeah, OK, on time. Of course I would say partially yes, why partially because of course the problem is that when you publish your research in a journal, it takes like ... So I started the research, this research, in 2011 and it took almost three years to publish the final paper because of course started the research, you know, doing the evaluation, design the study and then write the paper and then wait for reviews and publish. So now that we're talking about this research, actually in 2015 I'm presenting research results that are actually from 2011 and I'm currently working on, already on something much more updated, but ...

- **Faris**

  Something ... yeah, but this is for the field you are talking about.

- **AP7**

  Yeah.

- **Faris**

  But who will watch it, people are not in the field, general public watch it.

- **AP7**

  OK.

- **Faris**

  Do you think it's going to maybe it's current for them?

- **AP7**

  OK, oh right, so for the audience?

- **Faris**

  So, this is for the audience, more, the questions for the audience, yeah.

- **AP7**

  Yeah, I think it is, I think it is. I don't know if it's my particular topic but I think it is you know because you know this is of general interest really, it's about emergencies.

- **Faris**

  That's good because I just want to see here how the author itself, is he isolated from audience or ...

- **AP7**

  OK.

- **Faris**

  He's with a market or is needed (?) because the journals are different. OK, format, do you think it's well formatted the video?

- **AP7**

  Oh yes, in general yes. I sort of wrote down a couple of notes when I was seeing it.

- **Faris**

  For the jour ... this is I mean like.

- **AP7**

  The format is OK ...

- **Faris**

  Yeah.

- **AP7**

  It's very good actually.

- **Faris**

  Yeah, do you think that the audience, general audience is suitable for them, this ? ...

- **AP7**

  Absolutely because she looks like a news report and we're all used to that. So as I told you at the beginning, I like the parters, the five elements the five questions, and the length, the format is alright, absolutely.

- **Faris**

  Format, do you think it's easy to understand and well formatted?

- **AP7**

  Yeah, I think so. I have a couple of notes but I don't know if this is related to the question. One is, I think that for make it, it's a bit more sort of easier for general public, could be if you have a voice, reading again the question, because for now you visualise the question and then there is an answer. And to me there's a sort of little bit of break between the question and then the answer. So of course when I gave the answer I didn't know this was going to be synchronised ...

- **(laughs)**

- **AP7**

Which is good, it's a good idea.

- **Faris**

  Thank you!

- AP7

  So I think you know reading the question as well, so hearing one voice, like an interview, reading the question and then the rest is exactly as you did, would be a bit more usable for the general public. Especially, because for instance there is a section, one of the questions it's around two minutes and a half, that questions, which I start to say there is a question, and then I stand by this course, my you know topic, saying they, they, they, but the question didn't have any subject. So you listen to this they, they, they, you don't know who is the subject you can get.

- **Faris**

  Who's they, yeah, yeah.

- AP7

  If you have, probably if you have repeated the question in voice, therefore make ... could have make it be peculiar of that interview, but ... I mean to make it a bit more like dialogue, just a little bit more like an interview, but the format is fine, yeah.

- **Faris**

  Yeah, it's good. Author presence. Do you think that if you are, like your face is, if they will see the author is present ...

- AP7

  OK.

- **Faris**

  Do you think it's much better?

- AP7

  Not necessarily, no, I don't think this will change. Of course it would be nice because this give a sort of level of personalisation, you can have two options, one is to have maybe a small window with the author sort of talking ...

- **Faris**

  Ah, big picture

- AP7

  But the big video should be images and audio. But this could be you know a suggestion. Now, I still think that it works much better in that way because it's something the audience is used to, it look, it really looks like a news report and the news report, this is not really an interview, it's more, even if I would like you know the questions to be read, but this is not really an interview, it's someone talking about this work through a pattern ...

- **Faris**

  Well ...

- AP7

  So I don't think the video of the ?? will ? very much.

- **Faris**

  Yeah, I was happy with your way talking as well, you were talking that this one is mainly about blind people.

- **AP7**

  Yeah.

- **Faris**

  I like it, it's good. What do you think is, I'm mentioning this question because we asked about it before, like is it expressed in appropriate language, do you think is appropriate language like most, most like many people can understand the language you use, the English itself?

- **AP7**

  Yeah, I think ... yeah, yes ...

- **Faris**

  No jargons there.

- **AP7**

  Yeah, exactly. The way you ask a question, I don't mean not to be not very specific, there's not much jargon. Although, no, no, because really if I think about my specific word, the word 'ontology' appears only in the title really but then I didn't use it when I was talking. So I think your interview was well designed.

- **Faris**

  OK, any other comments in general what do you think about this work?

- **AP7**

  Yeah, first of all, I think it's very good job, I like it.

- **Faris**

  Thank you.

- **AP7**

  I think we need something like this because absolutely I would like it to, imagine if I could have a sort of, I wouldn't say a web agency but someone offering me this service in the university, that can help me to put together this, imagine how you can communicate to the general public and then finally have an impact. This is something we're really looking for. Science in the end should have an impact on society, it's not for us, it's for others. But suggestion could be, one suggestion could be, again this could be peculiar but since I'm thinking about the general public, this format is particularly good, especially if you think about social networks, you can put it on You Tube, a link on Twitter and easily disseminate it. I think that for ... and this, right, for non-native speakers, like me, of course the best thing is to hear you know the research talking about this research. But if you want to sell(?09.45) between ? product that actually demonstrate the impact that can rise sort of interest, it could be good as well to sort of have more like, the author to generate the script and then a professional actor or someone that is a native speaker reading it, you know what, simply because it looks more professional, a bit more professional. But I like it

as well in this way, because from this way it look more personal, it looks like he's the author talking about his research ...

- **Faris**

  Giving more (?) ...

- AP7

  So I cannot really tell which one is better, but I can tell you that this other option might be considered, it's just like ... I can give you an example, when I normally publish a paper in a journal, you know, very technical, I design my own graphics, my own, you know, you know charts and graphics, and they can give you feedback but you are in charge of that.

- **Faris**

  Mm.

- AP7

  When I publish papers on magazines that are read by many people, like science magazines, like, I don't know ?? Computer and those ones, I write the article and I give them an example of a figure but they will do it, they will have a graphic department, they will do it much better, sometimes completely different from how I would do it, which is much better for a general, in that case it's a general scientific public. So I think, from one point of view it's nice to hear, sorry it's not really bad thing, I like what you did, to hear the researcher, for another point of view we might want to also do sort of communicate in a more professional way ...

- **Faris**

  That's to me like ...

- AP7

  To the general public ...

APPENDIX L – EXAMPLE OF POTENTIAL AUDIENCE INTERVIEW SCRIPT PHASE 3

Faris

What is your occupation?

Prac-3

My official title is application development manager.

Faris

Development manager, Specialisation?

Prac-3

Software development or even if you want to go one step further …

Faris

Yeah.

Prac-3

Dark base or software development should be enough I think.

Faris

Dot … what is …?

Prac-3

Dot Net, it's a technology you use, like Sea Shore, I don't know how much …

Faris

PHP?

Prac-3

Yeah, but a different area…

Faris

So we will start the questions here before we see the videos. Do you seek any information from the academic literature relating to your work?

Prac-3

Like activity or one off?

Faris

Like, I mean like do you seek any information from the academic side, the research side, academic research side that talks about your work?

Prac-3

What we do normally is let's say we face a problem, a new problem that we haven't solved before, we'll go and research, we'll go and find, Google it and Google will come back and say a person has already solved that problem, and that problem, solution could come academia, it can come from another company or like a third party products and we're selling a solution, who will take the cheapest, most efficient solution? And mostly, I would say 90% of the time; it's not going to come from academia.

Faris

Mm.

Prac-3

Because when we start looking into Google and we see research paper and then stuff, we don't read, we look for a solution, a cord or a component or product that we can use straight.

Faris

Oh ...

Prac-3

But that's based on my personal experience.

Faris

Yeah, yeah, so to solve the problem?

Prac-3

Yes.

Faris

And you never come across a research paper?

Prac-3

Yeah, but normally I'm telling you. What will happen, if I'm looking for a solution to a problem or a new thing to do, I will never go and look into Google Scholar, I will look into Google ...

Faris

So what is the difference, where you find there?

Prac-3

Quick solution, actual to the point solution, not a five page paper that has a lot of discussion previously ten guys did this, I did that, and the solution is this, and I propose the solutions, it's not a hard-core solution. What we normally need in industry is something that is proven again and again and someone has tested it and we just use that.

Faris

What is the sector you are working ...?

Prac-3

Software development but it's in investment banking.

Faris

Ah.

Prac-3

So it's a high throughput, high volume trading which means that things we will look for is very optimised solution that can handle a lot of data very easily, very quickly.

Faris

Mm, have you worked ever closely with academia or research, academic research?

Prac-3

Well yes, in my own capacity, where I was studying or working with a project with a supervisor to deliver something.

Faris

But from the company side now, from the like industry side, they never like something you involve in it ...?

Prac-3

No, we have a programme where we get students over for internship, for graduate rotation or industry placement. So they do three months with us, they do one year with us, they do three years with us, so

there are three programmes. And that is part of my ... so my team I have a grad, he's doing a one, a two year rotation, then I have another grad she's doing a three months' internship. So that gives us some insight into what they learn in the university but they're mostly under grads, so they don't have research they will have something that they learn practically.

Faris

So what do you think about the outcomes that comes from the, from the academic side, like students they come to as internship, what do you think that, are they teaching them the same thing you are doing in the industry or there is totally different mind-set?

Prac-3

It's, it depends on the university, it depends on the person who needs help. So we'll see a big variation between someone who knows everything, latest, what's going on in the market, things like that, latest technologies, angular nod, someone we know he's got that talent already there, not maybe because the university has taught him but he was inclined to learn it. But, in some cases universities are doing that as well. And in other cases we'll see someone who is still doing C programme, C Plus Plus in old system that no one use anymore. So you will see a variation of both. What we do is anyone who is coming in, they ... they don't bring with us technology, what they bring with them is motivation to do something. So only reason why we hire them is that they will bring some new perspective. But then technical gap we'll filled.

Faris

So there is a technical gap when they come?

Prac-3

Yes, of course, there will always be a gap ...

Faris

Oh ...

Prac-3

And that gap may not mean that they don't know anything, they will do maybe ... so 100% of the cases when they're going to come in, they will not have the discipline to do a production quality call, which means call that he can use to run a project, they will be close or they will be really far off.

Faris

They're not updated let's say.

Prac-3

Yeah.

Faris

In general, like what is your understanding about academic research?

Prac-3

Ehm ...

Faris

What is your view about the kind of academia when they produce research?

Prac-3

Yeah, the way ...

Faris

In your area.

Prac-3

Yeah, so the way I see it, ehm, not much is happening in terms of the development methods and engineering methods because it sort of stabilised, things that happen there, like the new models coming, how to develop software, like AJA, and the new method, it's … it's a different method of doing software, which we're using, it was/wasn't in industry, it was in academia like fifteen years ago, ten years ago, now we're using our databases. So it took some time to come there. Anything that is happening currently, like big data or any technologies that are still under development, maybe something like Google, Microsoft, they are following it more closely and they're working on it, but in our area, we're not that up to date with it. So things are happening we know, people are working on this but we are not ready to use it, and we will only use it when it's mature.

Faris

So this is from your perspective towards the academia, that's why you feel that they are not really updated with what happening, like Google and …?

No, no but I think they, they are, they are working on something new, but before industry start using it …

Faris

Oh.

Prac-3

They wait or it is a natural/national(?07.34) gap. I give you a very good example of AJAL, yeah, it was, they started discussing late, like late 90s or early 90s and now pretty much everywhere in the industry it's being used, but it took a while. It wasn't like it wasn't good, it was good, but people didn't have experience with it, didn't know how to use it and now they're using it.

Faris

So it was discussed in academia, that's why you …

Prac-3

Yeah, it came, everything came from research, right?

Faris

Yeah, then it takes time to implement it?

Prac-3

It takes, yeah, and everything is like that.

Faris

Yeah.

Prac-3

And when I said companies like Google and Microsoft, they may be a bit quicker to adopt than other companies, that's the only difference.

Faris

Yeah. Do you have any comments?

Prac-3

Any other … (laughs)

Faris

Any other comments, like for the academia, for the research, the relationship between like practitioners and academia, have you seen any, experienced anything there is ...?

Prac-3

I think there is a big gap in terms of when someone goes and do PhD, because when I started mine. Actually I wanted to do my PhD and then my course coordinator said, you are being stupid because a) you have a full-time job, b) you have two kids, I don't think you can do that, yeah? So, and I said, OK yeah, that makes sense. And when I started, I realised that I would never be able to do PhD with the time required for PhD. But at that time I was looking into ... If I start doing research into one area, there are not many opportunities where I can go and say, you know what, I am really interested in big data, yeah, I'm always interested in big data. There was no relationship from, with big data to a company who wanted to sponsor research into that. So what option I had, the money that my university had was in fire and safety, so if I wanted to do PhD, I would have to do fire and safety because they already had funding. So a lot of these things are driven by funding and people are naturally inclining to do it because there is no other option.

Faris

Section 2: OK, about the amount of the information, what do you think about the amount of information, is it enough for your needs?

Prac-3

It's enough to get me started but what I was expecting from when you showed me the title was I would have something by the end of it to go and apply in my job. What she mentioned was absolutely correct and I'm, ideally you need it and we would love to have that, but where is that, I have to go and find the information that the video doesn't include.

Faris

OK, so the information you need is not there?

Prac-3

It's not complete. So it's like, there's a problem statement that the paper written has done something to solve your problem, how is not there. And in the industry we always look for how.

Faris

The understandability, is it easy to understand?

Yeah, it was ... so OK, when you can say that that ... that the part now you only have is only how is missing from this, then that part, yeah, of course.

Faris

What about the language used?

Prac-3

Yeah, whatever it was presenting in the middle that was clear.

Faris

It's clear, OK. Is it related to your work ...

Prac-3

Yes, very ...

Faris

… to what you are doing?

Prac-3

Very relevant

Faris

Very relevant for … why is very relevant?

Prac-3

Because as Tracy mentioned, I think Tracy is the person in that video, when the … when the problem happens in a live environment, in an environment used by your users, in our case we have a fifty year old user/odd views, maybe hundred will view that in case of a big bug you need an ATM machine and that create millions of users. So at that time, the loss is a bit too much. If we found that issue, let's say before we put it into production environment, we will face it, yeah? And if we can fix it, then we would have prevented that loss that happened. No one likes to … I don't want someone to call me three am in the morning, wake me up, ooh something has happened, it happened a few days ago, it happened a few months ago as well, so …

Faris

It happens now …?

Prac-3

Yeah, yeah, like a system, some of our system fails(?11.44) on a daily basis.

Faris

So is it, I mean like is this information on time came to you, is it up, like current?

Prac-3

It's ehm, a bit late but it's, I already knew about this, the research is going on with this, where all these models haven't been proven anywhere. There is enough data, there is enough cord out there, like open source, so people have this cord. They haven't been able to say, you know what, I created a model, I predicted this bug a month advance it happening, no one has done that, it's all theoretical, which may or may not be … I'm not saying it's not correct, it may or may not be correct, we haven't seen that, and if we haven't seen that, no one will put that in use in industry.

Faris

OK, that's good. So about the format, what do you think, is it easy to follow, is it formatted very well?

Prac-3

It was a bit jumpy and a bit short, when I say jumpy means that it didn't have any structure in terms of say, this is the problem currently industry is facing, everyone is facing, so it was there but it wasn't right at the beginning. Then this is what we are proposing, this is the solution, this is how you do it. So I think the whole video was about we've in a paper, we've done analysis, there are no numbers, there are no facts, it's all, maybe it's in the paper but in the video it wasn't there.

Faris

Yeah.

Prac-3

So if someone shows me I've done research of two million lines of cord of Linex Colonel and I predicted this bug, yeah, because you can go back in time and you can take a previous cut of the cord and you can say, you know that bug happened, my model predicts that, and I haven't seen anyone doing that, which means the models are not working or maybe not directly.

Faris

OK, what do you think is missing as you said in the beginning I think you mentioned something in the beginning that's missing in this video?

Prac-3

Evidence

Faris

Evidence

Prac-3

Practical, real evidence …

Faris

Applications?

Prac-3

Yeah.

Faris

So what do you think that the applications take time to show you how they apply it?

Prac-3

If they have a model that's working, then everything is there available for someone to go and apply that model and show some numbers, when I say numbers, I mean facts.

Faris

Evidence, yeah… even if it's three minutes to follow/find(?) …

Prac-3

Yeah, you can take a lot of source(?) cord(?) is open, where you can go, find it and you can say, based on my analysis, I don't know how they're going to do.

Faris

Final question, if you find this on-line, You Tube let's say, you are looking for a solution, you've found this one as it is, nothing is added, as you saw it, what is the second step you will do?

Prac-3

I'll go and look into that paper because the video doesn't give me more, so/sorry it's incomplete, maybe that is the target of the video, but from the video if I … I'm intrigued what kind of model is it, so I'll go and look for that paper. Now if that paper, I find, after reading the paper, if I find my solution, perfect but I, based on my experience, I know I will not find a solution, I will find a lot of theory.

Faris

OK.

Prac-3

And that means I will be disappointed.

193

Faris

So it means the application, let's say …

Prac-3

Yeah.

Faris

The applicable site is missing …

Prac-3

Yeah.

Faris

Even in the paper from your experience as well. Do you have anything to add?

Prac-3

No, I think I will just go back to the same point, I think ? the work that, for example, Tracy has done and you have done maybe, I saw your name there … So if that prediction is already there, I think what currently we are doing in research is we're leaving it to say maybe 80, 90% done and that last 10% application we're leaving it to industry. Coming back to my point, where we don't have industry to support it, where you can actually build something to prove it, show evidence, and then apply it somehow, that part I think is missing, and if we can close that gap … In some cases it's there, yeah, like car manufacturers, jet engines and …

Faris

Yeah.

Prac-3

They do research, it's funded by someone and then ??(16.15) …

Faris

Yeah, Jaguar or … yeah.

Prac-3

Yeah, so it comes out as a product. A lot of research happening in software engineering, to data is mostly theoretic.

Faris

So if, if the video, as you said, the problem, the proposed model and application itself, what you will do, you're going to contact or see the paper or tell the people or what you …?

Prac-3

Yeah I will, so currently we're not looking for that model …

Faris

Yeah.

Prac-3

But let's say if I was, then maybe I will probably do it now as well is I'm intrigued by the idea and I knew there was work going on, I don't know what's the latest in that.

Faris

Mm.

Prac-3

I don't know if someone had a breakthrough and created some really good model that does that, and if I can apply it, fine, then why not? Why wouldn't we apply like this?

…………, thank you so much for your time, it's really, really helpful and … (END OF RECORDING)

APPENDIX M – THE BACKGROUND OF PHASE TWO QUESTIONS

Academic Research and Practice: Different Values for Different Purposes (source: Senn, 1998)

ACADEMIC RESEARCH	PRACTICE
Focus on long-term value of knowledge	Focus on short-term application of knowledge
Building cumulative tradition	Solving current problems
Emphasis on research process	Emphasis on best practices
Rigor overshadows relevance	Relevance overshadows rigor
Value broad representative sample	Value situational cases
Journals serve as principal means of gaining and sharing knowledge	Trade publications, white papers, and personal communications serve as principal means of gaining and sharing knowledge
Publications incorporate citations of prior work in field	Publications focus on situations, experiences, and results
Lengthy publication channel	Short publication channel

The questions were based on Paul's 2007 questions that reflect the values of academic research and practice in the Table above. Also, some questions were developed based on the Table itself (See the Table below).

Academic Research and Practice	Paul's Questions and based on the Table itself
1) Focus on short-term application of knowledge.	What story are you trying to tell the reader? (Paul, 2007). The academics were asked to present the benefits of their research paper after being applied in real-life.
2) Solving current problems.	What will the readers know after reading your story that they did not know before reading the story? (Paul, 2007).
3) Emphasis on best practices.	This value was not asked as this study was focused on disseminating and communicating research finding beyond academia.
4) Relevance overshadows rigor.	The academics were asked if their research paper was relevant to practitioners.
5) Value situational cases.	Why should anyone care about the story being told? (Paul, 2007). The academics were asked to present the benefits of their research paper for a particular situation.
6) Trade publications, white papers, and personal communication serve as principal means of gaining and sharing knowledge.	This value was not asked as this study was focused on disseminating and communicating research finding beyond academia.
7) Publications focus on situations, experiences, and results.	Why should anyone believe you? (Paul, 2007). The academics were asked to present the value of their results.
8) Short publication channel.	This value was not asked as this study was focused on disseminating and communicating research finding beyond academia.