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The cautious faculty: their awareness and attitudes towards institutional repositories

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ABSTRACT

This paper reports on a web-based survey carried out on academics of a research intensive university in Malaysia, investigating their use of open access repositories, advocacy undertaken, and reasons for contribution or non-contribution to Institutional Repositories (IRs). The outcome of this study is to provide an institutional repository (IR) that will preserve and disseminate digital materials created by, or associated with the university. Specifically, the objectives of the study are to investigate (a) the issues in establishing a facility to provide open access to research materials, and (b) the potential of an IR and the requirements of a good digital repository in allowing faculties to contribute resources to the institutional repository. Using a mixture of closed and open questions, the survey explored the faculty's awareness, experiences and opinions of open access publishing, and the university's IR. Responses were received from 131 academics from 14 faculties, institutes and centres at the university. Science-based faculty members were overwhelmingly in favour of permitting the deposit of research work. More than 60% of the respondents mentioned allowing the deposit of theses and dissertations. Findings indicated that, as users, the academics wanted to find many more types of material in the repository and as authors, they were willing to deposit. Complete theses, post-prints and conference papers were acceptable to be deposited in the IR. Respondents' support of open access principle and altruism in making their scholarly work publicly accessible were the most important motivators for the academics depositing their work, closely followed by the prospect of an increase in the accessibility of their work. The greatest deterrents were the ownership of copyrights and plagiarism. Other reasons that might impede self-archiving were the pre-print culture, publishers' policy, trust of readers and preservation. Findings indicated that faculty who planned to contribute to the IR in the future agreed with of the concept of open access and had a greater altruism in making their work publicly accessible. It was also found that a mandate from an institutional employer or a research funder to self-archive would meet with very little resentment and less resistance from the respondents. Based on the findings of the literature review and the survey, appropriate recommendations were made for the university's repository.

Keywords: Institutional repositories, Open access publishing, Scholarly communication; Faculty contribution; Malaysia

INTRODUCTION

Institutional Repositories (IRs) are now becoming a component of the technical infrastructure in research intensive institutions and a favoured option for providing open

access to research output. Foster and Gibbons (2005) define an institutional repository as “an electronic system that captures, preserves and provides access to the digital work products of a community”. Crow (2002) and Ware (2004) characterise the following features of a IR: (a) It is institutionally defined and it captures only the intellectual property of the host institution such as purely scholarly work, or administrative, teaching and research materials, both published an unpublished; It is open an interoperable and the primary goal is to disseminate the institution’s intellectual output; (c) It is cumulative and perpetual and this carries with it a long term obligation on the host institution to preserve IR content; and (d) It contributes to the process of scholarly communication in collecting, storing and disseminating the scholarly content. As such authors and researchers can deposit materials in IRs, subject to copyright, with the host institution providing the infrastructure for these materials to be properly organized, archived and disseminated.

This infrastructure has emerged since 2002 when major research universities in the U.S.A (such as MIT and Cornell University, using *DSpace*), and the U.K. (Southampton and Oxford University using *E-print*) launched their own IR systems. Over the past 4 years, an increasing number of research universities has implemented or plans to implement an IR (Markey et al. 2007). Lynch and Lippincott (2005) found that out that in the USA, of 97 universities categorized as "doctoral universities", 40% already operated IRs. Among non-implementers, 88% were found to be in the planning stage of IR implementation. A survey in 2005 was undertaken at universities in ten European countries – Belgium, France, the United Kingdom, Denmark, Norway, Sweden, Finland, Germany, Italy and the Netherlands (van Westrienen and Lynch 2007). It was found that the number of IRs varies from as low as 1.5% of universities in Finland to as high as 100% in Germany, Norway and the Netherlands, with the focus on acquisition of content almost exclusively on collecting faculty publications. By mid 2006, all Australian universities had established IRs, for the purpose of giving researchers a vehicle to enhance the availability of their publications by making them available via open access (Henty 2007).

A few research universities in Malaysia have established, or are partway to establishing IR services with the aim to enhance the visibility and the impact of the research generated within that university. The development of the IR services is related to the open access movement in Malaysia, which seeks to make valued research outputs openly available by encouraging academics to place their publications into repositories, enhancing their availability and visibility to the global academic community and increase the chances for use and exchange of ideas among scholars within similar disciplines (Abrizah et al 2007). At the same time, university research increasingly involves the use, generation, manipulation, sharing and analysis of digital resources. However, not every institutional repository adopts the principle of open access and it is possible for the institution to restrict the access to its member (www.opendoar.org). The University of Technology Malaysia (UTM) and the National University (UKM) for example allows access to some theses, dissertations and programme to members of the institution only. This characteristic fits Clifford Lynch’s framework of institutional repositories - ‘a set of service that a university offer to the members of its community for the management and dissemination of digital materials created by the institution and its community members’ (Lynch 2003).

In research universities, IRs are predicated on contributions by their stakeholders which include both academic and non-academic staff; those involved in teaching and research; and both postgraduate and undergraduate students. Each of these groups contains potential authors and readers of the materials in IR, and the contributions of authors, are critical to the success of an IR. As such whether or not IRs become a part of the intellectual infrastructure depends on the extent of the university's community contribution. Shearer (2003) argues that the success of an IR should be determined by its use, and one of the measures of usefulness is contribution of content. Faculties are typically best at making a major contribution to an IR, by creating, not preserving, new knowledge, because they are becoming so involved in producing scholarly works and participating in the evolving scholarly communication process. As IRs are flourishing to preserve scholarly output and to make it openly accessible, more and more faculty members are in favour to provide open access to the universities' research output, maintained either institutionally or on a subject basis. Faculty contribution is considered one of the success factors for an IR even though several studies have found low rates of faculty submission (Chan 2004; Foster and Gibbons 2005; Pelizzari 2005; Davis and Connolly 2007). These studies found that the challenges for an IR are not in the technical implementation but in affecting the culture changes necessary for it to become an integral part of activities of the research institution. Cultural rather than technological factors limit the use and development of IRs. Literature suggests that ingrained behaviours, inertia, indifference and resistance to change hamper the adoption of the working practices needed to support the IR (Ware 2004).

This research is concerned with the activities and attitudes of an IR stakeholder – the academicians – with respect to open access publishing in IRs. There are some research studies which are close to this goal. In order to understand the requirements to provide an IR that will preserve and disseminate research materials created by or associated with a research intensive university, the present study began with an extensive search for information concerning faculty's attitudes towards open access publishing and institutional repositories. It was apparent from this review that there has been research which focused on the needs and potential contribution of faculty in this area.

REVIEW OF LITERATURE

There have been several previous studies that looked at academic's attitudes to open access, and their willingness to contribute to repositories. In as early as 2001, a survey of scholars randomly chosen from nine scientific disciplines from colleges and universities in the United States and Canada was conducted to determine faculty participation in depositing materials into digital repositories (Lawal 2002). Physics and astronomers reported the highest participation, followed by mathematicians and computer scientists, engineers, cognitive scientists and psychologists, and biological scientists. Lawal (2002) found that those who reported participation cited the dissemination of research results, visibility, and the author's exposure as reasons for depositing their work. Reasons for non-participation included publisher policies, relevance to their field, and technological constraints. In contrast, Pellizari's (2003) survey on 62 social science faculties indicated

that all respondents were aware of open access materials and more than half declared that they already had open access materials freely available on the web. Pelizzari's report implies positive acceptance of open access principles among academic staff of the social science discipline. The most acceptable uses for author's work were free version of the materials, followed by the possibility to print, save and copy. The majority refuse the possibility by other people to modify the deposited materials.

Rowlands, Nicholas and Huntingdon (2004) found a low level of preference among author-researchers communities to deposit their work in IRs. They found that the level of awareness on the alternative business model of open access publishing and copyright issues was alarmingly low among the research community. A total of 15 % respondents (researchers) in Rowlands, Nicholas and Huntingdon (2004) survey said they had not and had no further intentions to depositing their work in an institutional repository, which showed a significant level of reservations about quality and preservation in an increasing digital information landscape.

Another large U.S. survey of authors by Rowlands and Nicholas (2005) also demonstrated a general low level of knowledge and motivation to use institutional repositories. Van Westrienen and Lynch's (2005) European survey also reported low faculty participation in IRs. Their article identified several reasons for non-participation from faculty, including: (a) Difficulties informing faculty and convincing them to participate; (b) Confusion and uncertainty about intellectual property issues; (c) Scholarly credit and how the material in IRs would be used; (d) The perception of Open Access content being of low quality, and (e) A lack of mandatory policies for depositing manuscripts. Correspondingly, Swan and Brown (2005) who investigated author self-archiving behavior found that there was a substantial proportion of authors unaware of the possibility of providing open access to their work. Only 30% of the 1296 respondents using specialized OAI search engines to navigate the open access repository and only 10 % of authors knew of the SHERPA/RoMEO list of publishers' permissions policy with respect to self-archiving. More people opted for putting their work on a website than have used institutional or subject-based repository. However a vast majority of authors would willingly comply with a mandate from their employer or research funder to deposit copies of their articles in an institutional or subject-based repository. Swan and Brown (2005) found that authors' reluctance to self-archiving their work were due to the perceived time required and technical difficulties in carrying out the activity.

Foster and Gibbons (2005) interviewed 25 professors in order to investigate the factors affecting contribution. They suggested that the primary impetus for faculty contribution is to enable other scholars to find, use, and cite their work. Foster and Gibbons also identified reasons why faculty did not submit their content, such as copyright infringement worries and disciplinary work practices (e.g., co-authoring or versioning). The faculty members perceived that IR contribution involved additional work, such as metadata creation for contributed objects.

Davis and Connolly (2007) reported that Cornell's IR is largely underpopulated and underused by its faculty as the Cornell faculty have little knowledge of and little motivation to use the repository. Many faculty use alternatives to IRs, such as their personal Web pages and disciplinary repositories. Among the many reasons given for

not using the IR are: redundancy with other modes of disseminating information, confusion with copyright, fear of plagiarism, associating one's work with inconsistent quality, and concerns about whether posting a manuscript constitutes "publishing". Those collections that experience steady growth are collections in which the university has made an administrative investment, such are requiring deposits of theses and dissertations into the IR

A few researchers applied Social Exchange Theory to IRs where it is assumed that faculty may consider cost (Gadd, Oppenheim and Probets 2003; Foster and Gibbons 2005) and benefit factors (Kling and Spector 2003; Cronin 2005; Kankanhalli, Tan and Wei 2005; Swan and Brown 2005) implicitly in terms of IR contribution. In addition to cost and benefit factors, Nahapiet and Ghoshal (1998), in Kim (2007), suggested that 3 other factors - trust, identification, and pro-sharing norms - influence the motivation to exchange knowledge. Kankanhalli, Tan and Wei (2005) used these factors as contextual factors affecting the contribution to knowledge repositories. Trust indicates belief in good intent and competence of other actors, such as a university and users. Identification indicates faculty members' concerns with collective outcomes, membership and loyalty toward universities. The IR literature uses the term "pre-print culture" instead of "pro-sharing norms", in which researchers distribute drafts of research articles before they have been peer reviewed to colleagues around the world, as a factor (Kim 2007).

Based on this assumption, Kim (2007) investigated the factors that motivate or impede faculty contribution to IR where he suggested the extrinsic and intrinsic benefits relating to IR contribution. Extrinsic benefits include accessibility, publicity and trustworthiness of documents in IRs, professional recognition, institutional recognition, and academic reward. Intrinsic benefits concern altruistic intention of and self-interest in the IR contribution. Cost factors relate to copyright concerns and additional time and effort required to make the IR contribution. Kim who opined that trust and identification are considered important factors in the IR context, also incorporated contextual factors. The survey conducted on a sample of 67 professors whose materials were deposited in the IR of a major research university in USA revealed that that benefit factors were more influential than cost or contextual factors.

OBJECTIVES

The objectives of the study are to investigate (a) the issues in establishing a facility to provide open access to research materials such as level of knowledge, motivation, participation, partnership, ownership and management, and (b) the potential of an IR and the requirements of a good digital repository in allowing faculties to cooperatively develop and upload the resources to the institutional repository. Specific research questions posed are:

a) Are faculty aware about institutional repositories?;
b) What does faculty think about making their intellectual output available through an Institutional Repository?

c) How does faculty make their research/teaching materials publicly accessible on the Internet?
d) Why does faculty contribute their research/teaching materials to Institutional Repositories?
e) Why are faculty members reluctant to contribute to institutional repositories?

METHODOLOGY

An e-mail invitation to participate in the survey was sent out internally to all academics (around 800 of them) within the university, which has deployed a DSpace (www.dspace.org) IR in 2008. This is termed the randomly-selected population. The e-mail, which contained a hypertext link, enables the participants to link to the survey database hosted by SurveyPro (www.surveypro.com). The survey instrument consisted of 6 sections: (a) awareness and knowledge of IR as well as current IR contribution; (b) usefulness and importance of IR; (c) self-archiving experience; (d) future IR contribution; (e) reasons and concerns for contribution; and (f) demographic. If surveyed faculty members indicate that they have awareness of the IR, plan to contribute to the IR in the future, and do other self-archiving practices, they are administered every section of the questionnaire. Otherwise, they will skip one or more sections depending on their awareness and experience of self-archiving.

After three rounds of distribution, responses were received from 178 academics. The total number of usable, fully completed questionnaires was 131, from 17 faculties, institutes and centres at the university (Table 1), and the response rate is fairly typical of online surveys (Gravetter and Forzano 2008). By faculties, the respondent pattern is presented in Table 2. The sample is dominated from academics from the science-based faculties, which is a predictable response, given the Faculty of Science alone accounts for about 26.7% of responses. By academic position, the respondent pattern is presented in Table 3. From the 131 respondents, total of 63.4% (83) respondents reported that their discipline typically "always" uses technology, 22.1% (29) indicated "very frequently", 11.5% (15) somewhat frequently, 2.3% (3) rarely and one respondent indicated "not at all". A total of 23.7% (31) respondents reported "very comfortable" using technology, 69.4% (91) indicated comfortable, and 6.9% (9) reported neutral / uncertain. None of the respondents indicated either uncomfortable or very uncomfortable using technology.

Table 1: Survey Response Rate

Total sample	about 800
Clicked on survey link	178
Did not complete	47
Non-completion rate	26%
Completed survey	131
Response rate (approx)	16%

Table 2: Respondents by Faculties (n=131)

Faculty / Institute / Academy / Center	% of respondents	Number of respondents
Arts and Social Sciences	2.3	3
Business and Accountancy	5.3	7
Computer Science & Information Technology	17.5	23
Dentistry	3.1	4
Economics & Administration	3.8	5
Education	4.6	6
Engineering	8.4	11
Languages and Linguistics	3.8	5
Law	0.0	0
Medicine	11.5	15
Science	26.7	35
Built Environment	3.8	5
Islamic Studies	3.1	4
Malay Studies	1.5	2
Foundation Studies in Science	2.3	3
Cultural Centre	0.8	1
Sports Centre	1.5	2
Number of Respondents		131

Table 3: Respondents by Academic Position (n=131)

Academic Position	% of respondents	No of respondents
Professor	16.8	22
Associate Professor	18.3	24
Senior Lecturer	21.4	28
Lecturer	39.7	52
Other academic staff	3.8	5
Number of Respondents		131

FINDINGS

a) IR Awareness, its Importance and Faculty Contribution

Respondents were first asked if they have ever made any of their own work publicly available (for example in a journal, on a website or in departmental publication), either at the university or elsewhere. A total of 55.7% (73) indicated Yes, and 44.3% (58) reported No. Examples of work made publicly available are such as conference papers, journal articles, lecture notes and presentation slides and these are published at the conference and journal hosting websites, as well as the faculties' websites. Two respondents indicated that they even make their work available at social networking sites. Out of 131 respondents, 69.5% (91) academics know what open access meant and

were aware of any digital repositories and IR. Those who knew about the IR learned about it in various ways, namely from (a) working in a field with established subject based archives (93.4%, 85); (b) following the debate on open access (79.1%, 72); (c) results of a web search engine (59.3%, 54); (d) publicity on the university library web site (30.8%, 28); from fellow postgraduate students (23.1%, 21); (e) information provided at faculty or department meeting (19.8%, 18); and (f) from other academic staff (17.6%, 16). Those publishing in molecular biology, physics, mathematics, library science and computer science and were the most likely to have published their work via an open access repository, as reflected from the open-ended responses, which listed Genbank, EMBL, MiRbase, arxiv.org, and E-LIS as the avenues for archiving.

Although nearly 70% of the respondents said they knew what was meant by open access repositories, their understanding varied considerably. Responses ranged from "anyone can access electronically without having to pay subscription" to "a facility that can be accessed and utilised by anybody without restrictions", and from "free, immediate online full text access of journal articles" to "creative works and research output that can be freely accessible online which scholars and researchers give to public without expectation of payment". Most had grasped the idea that OA work was available to everyone, and most understood that it was free of cost to the user.

However, only 35.9% (47) of the total respondents were aware that the university is initiating a project to investigate the feasibility of an IR. This result indicates that although more than half of the respondents have published their materials online, only a small number knew about this initiative. In spite of the low awareness of the IR, 39 (29.8%) out of 131 respondents strongly like the idea of making their intellectual output available through the university's IR. These science-based faculty members (such as Medicine [6 out of 15 people], Engineering [9 out of 11 people], Science [17 out of 35 people] and Computer Sciences [7 out of 23 people]) were overwhelmingly in favour of permitting the deposit of their research work through the university's IR. Interestingly, 7 out of the 39 who were motivated to contribute to the IR had no awareness of the IR, but wanted to make IR contributions in the future. Another 85 (64.9%) like the idea, and out of this figure, 53.4% had no awareness of the IR. Thus, among those respondents who liked the idea and intended to contribute to the IR, 15 were already aware of the IR and 70 were not. Of the remaining respondents, only one person (0.8%) dislike the idea and had no plans to contribute in the future and 6 (4.6%) were undecided.

The survey also solicits opinion on the usefulness and importance of an IR to the university. The five Likert-scale questions, therefore, were answered by those 91 respondents who were aware of any digital repositories and IR. The majority of those who were aware felt that an IR would be very useful for the university, and that it is critically important that the university implements an IR. In general, faculty unanimously felt that it is important for (a) the members of the university to retain those intellectual property rights needed to make their intellectual output available through an IR; and (b) the members of the university (UM) consistently make their intellectual output available through an IR. However, not everyone felt that it is important that the university considers works placed in an IR when evaluating faculty for tenure. Table 4 presents these findings.

Table 4: Usefulness and Importance of Making the Intellectual Output available through an Institutional Repository (n=91)

	Not at all useful	Slightly useful	Somewhat useful	Very useful	Indispensably useful
How useful would an Institutional Repository be for UM?	0 (0%)	0 (0%)	4 (4.4%)	63 (69.2%)	24 (26.4%)
	Not at all important	Slightly important	Somewhat important	Very important	Critically important
How important is it that UM implements an Institutional Repository?	0 (0%)	0 (0%)	1 (1.1%)	28 (30.8%)	62 (68.1%)
How important is it that members of the university (UM) retain those intellectual property rights needed to make their intellectual output (papers, data, etc.) available through an Institutional Repository?	0 (0%)	0 (0%)	5 (5.5%)	72 (79.1%)	14 (15.4%)
How important is it that members of the university (UM) consistently make their intellectual output available through an Institutional Repository?	0 (0%)	0 (0%)	4 (4.4%)	76 (83.5%)	11 (12.1%)
How important is it that the university considers works placed in an Institutional Repository when evaluating faculty for tenure?	2 (2.2%)	7 (7.7%)	26 (28.6%)	56 (61.5%)	0 (0%)

b) Self-archiving Experience

The study is also concerned with respondents' self-archiving experience. As indicated earlier, 73 (55.7%) respondents had deposited their research/teaching materials on publicly accessible web sites as well as other open access digital repositories. All these self-archiving respondents know what open access meant, 47 (64.4%) were aware of the university's IR and the majority (65, 89.0%) planned to contribute to it. Therefore, most respondents had some IR awareness, and a majority of those who planned to contribute, already had experience with self-archiving. Findings suggest that senior lecturers were more likely to say yes to self-archiving: 75.0% (21) of them said yes compared to 45.5% (10) of Professors, 45.8% (11) of Associate Professors and 59.6% (31) of lecturers.

Out of the 73 respondents who had self-archiving experience, 3 (4.1%) had self-archived their work for more than 5 years, 9 (12.3%) had done so for 3-5 years and an additional 14 (18.2%) had 1-3 years experience. The majority (47, 64.4) had deposited their work in publicly accessible web sites for the past one year. When asked about the frequency of contribution to IRs in an open-ended question, one respondent reported the frequency of contribution to the web site of his faculty saying, "I have been contributing through my faculty's web site for years." Nine respondents who were aware of the university's IR, planned to contribute in the future, and already had self-archiving experience in other open access venues such as arxiv.org, E-LIS and MyAIS (myais.fsktm.um.edu.my), the open access system for Malaysian scholarly publications. One professor indicated depositing various versions of his scholarly articles to a particular open access repository "whenever the papers have been submitted for review and have been revised".

In the survey, data regarding what types of work that faculty would like to use for self-archiving and which file formats would they generally use and therefore would like to deposit were ascertained. As producers of information, faculty would like to deposit refereed and published articles in the form of research reports and conference papers, as well as co-authored works (Table 5). Conference presentations were also found to be the most frequently self-archived materials. Complete or parts of theses were acceptable to be deposited in the IR. Respondents would also like to make departmental papers and book chapters publicly accessible. However, respondents were less likely to self-archive pre-refereed articles than they were to self-archive refereed, published articles. Other types of research/teaching materials some would like to deposit are unrefereed articles (technical reports or working papers) and data sets. This result indicates that there are various types of resources that respondents would employ for self-archiving; they may not only deposit published articles, but also other types of research work.

Table 5: Types of self-archived materials that Faculty would like to deposit and find (n=73)

Materials	**Would like to deposit** Percentage (Frequency)	**Materials**	**Would wish to find** Percentage (Frequency)
Thesis (complete)	61.6% (45)	Theses (complete)	64.4% (47)
Thesis (part) – Literature review	63.0% (46)	Theses (part)	61.6% (45)
Thesis (part) – Methodology	60.3% (44)	Research reports	94.5% (69)
Thesis (part) – Results	61.6% (45)	Preprints (research article before peer review)	30.1% (22)
Thesis (part) – Discussion	63.0% (46)	Postprints (peer-reviewed research paper)	98.6% (72)
Thesis (part) – Data sets	24.7% (18)	Conference papers	100% (73)
Research report	98.6 (72)	Presentations	69.9% (51)
Co-authored work	97.3% (71)	Departmental papers (e.g. seminar papers)	80.8% (59)
Preprint (research article before peer review)	20.5% (15)	Technical reports	80.8% (59)
Postprint (peer-reviewed research paper)	30.1% (22)	Working papers	64.4% (47)
Conference paper	98.6 (72)	Discussion papers	80.8% (59)
Presentation	61.6% (45)	Teaching materials	53.4% (39)
Departmental paper (e.g seminar paper)	63.0% (46)	Data sets	15.1% (11)
Book	60.3& (44)	Software	26.0% (19)
Dataset	21.9 (16)	Books	63.0% (46)
Others:	-	Others: Training manuals	38.4% (28)
		Others: Video files	38.4% (28)
		Others: Sound files	37.0% (27)

In addition, Table 5 also presents the resources that faculty would wish to find in an IR. In sum, the respondents who had self-archiving experience would most likely use post-prints, conference papers and presentations, as well as seminar and technical papers more frequently than theses and pre-prints. In addition to research articles, the respondents also would wish to find teaching materials and resources such as software, video and sound files, training manual, book chapters and data sets.

Faculty were also asked which file formats they generally used and therefore might wish to deposit. Fourteen file types were offered (Pickton 2005), as was the chance to specify any other file type. The faculties' responses are presented in Table 6. PDF format is the most commonly used. It is most likely that all respondents believed that an appropriately formatted PDF file was the most suitable format. Perhaps this stemmed from faculties' concern of others altering their work. Other popular formats are document type (64.4%, 47; rich text format and postcript/latex (63.0%, 46 responses respectively), and presentations (61.6%, 45).

Table 6: File formats to be deposited in the University's IR (n=73)

File Formats	Percentage (Frequency)
HTML	43% (13)
XML	4.1% (3)
PDF	100% (73)
Word processed document (e.g. MS Word)	64.4% (47)
Rich text format (.RTF)	63.0% (46)
Desktop publishing or typesetting (Postscript, LaTeX)	63.0% (46)
Technical drawings	30.3% (23)
Image (.gif, .jpg, .tif etc.)	39.7%(29)
ASCII	17.8% (13)
Presentation (e.g. MS Powerpoint)	61.6% (45)
Spreadsheet (e.g. MS Excel)	35.6% (26)
Database (e.g. MS Access)	21.9% (16)
Sound (.wav, .mp3, .aiff)	38.4% (28)
Video (mpeg, DVI, Quicktime)	37.0% (27)

Replicating Pickton's (2005) question on responsibility for task involved in depositing work in an IR, respondents were presented with a list of ten tasks and they were asked to indicate whether each task should be the author's responsibility or of the repository administrators. The results are shown in Table 7. The figures show a clear consensus over some of the tasks. The respondents unanimously agreed that it was their responsibility to provide an abstract of their work, and most (94.5%, 69) felt that they should also be responsible for taking the decision to delete work. The other tasks for which faculty largely felt responsible were providing key words (72.6%, 53) and entering

appropriate descriptive information (69.9%, 51). Perhaps, the remaining respondents were concerned over the standardisation of bibliographic information or metadata and felt that the repository administrator might be in a better position to achieve this. A total of 69 respondents (94.5%) said that the repository administrators should be responsible for migrating files ('converting files to the latest version of hardware or software'); 43 (58.9%) agreed that the administrators should confirm intellectual property rights and actually put the work onto the repository (57, 78.1%); 56 (76.7%) said they should be responsible for deleting material. The findings seem to suggest that the faculty generally felt that the 'back end' tasks should be the responsibility of the administrators.

Table 7: Responsibility for tasks involved in depositing work in the IR (n=73)

	The Author Percentage (Frequency)	Repository Administrators Percentage (Frequency)
Converting source material to appropriate format for deposit	32.9% (24)	67.1% (49)
Providing key words	72.6% (53)	27.4% (20)
Providing an abstract (or descriptive summary of content)	100% (73)	0% (0)
Providing web links to associated material (e.g. referenced articles, data sets etc)	28.8% (21)	71.2% (52)
Putting the work onto the repository	21.9% (16)	78.1% (57)
Entering appropriate descriptive information (author, title, date, key words, abstract)	69.9% (51)	30.1% (22)
Confirming intellectual property rights	41.1% (30)	58.9% (43)
Converting files to the latest version of software after the work has been deposited	5.5% (4)	94.5% (69)
Decision to delete work	94.5% (69)	5.5% (4)
Deleting work	23.3% (17)	76.7% (56)

c) Faculty's Reasons for Contribution to IRs

Faculty deposits contents in IR for a variety of reasons. The 65 respondents motivated to contribute to the IR in the future responded to the 32 statements adapted from Pickton (2005) regarding reasons that influence their decision about whether to self-archive. The statements were sorted and coded, and ordering was undertaken for these statements offering two options agree and disagree. Appendix 1 presents the statements reflecting the reasons why the academics would want to self-archive.

Using Kim's (2007) model of factors on IR contributions, the 32 items are categorized into 3 main factors, namely benefit, contextual and cost factors. Out of the 32 items, 14 items are considered to be benefit factors regarding (a) advocacy (b) accessibility and publicity of their research work, (c) professional recognition, (d) positive impact of self-archiving, and (e) altruistic intention. Ten items were contextual factors, including (a) pre-print culture; (b) influence of other actors - co-authors; (c) grant-awarding body; and (d) university or department actions - upon respondents' decisions to make, or not to make their materials publicly accessible. Eight items are considered as cost factors

including (a) concerns about preservation of self-archived materials; (b) publishers' policies prohibiting self-archiving; and (c) additional time and effort required to perform self-archiving.

Overall, more respondents that had self-archived their materials tended to agree with the benefit factors. Findings indicate that all faculty respondents were involved as open access advocates (Statement 1). Respondents' altruism in making their materials publicly accessible was likely to be a motivator for contribution to the IR as all believed in the importance of freely accessible scholarship for their research community or their university (Statement 6) and 93.8% agreed that self-archiving would enable them to share material with their research collaborators (Statement 7). Furthermore, it was found that accessibility was one of the most important reasons for IR contribution (Statement 3, 4 and 5) – faculty might be motivated to contribute to the IR by the prospect of an increase in the accessibility of their materials and an enhanced opportunity to make them accessible to students and peers. In addition, professional recognition – establishing ownership (Statement 13) and retaining intellectual property rights (Statement 14), which are agreed by 89.2% and 80% respondents respectively – would be positively related with IR contribution. Positive impact of self-archiving (Statement 8, 9, 10, 11 and 12) is also an important reason, although its rating was not as high as advocacy, altruistic intention and accessibility.

Contextual factors do not provide an incentive for future contribution among many respondents. The majority disagree that they would deposit their work because of university or department's action (Statements 18, 19 and 20). However, a high majority agree that they would do so if they are encouraged by their research funders (Statement 21, 87.7%) and co-authors (Statement 22, 70.8%). The existence of pre-print culture was the only contextual factor that shows more or less similar weightage between those who agree and disagree to deposit. The group which disagrees might not have pre-print culture in their disciplines. This finding suggested that the existence of pre-print culture might be positively related to the decision to self-archive.

It was found that that preservation was the most important cost factor for IR contribution (Statements 25, 26 and 27). A total of 73.8% respondents agree that they would contribute to the IR if they are provided with additional support to do so in the forms of training, online instruction and advice (Statements 29, 30 and 31). The majority of the respondents were more likely to perceive publishers as prohibiting self-archiving since only 27.7% agreed to self-deposit because they felt that publishers would not have exclusive rights over their work. Monetary incentive was considered least important reasons for IR contribution (Statement 32).

d) Faculty's Concerns about Self-archiving

What make faculty reluctant to contribute to IRs? In order to investigate this research question, the same 65 respondents motivated to contribute to the IR in the future had to respond to the 28 statements regarding their concerns about self-archiving. The same procedure of selection and sorting, coding and ordering was undertaken for these statements offering two options agree and disagree. Appendix 2 presents the statements reflecting the reasons why the academics would not want to self-archive.

Overall, many faculty members disagreed with the statements presented as "deterrents of self-archiving" (Pickton 2005). The top three deterrents for more than 70% respondents include: "I am concerned about other publishers owning the copyright of previously published material" (75.4%), "I am concerned about plagiarism" and "I am concerned that others might copy my work without my permission" (73.8% respectively). As such, concerns about copyrights and plagiarism might impede self-archiving.

In addition, more than half of the respondents disagreed with the following statements reflecting pre-print culture, publishers' policy, trust of readers and preservation as the reasons for not contributing to IR:

a) I do not want to put my work with work that has not been peer-reviewed (55.4%; 36)
b) I might want to change or delete my work (66.2%; 43)
c) I am concerned that if I deposit my work in the University's Repository I may not be able to publish it elsewhere later (55.4%; 36)
d) I am concerned about the effect of open access repositories on journal publishers (67.7%; 44)
e) I am concerned that others might alter my work without my permission (67.7%; 44)
f) I am concerned about the long term feasibility of the repository (66.2%; 43)
g) I am concerned that my work might not be preserved in the long term (63.1%; 41)

This result suggests that the respondents might be more concerned or skeptical about the quality and secure maintenance of open access materials. As such, IRs might have to emphasize their function of facilitating the pre-print culture and of long-term preservation and explain how these would be accomplished.

e) Decision to Self-archive

How would the 131 faculty respondents respond to a requirement from the university or research funder to make their work open access by self-archiving in the university's IR? A total of 52.7% (69) respondents would comply willingly, 47.3% (62) would comply reluctantly. None would not comply. The finding clearly indicated that a mandate from an institutional employer or a research funder to self-archive would meet with very little resentment and even less resistance from the respondents.The results corroborate with the earlier finding that shows the influence of research funders as one of the reasons for IR contribution.

Although this study did not determine the university's or grant funders' attitude toward self-archiving, the lack of motivation for IR contribution might be led by grant funders that showed no interest in or ignorance of self-archiving. Since 43.5% (57) of the overall respondents acknowledged grant awarding body as a contextual factor for IR contribution, this result seemed to indicate that grant funders' influence would contribute to having faculty with strong belief in positive outcomes from self-archiving. This result also suggested that those with no intention or was uncertain about future IR contribution tended to perceive more influence of grant-awarding bodies on their

decision to self-archive. This study supports those by Kim (2007) and Swan and Brown (2005) who opined that if grant funders encourage self-archiving, authors or researchers would consider depositing their work into IRs. If not, they would have lack of motivation to contribute to the IR.

DISCUSSION AND CONCLUSION

The study, based on a small set of survey data, has presented findings on faculty awareness and their use of open access repositories, the advocacy undertaken, and reasons that may influence faculty's motivation for IR contribution, which will lead to the actual deposit into the IR. Findings suggest that over one third of the faculty respondents are unaware of open access and IR, or are aware of its existence but remain detached from it. However, faculty's' attitudes to the open access movement and IRs are generally positive – the majority acknowledge the importance of an IR and like the idea of making their intellectual output available through the university's IR. Faculty who have had experience in self-archiving want open access at both ends of the chain: as authors and as readers

The study also looks at various factors influencing faculty contribution to IRs. Overall, the findings showed that benefit factors were more influential than cost or contextual factors. Faculty members who planned to contribute to the IR in the future agreed with some of the benefit factors resulting from self-archiving. Overall, faculty motivated to contribute to the IR appreciated the positive outcomes of self-archiving, especially growing accessibility and publicity of their research work, and displayed altruism. Other benefit factors are related to publicity and accessibility which included an increase in the chance to communicate research findings to peers, potential impact of research work, and larger readership.

The concerns relating to IR among the faculties reflect to some degree the way in which repositories have developed in Malaysia, where for the most part IRs have been introduced for the worthy purpose of giving researchers a vehicle to enhance the availability of their publications by making them available via open access. The commonly expressed concerns regarding self-archiving are copyright and plagiarism. Considerable work has been done on copyright in association with the use of repositories to enhance the open access for research outputs, especially published articles. Faculties need to be informed that over 90% of journals explicitly permit authors to self-archive their articles (Swan and Brown 2005), in most cases as postprints (after peer review, in the form of the author's final submitted manuscript). Promotion and the advocacy of the IR need to be undertaken to highlight the motivations for using the IR and reassure faculty who may be worried about the deterrents. As such, to facilitate faculty to make an informed decision to deposit their work, the university's IR would provide FAQs covering the following areas: ownership of copyright, protection of rights using Creative Commons license, plagiarism and file security. The IR would also need to provide a link to the SHERPA/RoMEO list of journals' publishers' self-archiving policies (http://romeo.eprints.org).

The success of open access archiving in expanding access to scholarly works depends significantly on the author's knowledge of open access, and the ready availability and accessibility of archives to authors. As Papin-Ramcharan and Dawe (2006) plainly put it "If authors are unaware of the existence and benefits of archives then they cannot self–archive." The faculties in this study are poorly-informed on institutional repositories. Almost two-third does not know if their institution has one. This low level of awareness may results from one current strategy used by the university library to populate its repository in which librarians collect and deposit materials on behalf of faculty members. The deposited items are generally post-prints, such as conference papers and journal articles. Therefore, faculty members may not realize that their materials are already in the library's repository. The other reason is that the IR of the university has just been deployed and has not been widely publicized.

All faculty respondents in this survey would comply with the university or research funder that required them to deposit copies of their scholarly work in the university's repository.
As institutional repositories exist to serve the institution and funding bodies, rather than the individual, several institutions around the world have implemented such a mandate as recorded in the Registry of Open Access Repository Material Archiving Policies (ROARMAP). An institutional mandate might be successful in producing Open Access for the research intensive university in this study. There have been evidences demonstrating that institutions that have a mandatory policy have high proportion of published articles self-archived (Sale 2006), compared to those that have only voluntary policies (Suber 2006).

Based on methodical IR development informed by best practices in the Open Access community, as well as findings from this study, have been used for repository design customizations and functionality enhancements that complement the needs, interests and concerns of the faculty. The IR development has been aimed at achieving near-term goals for building content and services in close consultation with faculty. The testbed is a collection of theses, dissertations, and articles by the Faculty of Computer Science & Information Technology community. Preliminary findings has shown that an IR, is an extremely worthwhile endeavour, and is a viable proposition for the University's support for a new pattern for scholarly communication, apart from surfacing its scholarly works and low cost interoperability among various faculties' web portals. It is hoped that this IR will increase the accessibility of scholarly works, which exist in digital format and make the university's contributions to world literature more visible. However, as evidenced by other studies (Davis and Conollay 2007) and verified again by this initiative, faculty output is not finding its way into the university's IR in large numbers (see http://dspace.fsktm.um.edu.my). The prevalence of peer-reviewed work nationwide and the well-documented difficulty of recruiting works of any type are not currently facilitating significant inroads in the open access movement. However, at this stage, the success of the institution in implementing an IR, as gauged by the criteria in this study, should provide hope to later entrants into the community and should influence the way we evaluate the potential of these repositories in Malaysia.

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REFERENCES

Abrizah, A., Kiran, K., Edzan, N.N. and Zainab, A.N. 2007. Making Malaysian research available through publishing in Open Access E-journals and E-prints. Paper presented at the *Persidangan Kebangsaan Ilmiah* MAPIM 2007, Johor Baharu, Johore, 9-11 Januari 2007. 15p.

Chan, L. 2004. Supporting and enhancing scholarship in the digital age: the role of open-access institutional repositories. *Canadian Journal of Communication*, Vol. 29: 277-300.

Cronin, B. 2005. *The hand of science: academic writing and its rewards*. Oxford, UK: Scarecrow Press, Inc.

Crow, R. 2002. *The case for institutional repositories: A SPARC position paper*. Available at: http://www.arl.org/sparc/IR/ir.html

Davis, P.M. and Conollay, M.J.L. 2007. Institutional repositories: evaluating the non-use of Cornell University's installation of DSpace. *D-Lib Magazine*, Vol. 13, no.3/4. Available at: http://www.dlib.org/dlib/march07/davis/03davis.html

Foster, N. F., and Gibbons, S. 2005. Understanding faculty to improve content recruitment for institutional repositories. *D-Lib Magazine*, Vol. 11, no. 1. Available at: http://www.dlib.org/dlib/january05/foster/01foster.html

Gadd, E., Oppenheim, C., and Probets, S. 2003. RoMEO studies 1: the impact of copyright ownership on academic author self-archiving. *Journal of Documentation*, Vol. 59, no. 3: 243-277.

Gravetter, F. J. and Forzano, Lori-Ann B. 2008**.** *Research Methods for the Behavioral Sciences.* Gardners Books

Henty, M. 2007. Ten major issues in providing a repository service in Australian universities. *D-Lib Magazine*, Vol. 13, no 5/6. Available at: http://www.dlib.org/dlib/may07/henty/05henty.html

Kankanhalli, A., Tan, B. C. Y., and Wei, K.-K. 2005. Contributing knowledge to electronic knowledge repositories: an empirical investigation. *MIS Quarterly*, Vol. 29, no.1: 113-143.

Kling, R., and Spector, L. 2003. Rewards for scholarly communication. In D. L. Andersen (Ed.), *Digital scholarship in the tenure, promotion, and review process.* Armonk, NY: M.E. Sharpe, Inc

Lawal, I. 2002. Scholarly Communication: The Use and Non-Use of E-Print Archives for the Dissemination of Scientific Information. *Issues in Science and Technology Librarianship*, Vol. 36. Available at: http://www.istl.org/02-fall/article3.html.

Lynch, C. A. 2003. Institutional repositories: essential infrastructure for scholarship in the digital age. *ARL Bimonthly Report*, 226: 1-7. Available at: http://www.arl.org/newsltr/226/ir.html

Lynch, C. A., and Lippincott, J. K. 2005. Institutional repository deployment in the United States as of early 2005. *D-Lib Magazine*, Vol.11, no. 9. Available at: http://www.dlib.org/ dlib/september05/lynch/09lynch.html

Markey, K., Rieh, S., St.Jean, B., Kim, J. and Yakel, E. 2007. Census of Institutional Repositories in the United States: MIRACLE Project Research Findings. *CLIR Publication* No.140, 167 p. Available at: http://www.clir.org/pubs/abstract/ pub140abst.htm

Papin-Ramcharan, J.I. and Dawe, R.A. 2006. Open access publishing: A developing country view. *First Monday,* Vol. 11, no. 6. Available at: http://firstmonday.org/issues/ issue11_6/papin/index.html

Pelizzari, E. 2005. Harvesting for disseminating: open archives and the role of academic libraries. *The Acquisitions Librarian*, Vol. 33/34: 35-51.

Pickton, M. J. 2005. *Research students and the Loughborough institutional repository.* Master of Science dissertation, Loughborough University. 104p.

Rowlands, I., Nicholas, D., and Huntington, P. 2004. Scholarly communication in the digital environment: what do authors want? *Learned publishing*, Vol. 17: 261-273.

Rowlands, I., and Nicholas, D. 2005. *New journal publishing models: an international survey of senior researchers*. Vol. 75. Available at: http://www.ucl.ac.uk/ciber/ ciber_2005_survey_final.pdf

Sale, A. 2006. The acquisition of open access research articles. *First Monday,* Vol. 11, no. 9. Available at: http://firstmonday.org/issues/issue11_10/sale/index.html

Shearer, M. K. 2003. Institutional repositories: towards the identification of critical success factors. *The Canadian Journal of Information and Library Science*, Vol. 27, no. 3: 89-108.

Suber P. 2006. SPARC open access newsletter, Issue #10. Ten lessons from the funding agency open access policies. Available at: http://www.earlham.edu/~peters/fos/ newsletter/ 08-02-06.htm#lessons

Swan, A., and Brown, S. 2005. Open access self-archiving: an author study. Cornwall, UK.: Key Perspectives Limited. Available at: http://www.jisc.ac.uk/uploaded_documents/ Open%20Access%20Self%20Archiving-an%20author%20study.pdf

Van Westrienen, G. and Lynch, C.A. 2005. Academic Institutional Repositories: Deployment Status in 13 Nations as of Mid 2005 *D-Lib Magazine*, Vol. 11. Available at: <doi:10.1045/september2005-westrienen>.

Ware, M. 2004. Institutional repository and scholarly publishing. *Learned publishing*, Vol. 17: 115-12

Appendix 1

Reasons for IR contribution (n=65)

Category	Factor		I would deposit my work in the IR…….	Agree Percentage (Frequency)	Disagree Percentage (Frequency)
BENEFIT FACTOR	Advocacy	1.	Because I support the principle of open access	100% (65)	0% (0)
		2.	Because I wish to be involved with innovative technology	78.5 % (51)	21.5% (14)
	Accessibility	3	Because I would like to be able to make my work available to myself from anywhere	93.8% (61)	6.2%(4)
		4	Because I would like to be able to make my work available to other students	90.8% (59)	9.2%(6)
		5	Because I would like to be able to make my work available to others in the university	84.6% (55)	15.4%(10)
	Altruistic intention	6	I believe it is a good way of disseminating my work to the research community and beyond	100% (65)	0% (0)
		7	Because I would like to be able to share material with my research collaborators	93.8% (61)	6.2%(4)
	Positive impact of self-archiving	8	Because it would be helpful for gathering information about my work for career purposes	75.4% (49)	24.6%(16)
		9	Because I would like to take advantage of added services such as download counts and cross-searching	73.8% (48)	26.2%(17)
		10	Because I like the idea of being able to publish supplementary material such as data sets, video clips or sound files	70.8%(46)	29.2%(19)
		11	If I was informed of the benefits of doing so	70.8% (46)	29.2%(19)
		12	Because it would be helpful for collecting and organizing my work	60% (39)	40%(26)
	Professional recognition	13	Because it might help me establish priority or prove ownership of my ideas	89.2% (58)	10.8%(7)
		14	So I could retain the intellectual property rights for my work	80% (52)	20%(13)
CONTEXTUAL FACTOR	Pre-print culture	15	Because I would like to get feedback or commentary from others	60%(39)	40%(26)
		16	Because it would enable me to publish my work very quickly	50.8% (33)	49.2%(32)
		17	Because I would use it as practice for getting published elsewhere	47.7% (31)	52.3%(34)
	University or department action	18	If I was encouraged to do so by the library	46.2% (30)	53.8%(35)
		19	If I was encouraged to do so by my department	20% (13)	80%(52)
		20	If I was encouraged to do so by my supervisor (for faculty on study)	16.9% (11)	83.1%(54)
	Grant awarding body	21	If I was encouraged to do so by my research funders	87.7% (57)	12.3%(8)
	Influence of other actors	22	If I was encouraged to do so by my co-authors	70.8% (46)	29.2%(19)
		23	If I was following the example of many others	52.3% (34)	47.7%(31)
		24	If I was encouraged to do so by my fellow students	27.7% (18)	72.3%(47)
COST FACTOR	Preservation	25	Because I like the idea of my work being permanently available	92.3% (60)	7.7%(5)
		26	Because I would like to maintain multiple versions of my work	81.5% (53)	18.5% (12)
		27	Because I would like someone else to take responsibility for preserving my work	76.9% (50)	23.1%15)
	Publishers' policies prohibiting self-archiving	28	Because publishers would not have exclusive rights over my work	27.7% (18)	72.3%(47)
	Support (Additional time & effort)	29	If I was given training on how to do so	73.8% (48)	26.2%(17)
		30	If I was provided with step by step instructions online	73.8% (48)	26.2%(17)
		31	It there was a nominated UM Repository representative in my department that I could go for advice	73.8% (48)	26.2%(17)
	Monetary incentive	32	If I was paid to do so	9.2% (6)	90.8% (59)

Appendix 2

Reasons for not contributing to IR (n=65)

		I would be unhappy about depositing my work in the IR because……	**Agree** Percentage (Frequency)	**Disagree** Percentage (Frequency)
Publicity	1	I perceive that few people would see my work there	9.2% (6)	90.8 % (59)
	2	I perceive that the readership of the repository would be too broad and not targeted to my field of work	27.7% (18)	72.3% (47)
	3	I am concerned about the 'newness' and initially small scale of the repository	49.2% (32)	50.8% (33)
	4	I would prefer to deposit it in another repository (such as a subject repository)	32.3% (21)	67.7% (44)
	5	I perceive that the repository would have low prestige	9.2% (6)	90.8% (59)
Pre-print culture	6	I do not want to put my work with work that has not been peer-reviewed	55.4%(36)	44.6% (29)
	7	I would not want my work to be subject to a quality control process	9.2%(6)	90.8% (59)
	8	I would not want my work to be deposited with work from other disciplines	9.2%(6)	90.8%(59)
	9	I am concerned that the content of the repository is too ephemeral	29.2%(16)	70.8%(46)
	10	I might want to change or delete my work	66.2%(43)	33.8%(22)
	11	My work is confidential	27.7% (18)	72.3% (47)
Accessibility	12	I would prefer to make my work available only on my personal website	4.6% (3)	95.4%(62)
	13	I would prefer to make my work available only on my departmental website	7.7% (5)	92.3%(60)
Publisher's policy	14	I am concerned about other publishers owning the copyright of previously published material	75.4% (49)	24.6%(16)
	15	I am concerned that if I deposit my work in the University's Repository I may not be able to publish it elsewhere later	55.4%(36)	44.6%(29)
	16	I am concerned about the effect of open access repositories on journal publishers	67.7% (44)	32.3% (21)
Trust of readers	17	I am concerned that others might copy my work without my permission	73.8%(48)	26.2%(17)
	18	I am concerned that others might alter my work without my permission	67.7%(44)	32.3%(21)
	19	I am concerned about plagiarism	73.8%(48)	26.2%(17)
Additional time and effort	20	I am afraid it might take too much time	47.7%(31)	52.3%(34)
	21	I am concerned that my images and graphics will require too much storage capacity and download time	46.2%(30)	53.8%(35)
Technological skills	22	I am concerned about that I do not have the necessary technical skills	16.9%(11)	83.1%(54)
Preservation	23	I am concerned about the long term feasibility of the repository	66.2% (43)	33.8%(22)
	24	I am concerned that my work might not be preserved in the long term	63.1%(41)	36.9%(24)
Advocacy	25	I am concerned about the effect of open access repositories on Learned Societies and Associations	49.2%(32)	50.8%(33)
University or department action	26	I am concerned that the University might expect me to pay to do it	35.4%(23)	64.6%(42)
	27	I am concerned that the University might do something with my work without my permission	20%(13)	80%(52)
	28	I am concerned about what would happen to my work if I moved to another institution	24.6%(16)	75.4%(49)